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

BA: 03 PROGRAM ELEMENT: 0603640M
PROGRAM ELEMENT TITLE: USMC Advanced Technology Demonstration (ATD)

COST: (Dollars in Thousands)

Project Number & Title	FY 2003 Actual	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate
C2297 CMC Warfighting Lab-Core	43,493	41,345	36,431	37,492	35,594	36,727	37,503
C9154 MC Anti-Terrorist/Force Protection (AT/FP) ATDs	4,206	15,023	0	0	0	0	0
R2223 Marine Corps ATD	16,144	18,475	21,791	23,014	23,799	24,537	25,043
R2362 Extended Littoral Battlespace	856	0	0	0	0	0	0
R2995 California Central Coast Research Partnership (C3RP)	2,931	3,857	0	0	0	0	0
R9167 Man-Portable Quadrople Resonance Landmine Detection	0	3,500	0	0	0	0	0
R9290 Expeditionary Water Purification Technology	5,977	5,537	0	0	0	0	0
R9333 CENTER OF EXCELLENCE FOR ROBOTICS, ADV TECH DEMO	0	1,384	0	0	0	0	0
R9334 RAPID REPAIR, PORTABLE PRODUCTION (R2P2)	0	989	0	0	0	0	0
Totals	73,607	90,110	58,222	60,506	59,393	61,264	62,546

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, Firepower, and Mine Countermeasures (MCM). 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. This PE also provides Extended the Littoral Battlespace efforts in the area of command, control, communications, computers, and intelligence (C4I), and fires and targeting. Efforts focus on connectivity between MAGTF and Fleet organizations and naval sea-based fire support. 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 Military Operations in Urban Terrain (MOUT), in Operations Other than War (OOTW), 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 to Objective Maneuver (STOM) and Persistent 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.

PROGRAM CHANGE SUMMARY:

	FY 2003	FY 2004	FY 2005
FY 2004-2005 President's Budget Submission	74,970	56,404	58,446
Cong. Rescissions/Adjustments/Undist.Reductions	0	-757	0
Congressional Actions	0	34,474	0
Execution Adjustments	28	0	0
Inflation Savings	0	0	-188
Rate Adjustments	0	-11	-36
SBIR Assessment	-1,391	0	0
FY 2005 President's Budget Submission	73,607	90,110	58,222

PROGRAM CHANGE SUMMARY EXPLANATION:

Technical: C2297, Marine Corps Warfighting Laboratory (MCWL): FY 2003 controls contain an increase of $1.799M for the Spike program, a very small, low cost, man-packable, fire and forget guided missile and launcher system. Funding was used to prepare hardware/software for programmed missile test firings.

Also, since the FY 2004/2005 President's Budget submission, MCWL has reorganized reporting categories to better group/display like efforts and become more in line with the overarching Experimental Campaign Plan (ECP). In addition, experimentation goals for the Sea Viking 2004 (SV04) Advanced Warfighting Experiment (AWE) have been revised, as explained in the two following paragraphs.

MCWL's Sea Viking campaign is designed to transform the 1997 Ship to Objective Maneuver (STOM) concept into an operational reality. The first phase of this campaign, SV04, was initially focused at the Marine Expeditionary Unit (MEU) level. In May 2003 the Commandant of the Marine Corps refocused SV04 to a Marine Expeditionary Brigade (MEB) conducting Operational Maneuver from the Sea (OMFTS). Then late in 2003, the First Marine Expeditionary Force (I MEF) was assigned the mission of returning to Iraq as part of Operation Iraqi Freedom II (OIF II). The scope of I MEF's deployment precludes West Coast experimentation in 2004. However, MCWL's development of experimental technologies that enable today's commander to develop future operating concepts led to an intersection of current requirements and future capabilities. As a result, SV04 experimentation will now occur in theater with deployed I MEF forces. Experimentation will focus on tactical-level "on the move/over the horizon" (OTM/OTH) communications with the embedded position location indication (PLI) required to build a common tactical picture. These are key capabilities required to execute seabased OMFTS and STOM operations and the lessons learned will support follow-on experimentation in SV06.

Schedule: C2297, Marine Corps Warfighting Laboratory (MCWL): Due to OIF campaigns, I MEF elements anticipated experimentation availability for SV04 has become tenuous. Efforts are underway to reschedule and adjust events leading up to SV04 AWE to accommodate troop availability.

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

BA: 03 PROGRAM ELEMENT: 0603640M PROGRAM ELEMENT TITLE: USMC Advanced Technology Demonstration (ATD)
PROJECT NUMBER: C2297 PROJECT TITLE: CMC Warfighting Lab-Core

COST: (Dollars in Thousands)

Project Number & Title	FY 2003 Actual	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate
C2297 CMC Warfighting Lab-Core	43,493	41,345	36,431	37,492	35,594	36,727	37,503

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Marine Corps Warfighting Laboratory (MCWL) is the centerpiece experimental test bed for the operational enhancements of the Marine Corps. Using the Special Purpose Marine Air-Ground Task Force (Experimental) (SPMAGTF(X)), augmented by other Marine units, as its "test bed" organization, MCWL demonstrates the usefulness and necessity of integrating advanced concepts and new technological developments into the Operational Forces of the Marine Corps. Performing in the joint, as well as Marine Corps service arena, MCWL focuses on developing, assessing, and field evaluation of future operational and technological concepts and serves as the focal point for the enhancement/refinement of future warfighting capabilities.

Real-time exercises held in existing environments being used to simulate campaign theater (wartime) experiences "live experimentation" permits exploration of prototype and surrogate technologies in order to better refine equipment requirements and to identify Doctrine, Organization, Training, Material, Leadership, Personnel, and Facilities (DOTMLPF) initiatives needed to produce future 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. MCWL experimentation encompasses inquiries into multiple warfighting areas, including: Command, Control, Communications, and Computers (C4); Intelligence, Surveillance, and Reconnaissance (ISR); Fires, Targeting, and Maneuver; Seabasing, Logistics, Combat Service Support (CSS), and Combat in Cities; and Warfighting Excellence.

Using operational forces, MCWL conducts Advanced Warfighting Experiments (AWEs) supported by Limited Objective Experiments (LOEs), Limited Technology 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 AWEs are constructed. Detailed descriptions are provided below:

- An AWE is defined as a larger scale operational experiment where advanced warfighting capabilities and enabling technologies are evaluated to determine the military utility, operational effectiveness and operational suitability in as realistic an environment as possible (e.g. Sea Viking 2004 (SV04)).
- LOEs are smaller in scope than AWEs and focus on a discrete set of closely related experiment objectives. LOEs are designed to answer questions that, if left unanswered, would have a significant adverse impact on the successful execution of experimental operations in the related AWE.
- LTAs are oriented on the performance characteristics of specific tactics, techniques, technologies, and procedures (TTTPs) to assess their usefulness by means of analysis or experimentation. MCWL conducts LTAs in cases where the performance characteristics of developing TTTPs are insufficiently documented to conduct operational planning necessary for experimentation.
- A Wargame is a broad discipline manifested in a range of activities from a few individuals conducting Action-Reaction-Counteraction drills to a significant commitment from Operating Forces, Headquarters, Marine Corps (HQMC), and Marine Corps Combat Development Command (MCCDC) Staffs, JFCOM, and other services to execute a Command Post Exercise (CPX) that may also be supported by M&S. A Wargame is integral to MCWL's experimental process and ideally precedes the execution of LOEs and the AWE in order to refine the Experimentation Plan.
- A Study is a low-cost (relative to operational experimentation) technique designed to result in broader or deeper research into an experimental issue. MCWL undertakes a study when a literature search reveals that existing studies are inadequate to support experiment objectives and synthesis is required and is focused on one or a few closely related experiment issues.

Under the guidance of the Experimental Campaign Plan (ECP) (formerly known as the Five Year Experimentation Plan (FYEP)), MCWL's prior accomplishments and current plans include AWE "build-up" phases culminating in actual AWE execution:

- Millennium Challenge 2002 (MC02): (FY 2001 through FY 2002) Congressionally mandated, Secretary of Defense directed, United States JFCOM sponsored joint field experiment. (MCWL participation referred to as "Millennium Dragon"). MC02 was a large-scale, live, virtual, and constructive joint field experiment and demonstration, incorporating elements of all the Services and Special Operations Command (SOCOM) critical future warfighting capabilities and forces at the operational level of war.
- Sea Viking 2004 (SV04)(formerly known as Olympic Dragon): (FY 2002 through calendar year (CY) 2004) SV04 is a series of related events that constitute the overall Marine Corps Service Experimentation campaign through 2004. Its goals and objectives are based on the Commandant of the Marine Corps' guidance. While the Commanding General of the MCWL will exercise overall control over the experiment, its initial phases (experiment definition) will rely heavily on "external" support and input (HQMC, Operating Forces, Expeditionary Force Development Center (EFDC), Navy). The experiment will focus on the seabased Marine Expeditionary Brigade (MEB), emphasizing execution of the Operational Maneuver From the Sea (OMFTS) and Ship

to Objective Maneuver (STOM) concepts, in a Joint context. SV04 has been designated as a Naval Sea Trial event and will be conducted in a joint context.
- Sea Viking 2006 (SV06): (FY 2005 through FY 2006) Because SV04 was refocused to conduct experimentation as part of a real world deployment, SV06 will build on the results, findings, and events of SV04, but will be the first opportunity to examine a true seabased capability within the context of emerging Joint concepts. SV06 will use an integrated "campaign" approach, be a key component of the Navy's Sea Trial process, and fully support 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. It will also explore emerging seabased Command and Control (C2) capabilities involving distributed, collaborative planning, and execution. In addition to continuing to examine fires and maneuver C2, SV06 will also focus on logistic C2, involving a combination of amphibious and future maritime prepositioning ships, while also exploring the utility of the Joint High Speed Vessel (JSHV). In exploring the seabase, such issues as: seabased fires -- as an integral part of joint fires; at sea arrival and assembly; strike-up/strike-down techniques; and various applications of "sense and respond" portal technologies -- for adaptive logistics capitalizing on autonomic logistics features – will be addressed in support of the operating forces conducting operational maneuver from the seabase.

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2003	FY 2004	FY 2005
Command, Control, Communications, Computers (C4)	9,541	8,965	8,463

This section encompasses all Marine Corps Warfighting Laboratory (MCWL) C4 related experimentation efforts.

FY 2003 Accomplishments:

- Initiated experimental planning and C4 development to support the Sea Viking 2004 (SV04) Advanced Warfighting Experiment (AWE).
- Continued to develop information processing and further integration of capabilities into the Command and Control Integration (CCI) (formerly known as Integrated Marine Multi-Agent Command and Control System (IMMACCS)) and the C4 Lab facility.
- Continued to develop enhanced capability for Shared Net and Graphical User Interface (GUI) communications/situational awareness technologies.
- Conducted experiments and evaluated the performance of advanced command and control (C2) investigations and experiments for sea based C2.
- Continued to evaluate the effectiveness of commercially available (off-the-shelf) technology for providing

wireless connectivity to the tactical level.
- Continued/expanded alternative Over The Horizon (OTH) communications technology investigations.
- Initiated efforts to constitute an On The Move (OTM)/Digital Combat Operations Center (DCOC) capability.
- Expanded experimentation and integration of the intra-squad radio systems.

FY 2004 Plans:

- Provide C4 support for the SV04 AWE.
- Continue to develop information processing and further integration of capabilities into the C4 Lab facility.
- Conclude CCI integration and experimentation, to include Shared Net and GUI efforts.
- Continue to conduct experiments and evaluate the performance of advanced C2 investigations and experiments for sea based C2.
- Continue to evaluate the effectiveness of commercially available (off-the-shelf) technology for providing wireless connectivity to the tactical level.
- Continue OTH communications investigations in support of First Marine Expeditionary Force (I MEF) Operation Iraqi Freedom (OIF) II deployment.
- Continue efforts to constitute an OTM/DCOC capability.
- Investigate collaborative planning capabilities. Investigate tactics, techniques, technologies, and procedures (TTTPs) of a Navy/Marine seabased Combat Operational Center (COC).
- Conclude experimentation and development of intra-squad radio systems.

FY 2005 Plans:

- Conclude C4 support for the SV04 AWE and initiate C4 support for the SV06 AWE.
- Continue to develop information processing and to further integrate capabilities into the C4 Lab facility.
- Continue to conduct experiments and evaluate the performance of advanced C2 capabilities to support sea based C2 interoperability.
- Continue to evaluate the effectiveness of commercially available (off-the-shelf) technology for providing wireless connectivity to the tactical level.
- Continue OTH communications investigations.
- Continue to investigate collaborative planning capabilities.
- Continue to investigate TTTPs of a Navy/Marine seabased COC.
- Continue development and experimentation of OTM/DCOC capability.
- Initiate investigation of TTTPs to achieve common tactical picture (CTP) for Marine Expeditionary Brigade (MEB) conducting OMFTS.
- Initiate investigation of TTTPs for fires C2 in order to simplify operations/training and enhance

interoperability of Joint, Navy, and Marine Corps systems.

	FY 2003	FY 2004	FY 2005
Marine Corps Warfighting Laboratory (MCWL)Operations (Support)	8,378	8,057	8,294

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

FY 2003 Accomplishments:

- Continued Sea Viking 2004 (SV04) planning focused on enhancing the capabilities of a deploying Expeditionary Strike Group (ESG)/Marine Expeditionary Brigade (MEB).
- Examined programs of record (POR) and experimental technologies developed with an eye toward achieving a significantly more capable force in support of Operational Maneuver from the Sea (OMFTS).
- Continued Strategic Planning through the location, development, and evaluation of advanced warfighting operational and organizational concepts and related enabling technologies.
- Continued providing technical, strategic, and managerial support to the Marine Corps.
- Continued development and integration of Marine Corps Doctrine, Organization, Training, Materiel, Leadership, Personnel, and Facilities (DOTMLPF) recommendations. Synthesized results and lessons learned into proposed tactics, techniques, and procedures (TTPs) for the Marine Corps and expanded investigations into transition avenues for maturing tactics, techniques, technologies, and procedures (TTTPs).
- Continued Science and Technology Operations Information Center (STOIC) development, an Information Management Database System used to support MCWL.
- Continued to provide overall analysis and reporting of experimentation efforts.
- Continued to support tactical instrumentation capability that provides battlespace instrumentation for experimentation. Continued effort to improve upon the automated data collection system. Initiated Integrated Global Positioning System (GPS) Radio System (IGRS) II data collection efforts.

FY 2004 Plans:

- Conclude SV04 and initiate Sea Viking 2006 (SV06) Advanced Warfighting Experiment (AWE) planning and technology investigations.
- Maintain Strategic Planning efforts.
- Continue to synthesize results and lessons learned into proposed DOTMLPF recommendations for the Marine Corps. Continue pursuing transition avenues for maturing TTTPs.

- Continue to provide technical, strategic, and managerial support to Marine Corps Experimentation.
- Complete Science and Technology (S&T) Common Operational Picture (COP) (formerly known as STOIC) development, focusing on linking S&T communities.
- Maintain overall analysis and reporting of experimentation efforts, analytical experimental design support, and a capability to provide ad-hoc analysis support as required. Continue tactical instrumentation and IGRS II data collection/reconstruction efforts.
- Initiate development of an experimental effort that allows IGRS II to become an On The Move (OTM), beyond line of sight (Over The Horizon (OTH)) blue force tracking capability; serving both tactical position location information (PLI) system and administrative ground truth functions.

FY 2005 Plans:

- Continue SV06 AWE planning and technology investigations.
- Continue Strategic Planning efforts.
- Continue to synthesize results and lessons learned into proposed DOTMLPF recommendations for the Marine Corps. Continue pursuing transition avenues for maturing TTTPs.
- Provide technical, strategic, and managerial support to Marine Corps Experimentation.
- Provide overall analysis and reporting of experimentation efforts, provide analytical assistance during experiment design, and maintain an ad-hoc analysis capability.
- Complete tactical instrumentation and continue IGRS II data collection/reconstruction efforts.
- Continue IGRS II OTM/OTH blue (friendly) force tracking efforts.

	FY 2003	FY 2004	FY 2005
Intelligence, Surveillance, and Reconnaissance (ISR)	4,560	3,856	5,704

This section includes Marine Corps Warfighting Laboratory (MCWL) ISR related experimentation efforts involving enhanced reconnaissance; sensors; and unmanned ground and aerial vehicles.

FY 2003 Accomplishments:

Initiated ISR support for the Sea Viking 2004 (SV04) Advanced Warfighting Experiments (AWE).
- Continued Dragon Eye Unmanned Aerial Vehicle (UAV) payload development, integration, and experimentation. 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.
- Transitioned Dragon Eye UAV to Marine Corps Systems Command’s (MCSC’s) program of record (POR).
- Expanded/refined Dragon Runner Mobile Ground Sensor (MGS) efforts. Dragon Runner is a ground mobile sensor

that will be used by marine infantry battalions.
- Continued Unmanned Ground Vehicle (UGV) payload and micro UAV/UGV payload development efforts.
- Initiated Visual Intelligence, Surveillance, Tactical Alert System (VISTAS) (formerly known as Local Area Sensor System (LASS)) efforts. VISTAS is an unattended ground sensor system.

FY 2004 Plans:

- Continue ISR support for the SV04 AWE.
- Continue Dragon Eye UAV payload development, integration, experimentation, and refinement of tactics, techniques and procedures (TTPs).
- Initiate investigation of refocused Tier II UAV capabilities. The purpose of the Tier II UAV program is to test a fully autonomous, small UAV system for Marine Corps reconnaissance, surveillance, target acquisition (RSTA) and communication relay missions.
- Continue Dragon Runner MGS efforts.
- Continue UGV payload and micro UAV/UGV payload development efforts.
- Continue VISTAS development efforts.

FY 2005 Plans:

- Conclude ISR support for SV04 and initiate ISR support for the Sea Viking 2006 (SV06) AWE.
- Complete Dragon Eye UAV payload development, integration, experimentation, and refinement of TTPs.
- Continue investigation of refocused Tier II UAV capabilities; initializing focusing on a complete shipboard compatibility that requires minimal maintenance and time to train.
- Continue Dragon Runner MGS efforts.
- Continue UGV payload and micro UAV/UGV payload development efforts.
- Continue VISTAS development efforts.
- Initiate investigation of ISR/RSTA capabilities needed to support a Marine Expeditionary Battalion (MEB) conducting Operational Maneuver From The Sea (OMFTS).

	FY 2003	FY 2004	FY 2005
Seabasing, Logistics, Combat Service Support (CSS), and Combat in the Cities	3,391	7,839	5,039

This section includes Marine Corps Warfighting Laboratory (MCWL) experimentation efforts involving seabasing, logistics, CSS, urban combat, medical, as well as training and education.

FY 2003 Accomplishments:

- Continued to develop and integrate the CSS tools/systems/equipment that will support the "Marine of 2020."
- Continued to search for, evaluate, and assess potential solutions to enhance seabased sustainment capabilities. This effort explores the use of Command and Control (C2), fires, maneuver, and sustainment required of a Marine Combat Service Support Detachment (MCSSD) in support of a Marine Air-Ground Task Force (MAGTF) Operational Maneuver From The Sea (OMFTS) operation.
- Initiated effort with experimental vehicles to enable mobility of forces executing OMFTS sustainment operations.
- Established the MAGTF Utility Tractor Tactical (MUTT) initiative to assess the military utility of small, utility tractors in support of airfield and rapid runway repair and rapidly constructed field fortifications and revetments. The MUTT initiative was performed in concert with the establishment of Joint Expeditionary Field Fortification (JEFF) program efforts, augmented by the Rapid Deployment Fortification Wall (RDFW) Congressional enhancement (Project C9154).
- Established a Mine Counter Measures (MCM) initiative to develop and assess the tactics, techniques, technologies, and procedures (TTTPs) surrounding a Marine Expeditionary Unit (MEU) MCM Capability Set.
- Continued Military Operations in Urban Terrain (MOUT) experimentation efforts to include Project Metropolis and Project Rifleman. Project Metropolis is the definitive multi-year experiment designated to create realistic warfighting allowing Marines to shoot, move, and communicate as they accomplish missions during MOUT. Project Rifleman, a subset of Project Metropolis, is a project conducting experimentation with the tactics and techniques (TTPs) of the individual Marine to better enable him/her to fight and survive in the expeditionary combat environments.
- Continued investigating/integrating clothing and equipment that will enhance Marines' survivability.
- Continued aviation experimentation in the urban environment and aviation based simulation/instrumentation efforts.
- Investigated Marine Corps and Special Operations Command (SOCOM) TTTPs collaboration.
- Assisted the Joint Operations Center with Joint High Speed Vessel (JHSV) program efforts to explore the concepts and capabilities with commercially available advanced hull and propulsion technology.
- Completed Night Integrated Training Environment (NITE) Lab support efforts.
- Completed experimentation efforts with zinc-air batteries.
- Continued bio-science (medical) efforts to include en route care, mission package prototypes for Health Service Support (HSS) for long distance raids and homeostatic dressings for field user evaluation.
- Transitioned SEAWAY efforts (formerly referred to as SEAWAY-LOGGY) to Marine Corps Systems Command (MCSC) program of record (POR) (i.e., the logistics decision support module). As a decision support tool, it provides logistical data used to validate the supportability of courses of actions developed in wargames.

FY 2004 Plans:

- Continue to develop and integrate the CSS tools/systems/equipment that will support the "Marine of 2020."
- Continue to search for, evaluate, and assess potential solutions to enhance seabased sustainment capabilities.
- Complete effort with experimental vehicles to enable sustainment of forces in an OMFTS environment.
- Continue development of the MUTT initiative. Conduct assessment and documentation of JEFF military utility in conjunction with MUTT. JEFF efforts are augmented by the RDFW Congressional enhancement.
- Continue development of MCM initiative.
- Continue MOUT experimentation efforts.
- Continue to investigate individual equipment to enhance Marines' survivability and combat effectiveness.
- Initiate an assessment to determine the utility of Land Warrior technologies for Marine Corps application. Land Warrior is an integrated computer/weapon system worn by the individual Marine.
- Continue aviation experimentation in the urban environment and aviation based simulation/instrumentation efforts.
- Maintain Marine Corps and SOCOM TTTPs collaboration.
- Expand JHSV development, integration, and experimentation.
- Continue bio-science initiatives.
- Initiate SEAWAY effort to enable intra-hull assessment capability.
- Initiate TTTPs to facilitate sustaining a seabased Marine Expeditionary Battalion (MEB) conducting OMFTS/Ship to Objective Maneuver (STOM).

FY 2005 Plans:

- Continue to develop and integrate the CSS tools/systems/equipment that will support the "Marine of 2020."
- Continue to search for, evaluate, and assess potential solutions to enhance seabased sustainment capabilities.
- Complete MUTT and JEFF initiatives.
- Complete MCM development/experimentation efforts.
- Continue MOUT experimentation efforts.
- Continue to investigate individual equipment to enhance Marines' survivability and combat effectiveness.
- Continue utility assessment of Land Warrior technologies for Marine Corps application.
- Continue aviation experimentation in the urban environment and aviation based simulation/instrumentation efforts.
- Maintain Marine Corps and SOCOM TTTPs collaboration.
- Continue JHSV efforts.

- Continue bio-science (medical) initiatives.
- Continue SEAWAY initiative.
- Continue TTTPs to facilitate sustaining a seabased MEB conducting OMFTS/STOM.

	FY 2003	FY 2004	FY 2005
Warfighting Excellence	1,993	3,915	4,125

This section includes Marine Corps Warfighting Laboratory (MCWL) experimentation efforts in the areas of wargaming, the Center for Emerging Threats and Opportunities (CETO), and Project Albert.

FY 2003 Accomplishments:

- Continued research; planning; modeling and simulation (M&S), concept, and wargame development; preparation; execution; and analysis and assessment to extend exploration of critical components.
- Continued focus on advancing policy, concept and operational exploration at several levels to include Title X wargaming, joint and external gaming efforts, Joint Forces Command (JFCOM) Joint Concept Development and Experimentation (JCDE) programs, and a broad and diverse array of service programs. Title X wargames generally address future capabilities in the context of core Title X readiness responsibilities and include participation in other service Title X wargames, as well as, planning and executing the Marine Corps Title X Expeditionary Warrior program. JCDE efforts include the co-sponsored Marine Corps/JFCOM Joint Urban Warrior (JUW) program designed to support JFCOM Joint Urban Operations (JUO) efforts. External events include the Office of the Secretary of Defense's (OSD's) Net Assessment wargames. Marine Corps wargaming programs also include such efforts as Revolution in Military Affairs (RMA)/Project Ellis and Fast Train programs. RMA and Fast Train programs provide an exploratory venue to address critical conceptual, organizational, and technical issues essential to success on the 21st century battlefield. Moreover, these programs contribute significantly toward the assessment of the impact of changes in the strategic landscape on concepts, organization, and technology.
- Completed experimentation efforts and transitioned the Combat Decision Range to Marine Corps Systems Command (MCSC).
- Investigated Intelligence, Surveillance and Reconnaissance/Reconnaissance, Surveillance, and Target Acquisition (ISR/RSTA) capabilities needed to support a Marine Expeditionary Battalion (MEB) conducting Operational Maneuver From The Sea (OMFTS) via Wargaming and M&S.
- Provided CETO support for asymmetric warfare studies/investigations, as augmentation to the CETO Congressional enhancement (Project C9154).

FY 2004 Plans:

- Continue research; planning; M&S, concept, and wargame development; preparation; execution; and analysis and assessment to extend exploration of critical components.
- Continue to refine and extend established wargaming programs (Title X, JUO, RMA/Project Ellis, and Fast Train), and explore and develop innovative research and gaming methods and techniques to include "next generation" M&S capabilities.
- Continue to provide CETO support. (Note: Although administratively attached to MCWL, CETO will now be operationally controlled by the Marine Corps Combat Development Command (MCCDC)).

FY 2005 Plans:

- Continue research; planning; M&S, concept, and wargame development; preparation; execution; and analysis and assessment to extend exploration of critical components.
- Continue to refine and extend established wargaming programs (Title X, JUO, RMA/Project Ellis, and Fast Train), and explore and develop innovative research and gaming methods and techniques to include "next generation" M&S capabilities.
- Continue to provide CETO support.
- 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. Provide one man-year of program support as augmentation to the FY 2004 Project Albert Congressional Enhancement.

	FY 2003	FY 2004	FY 2005
Fires, Targeting, and Maneuver	4,818	5,052	3,726

This section includes Marine Corps Warfighting Laboratory (MCWL) experimentation efforts in the areas of fires, targeting, and maneuver.

FY 2003 Accomplishments:

- Prepared Spike hardware/software for programmed missile test firings to verify airframe performance matches measured wind tunnel test program data and the flight characteristics of the missile inertial measurement system. Spike is a very small, low cost, man-packable, fire and forget guided missile and launcher system.
- Continued breach loading capability redesign and fabrication efforts of the fully functional Dragon Fire I

concept demonstrator. Dragon Fire is a modular 120-millimeter Light Armored Vehicle (LAV) concept demonstrator mortar system.
- Continued Level I design of the Dragon Fire II including carriage design, fire control design, firing systems design and the integration of all of the systems to achieve the weight objective of 3,000 pounds and full compatibility with internal transport in the MV-22 Osprey (medium lift, vertical takeoff and landing (VTOL) tilt-rotor aircraft).
- Conducted Limited Technology Assessments (LTAs) firing the Dragon Fire I from the modular LAV testbed.
- Continued support for the development of the Target Handoff System experimental THS(X). The THS(X) program investigates and conducts experiments in aviation and fire support technologies that could lead to increased accuracy and effectiveness of close air and fire support missions while also reducing the possibility of fratricide. Also continued complementary laser rangefinder investigations/experimentation.
- Provided nominal engineering support for continued investigations and evaluations of the Remote Precision Gun (Telepresent Rapid Aiming Platform (TRAP)).
- Provided for continued Mobile Counter Fire System (MCFS) system development, as augmentation to the MCFS Congressional enhancement. MCFS is a sniper detection/force protection system.
- Continue exploration of precision targeting technologies and systems.
- Continued M3M machine gun mounted on helicopter platforms experimentation.
- Continued M3M mounted on vehicle platforms experimentation.

FY 2004 Plans:

- Complete first Dragon Fire II concept demonstrator and conduct proof firings, instrumented firings, and ballistic kernel verification/modification. This effort is an augmentation to the Mobile Fire Support System (MFSS) Congressional enhancement (Project C9154).
- Complete THS(X) development and transition to the Marine Corps Systems Command (MCSC).
- Continue engineering support as well as upgrade and assess current TRAP systems design. This effort is an augmentation to the TRAP Congressional enhancement (Project C9154).
- Continue laser rangefinder investigations/experimentation (i.e. in concert with THS(X), TRAP, and other MCWL program efforts).
- Initiate Digital Fires Coordination Device (DFCD) development, by providing concept demonstrator design and version I system delivery to participate in Sea Viking 2004 (SV04) Advanced Warfighting Experiment (AWE). The DFCD program will design a concept demonstrator of an advanced fire support coordination software system hosted in a ruggedized computer (handheld or laptop) to give the forward elements of a Ship to Objective Maneuver (STOM) force the ability to control and deconflict fires. The system will be based on the THS(X) software and will be designed to give the advance force commander a simplified and compact system to develop and transmit coordinating measures, target lists, fire plans, fire missions, and warnings.

- Continue exploration of precision targeting technologies and systems.
- Complete M3M mounted on helicopter platforms experimentation.
- Initiate investigations into highly mobile, internally transportable counter-fire radar to support a vertical maneuver element.
- Complete M3M mounted on vehicle platforms experimentation.

FY 2005 Plans:

- Continue development of modular design for fire support systems using the Dragon Fire/LAV test-bed.
- Initiate development of the "Fire on the Move" technology.
- Continue laser rangefinder investigations/experimentation.
- Continue DFCD efforts.
- Continue investigations into highly mobile, internally transportable counter-fire radar to support a vertical maneuver element.
- Investigate capabilities to enhance tactical mobility of a vertical maneuver element.

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
NON-NAVY RELATED RDT&E: Not applicable

D. ACQUISITION STRATEGY:
Not applicable

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

Exhibit R-2a

BA: 03 PROGRAM ELEMENT: 0603640M PROGRAM ELEMENT TITLE: USMC Advanced Technology Demonstration (ATD)

PROJECT NUMBER: R2223 PROJECT TITLE: Marine Corps ATD

Project Number & Title	FY 2003 Actual	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate
R2223 Marine Corps ATD	16,144	18,475	21,791	23,014	23,799	24,537	25,043

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; and Mine Counter Measures (MCM). 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 MCM capability is necessary if MCM is to become a functional component of Naval Expeditionary Maneuver Warfare (EMW). 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 Future Naval Capabilities (FNC) process.

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2003	FY 2004	FY 2005
Littoral Combat/Power Projection (LC/PP)	6,035	7,366	5,379

The goal of the LC/PP Future Naval Capabilities (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 Science and Technology (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, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR), fires, maneuver, sustainment, and force protection.

FY 2003 Accomplishments:

- Demonstrated secure wireless network capabilities in various environments to characterize performance.
- Expeditionary Fires Technology Program developed a prototype system with self-contained survey, networked, real-time geospatial fire control, communications and automatic aiming subsystems.
- Developed and flight tested tactical unmanned vertical take-off and landing platform technologies for United States Marine Corps (USMC) Tier II Unmanned Air Vehicle demonstrator.
- Tested beta version of software to aid in Marine Expeditionary Unit (MEU) planning and execution of Ship to Objective Maneuver (STOM) to include assault craft moving map displays.

FY 2004 Plans:

- Demonstrate prototype expeditionary fires system with stabilization technologies, advanced pointing and aiming system, and advanced ballistic prediction capability.
- Develop, integrate and test additional functionality for STOM planning software. Install with deploying MEUs for evaluation and feedback.
- Initiate development of a remote sensor fusion capability to enable correlation, cross-cueing, and triggering of imagery with other remote sensor data for eventual transition to the Tactical Remote Sensor System (TRSS).
- Initiate development of algorithms for identifying battlespace targets by Radio Frequency (RF), magnetic, acoustic, or other emissions signature.
- Initiate design and development of lightweight materials for use in artillery and mortar systems to reduce weight while maintaining strength, and increasing operational life and capability.
- Develop requirements for a Marine Corps Senior Intelligence System that enables advanced data parsing, fusion and discrimination.
- Initiate development of a system that provides for emitter tracking in high multi-path urban environment.
- Initiate development of tools that help operators initially understand a new radio frequency environment and assist in the generation of collection plans.

FY 2005 Plans:

- Continue development and improvements to the remote sensor fusion capability for the TRSS.
- Continue algorithm development and testing for RF emitter identification and geo-location.
- Continue refinements to expeditionary fires technologies for inclusion in Expeditionary Fires Support System (EFSS) and Lt Wt 155 Howitzer acquisition programs.
- Initiate integration and testing of Collision Avoidance System on the Expeditionary Fighting Vehicle (EFV) and transition.
- Transition a system that provides for emitter tracking in high multi-path urban environment to acquisitions.
- Transition tools that help operators initially understand a new radio frequency environment and assist in the generation of collection plans.

	FY 2003	FY 2004	FY 2005
Mine Countermeasures (MCM)	1,000	3,730	4,000

This activity focuses on advanced development and demonstration of mine countermeasures (MCM) technologies enabling MCM capabilities in synchronization and speed of mine detection, organic neutralization, assault breaching, tactical clearance, proofing, marking, and Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4I) operations.

This activity includes efforts for the Advanced Mine Detector (AMD). AMD will combine multiple sensing technologies to detect explosives in antipersonnel and antitank mines, a key capability due to the worldwide proliferation of low and non-metallic mines. Initial operational capability is scheduled for FY 2008 and full operational capability for FY 2009.

AMD will apply nuclear quadrupole resonance (NQR) science to confirm the presence of explosives. NQR science detects the electromagnetic signal emitted by relaxation of nitrogen atom nuclei in explosives, after tipping caused by a near-resonant frequency pulse. NQR science also detects metal objects and voids by sensing discontinuities in the dielectric properties of the medium, after application of an alternating current pulse. Specialized NQR science applications enable discrimination of buried, multi-compound explosives from clutter such as metal fragments, rocks, and voids.

FY 2003 Accomplishments:

-Continued refinement of NQR sensor design, achieving improvement in signal-to-noise ratio (SNR), reduced acoustic ringing effects, improved power management, and lighter system weight.

-Performed independent empirical analytical modeling of NQR sensor integrated with a specific ground penetrating radar (GPR) and electromagnetic induction (EMI) system.

FY 2004 Plans:

-Initiate NQR technology integration efforts with a GPR and EMI system.
-Develop very low power stochastic NQR pulse sequencing techniques for detection of multiple lines of Trinitrotoluene (TNT).
-Explore methods to compensate for the inhomogeneous radio-frequency (RF) field of surface coils, for optimizing SNR for varying inspection depths.
-Continue 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.
-Develop advanced NQR techniques for improved TNT detection, to include pulse sequences that are less sensitive to temperature variations, and examine the possibility of increasing TNT SNR by hybrid NQR/Nuclear Magnetic Resonance techniques.
-Reduce acoustic ringing by developing coils with a reduced electric field and composite RF pulses.
-Complete TNT characterization by determining whether observed differences in TNT formulations represent mixtures of pure orthorhombic and monoclinic crystalline forms, or twinning effects of the monoclinic phase.
-Extend characterization to a broader range of TNT sources, and to tetryl.

FY 2005 Plans:

-Continue refinement of RFI mitigation, SNR enhancement, and acoustic ringing techniques.
-Continue NQR technology integration efforts with a GPR and EMI system.
-Transition the AMD effort to the Littoral Combat Future Naval Capability (LC FNC).

	FY 2003	FY 2004	FY 2005
Human Performance, Training & Education	1,950	2,500	3,000

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.

FY 2003 Accomplishments:

- Integrated Advanced Close Combat Marines Ground Combat Element (GCE) Tactical Decision-making Simulation (TDS) for use in the Staff Sergeant's Course at the Marine Corps Institute (MCI).
- Integrated the Close Combat Marines GCE TDS for use in Infantry Platoon Sergeant's Course at the School of Infantry (SOI) East. Completed Training Effectiveness Evaluation (TEE).
- Integrated the Marine Air/Ground Task Force – XXI (MAGTF-XXI) GCE TDS for use in Captain's Course at the Expeditionary Warfare School (EWS). Preliminary TEE was completed.
- Integrated the MAGTF-XXI GCE TDS for use in Operations Chief Course at the SOI East.
- Performed technology search and experimentation in the areas of combating terrorism, support for the 4th Marine Expeditionary Battalion (MEB) Anti Terrorism (AT), and thermobaric weapons.
- Demonstrated prototype of Video Flashlights capability for enhanced situational awareness in a Military Operations in Urban Terrain (MOUT) training environment for the Special Reaction Team (SRT) at Marine Corps Base (MCB) Quantico.

FY 2004 Plans:

- Demonstrate and evaluate technologies available for prototype of Logistics Combat Services Support Element (CSSE) TDS for use in the Logistics Officer's Course at the Logistics School.
- Perform TEE for MAGTF-XXI GCE TDS in use for the Captain's Course at the EWS.
- Demonstrate and evaluate technologies available for prototype of an Anti-Terrorism Force Protection (ATFP) TDS for use by the 4th MEB Marine Security Force.
- Demonstrate and evaluate technologies available for prototype of a Combat Engineers TDS for use in the Engineer Officer's Course.
- Demonstrate and evaluate prototype of Video Flashlights capability for enhanced situational awareness in a Military Operations in Urban Terrain (MOUT) training environment for the Marine Security Forces. This will include a TEE.
- Demonstrate and evaluate technologies available for prototype of Radio Frequency (RF) tracking and video tracking fusion capability for enhanced situational awareness in a MOUT training environment.
- Demonstrate and evaluate technologies available for prototype of a Rapid Portable Synthetic Environment Generation capability.

FY 2005 Plans:

- Integrate Logistics CSSE TDS for use in the Logistics Officer's Course at the Logistics School at Camp Johnson. This will include a TEE.

- Integrate Combat Engineer's TDS for use in the Engineer Officer's Course at the Engineers School.
- Integrate the ATFP TDS for use in the Supervisor's Course by the 4th MEB Marine Security Force.
- Demonstrate and evaluate technologies available for prototype of an Aviation Combat Element (ACE) TDS.
- Demonstrate and evaluate technologies available for prototype of a common three-dimensional database format and tool kit capability for rapid synthetic environment generation and tactical decision-making simulations.
- Demonstrate and evaluate technologies available for prototype of RF tracking and video tracking fusion capability for enhanced situational awareness in a MOUT training environment.
- Demonstrate and evaluate technologies available for prototype of a Rapid Portable Synthetic Environment Generation capability.

	FY 2003	FY 2004	FY 2005
Logistics	2,000	1,500	2,875

This activity supports Expeditionary Maneuver Warfare capabilities assessing technologies for power, as well as technologies that enhance logistics flow (focusing on sensors and autonomic logistics).

FY 2003 Accomplishments:

- Investigated the feasibility of the hybridization of Zinc Air battery and Ultra Capacitor technologies as an alternative to BA5590 Lithium batteries with a goal of 30% weight savings and 50% power increase.
- Initiated the development of Micro-Channel Methanol Fuel Cells as a battery recharger for secondary batteries such as the BA2590 lithium rechargeable battery. Goal is to have a technology readiness level 5 brass board system.
- Developed a lightweight (3kw) power generator (mini-brayton cycle) with micro turbine technologies.
- Leveraged DARPA's Palm Power effort to evaluate direct methanol fuel cells for application in field battery charging stations.

FY 2004 Plans:

- Continue development of alternative power initiatives (Hybrid Zinc Air batteries).
- Continue Expeditionary Energy effort by down selecting the most promising lightweight power generation technologies to demonstrate the feasibility of performance improvement.

FY 2005 Plans:

- Continue development of alternative power initiatives to demonstrate performance improvement.

- Continue Expeditionary Energy effort development of lightweight power generation and alternative power technologies to demonstrate the feasibility of performance improvement.
- Explore efforts in support of Sea Based Logistics and Expeditionary Maneuver Warfare by assessing concepts that permit precision delivery of logistics assets while also reducing the logistics footprint ashore.

	FY 2003	FY 2004	FY 2005
Command, Control, Communications, Computers, and Intelligence, Surveillance and Reconnaissance (C4ISR)	2,200	1,650	2,760

This activity integrates and demonstrates enhanced communications and situational awareness in warfighting environments and communication and situational awareness technologies for near term U S Marine Corps (USMC) operations.

FY 2003 Accomplishments:

- Initiated demonstration of Low-Probability of Intercept/Low-Probability of Detection (LPI/LPD) ultra-wide band radios for reconnaissance and urban communications.
- Initiated & completed development of a Marine-portable, deployable, Tactical Jammer (transferred to Littoral Combat FNC).
- Continued 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.

FY 2004 Plans:

- Initiate and complete ground weapons locating radar study to determine the feasibility of modifying advanced ground-based radar functionality through software changes.
- Initiate development of blue-force tracking information management and data interoperability capabilities.
- Complete demonstration of Low-Probability of Intercept/Low-Probability of Detection (LPI/LPD) ultra-wide band radios for reconnaissance and urban communications.
- Continue 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.

FY 2005 Plans:

- Initiate development of measurement and signature intelligence data management and integration capability.
- Continued 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 transitions to 6.4.

	FY 2003	FY 2004	FY 2005
Maneuver	1,840	1,187	2,375

This activity demonstrates technologies to enhance battlespace mobility and survivability through analysis and development of demonstration hardware.

FY 2003 Accomplishments:

- Analyzed and tested several individual structural armor materials and countermeasure technologies in support of Marine Corps Air Ground Task Force (MAGTF) Marine Expeditionary Family of Fighting Vehicles (MEFFV) to determine effect on maneuver and survivability.

FY 2004 Plans:

- Develop detailed designs and build technology demonstrators of Tactical Unmanned Ground Vehicles (TUGV) to demonstrate advanced unmanned capabilities in the areas of mobility, survivability, Command and Control (C2), ISR (intelligence, surveillance, and reconnaissance), lethality (lethal and non-lethal systems), and mine countermeasures.

FY 2005 Plans:

- Analyze maneuver and survivability technologies for demonstration on a technology demonstrator testbed.
- Demonstrate key maneuver components, subsystem, and system breadboards to support initial MEFFV system design studies and trade-offs.
- Develop and evaluate MEFFV platform design concepts and mission variants.

	FY 2003	FY 2004	FY 2005
Firepower	750	0	2,482

This activity demonstrates enhanced lethality through technological improvements in fuzes and targeting.

FY 2003 Accomplishments:

- Completed Objective Crew Served Weapon air bursting munitions and weapon reliability testing support in conjunction with Joint Service Small Arms Project.

FY 2004 Plans:

- No Firepower Advanced Research projects available to transition to this funding line in this year.

FY 2005 Plans:

- Conduct Firepower effects enhancement “technology push” efforts.
- Support development of enhanced submunition fuse safety and reliability technologies for submunitions based on results of the FY04 6.2 fuse technology assessment.
- Support development of future mortar systems.

C. OTHER PROGRAM FUNDING SUMMARY:

NAVY RELATED RDT&E:
PE 0602131M (Marine Corps Landing Force Technology)
PE 0603612M (Marine Corps Mine/Countermeasures Systems)
PE 0603635M Marine Corps Ground Combat/Supporting Arms Systems
PE 0206313M (Marine Corps Communications Systems)
PE 0206623M (Marine Corps Ground Combat/Supporting Arms Systems)
PE 0601152N (In-House Laboratory Independent Research)
PE 0601153N (Defense Research Sciences)
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 0204163N (Fleet Communications - (Tactical))

PE 0305204N (Tactical Unmanned Air 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 Advanced Development)
PE 0603772A (Advanced Tactical Computer Science and Sensor Technology)
PE 0604710A (Night Vision Systems - Engineering Development)
PE 0604808A (Landmine Warfare and Barrier Engineering Development)
PE 0602301E (Computing Systems and Communications Technology)
PE 0602702E (Tactical Technology)

D. ACQUISITION STRATEGY:
Not Applicable

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

Exhibit R-2a

BA: 03 PROGRAM ELEMENT: 0603640M PROGRAM ELEMENT TITLE: USMC Advanced Technology Demonstration (ATD)

PROJECT NUMBER: R2362 PROJECT TITLE: Extended Littoral Battlespace

Project Number & Title	FY 2003 Actual	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate
R2362 Extended Littoral Battlespace	856	0	0	0	0	0	0

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The Extending the Littoral Battlespace (ELB) Advanced Concept Technology Demonstration (ACTD) project responds to the top level military need to rapidly deploy a Naval Expeditionary Task Force with an embarked Marine Air Ground Task Force (MAGTF) as part of a larger Joint Task Force to any region of the world's littorals and conduct military operations from a sea base across the spectrum of conflict to implement national military strategy. Forces employed ashore will be light, agile, distributed, and desegregated and capable of optimizing remote fires, to effectively deter aggression, halt attacks and secure critical areas as a precursor to a much larger force. Forces will be empowered by unprecedented situational awareness via a robust information infrastructure that is fully coupled to a decision/planning/execution system on a shared battlespace network (sea/land). The objective of the ACTD is to demonstrate an enhanced integrated command and control/fires and targeting capability to enable rapid employment, maneuver, and fires to support joint dispersed unit operations in an extended littoral battlespace. A Major Systems Demonstration (MSDI) was completed FY 1999 and a second one (MSDII) was completed in FY 2001. The ELB ACTD was approved by Deputy Under Secretary of Defense (Acquisition and Technology) (DUSD (AT)) on 16 January 1997.

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2003	FY 2004	FY 2005
Extended the Littoral Battlespace (ELB)	906	0	0

The demonstration phase of this effort will continue as Joint Task Force (JTF) Warrior Network (Warnet) beginning in FY04. United States Marine Corps (USMC) transition initiatives are part of the Littoral Combat/Power Projection Future Naval Capability (LC/PP FNC).

FY 2003 Accomplishments:

- Completed the transition of demonstrated technologies, hardware, software, and processes to Marine Corps acquisition and JTF WarNet.

C. OTHER PROGRAM FUNDING SUMMARY:

NAVY RELATED RDT&E:
PE 0206313M Marine Corps Communications System

D. ACQUISITION STRATEGY:
Not Applicable

CONGRESSIONAL PLUS-UPS:

C2297	FY 2003	FY 2004
ADVANCED LIGHT STRIKE VEHICLE (ALSV)	3,015	3,482

This synergistic effort capitalized upon lessons learned from the Internally Transportable Vehicle (ITV) and the Reconnaissance Surveillance Targeting Acquisition - Vehicle (RSTA-V) teaming Marine Corps, Navy, and industry subject matter experts (SMEs) to investigate promising technologies leading to an effective, combat suitable, ALSV. This effort began with a "clean sheet of paper" harnessing promising technologies in an effort to balance and mitigate competing performance requirements against vehicle characteristics such as speed, weight, and size. Through the use of computer-aided design and key technologies such as advanced suspension, hybrid electric drives, and composites, the goal is to produce a working prototype ultimately leading to an objective prototype.

C2297	FY 2003	FY 2004
MOBILE COUNTER-FIRE SYSTEM (MCFS)	2,392	0

The Marine Corps Warfighting Laboratory (MCWL) provided for improvements to the MCFS in the areas of correcting previously identified problems, repackaging Fire Control and Sniper Detection systems, increasing areas of vehicle protection, increasing accuracy of vehicle location coordinates, incorporating a laser range finder, adding calibration circuits, and conducting system experimentation. Began investigations into using infra-red sensors, in addition to acoustic, to pinpoint incoming enemy fires.

C2297	FY 2003	FY 2004
PROJECT ALBERT	5,758	4,203

FY 03 efforts: Models and developing data farming techniques were used in two distinct ways to allow decision-makers to deal with asymmetric threats and the uncertainty inherent in conflicts in today's world. The first was to understand the large landscape of possibilities in our changing world environment and the second was to discover outliers that, while individually improbable, collectively must be considered when building a robust force capable of protecting the interests of our country. Specific areas of application include surf zone/beach obstacle reduction and mine counter measures, human decision-making, command and control, and defense against enhanced blast weapons. Other areas of potential application included ship-to-objective maneuver, urban operations, homeland defense, force protection, and uninhabited vehicles.

FY 04 efforts: Continue modeling and developing data farming techniques to allow decision-makers to deal with asymmetric threats and the uncertainty inherent in conflicts in today's world.

C9154	FY 2003	FY 2004
CENTER FOR EMERGING THREATS AND OPPORTUNITIES (CETO)	974	0

This effort continued developing approaches to identify emerging threats, explore concepts, and determine capabilities and policies for addressing the asymmetric operational challenges emerging in the 21st century. These efforts result in the development, understanding, refinement, and application of operational and technical solutions to increasingly complex conflicts, many of which resist conventional application of military force. To meet future challenges in coordination with the Operating forces, CETO efforts included recommending emerging capabilities that are candidates for transition to the Expeditionary Force Development System.

C9154	FY 2003	FY 2004
MOBILE FIRE SUPPORT SYSTEM (MFSS) 120MM MORTAR PROGRAM	0	2,787

This effort formerly known as Dragon Fire and now referred to as Dragon Fire II, is a modular 120-millimeter Light Armored Vehicle (LAV) concept demonstrator mortar system. The FY 2004 Plans are to proceed with efforts to complete design and fabrication. These include: second gun assembly, safety release testing/documentation, and firing tests.

C9154	FY 2003	FY 2004
RAPID DEPLOYMENT FORTIFICATION WALL LIVE FIRE TESTING	1,021	995

Investigated and experimented with new tactics, techniques, and procedures (TTPs) to improve deployable fortification wall design and construction. This Joint Expeditionary Field Fortification (JEFF) program was established in concert with the establishment of the Marine Corps Warfighting Lab (MCWL)-core Marine Air-Ground Task Force (MAGTF) Utility Tractor Tactical (MUTT) initiative to assess the military utility of small, utility tractors in support of airfield and rapid runway repair and rapidly constructed field fortifications and revetments.

Established the MAGTF Utility Tractor Tactical (MUTT) initiative to assess the military utility of small,

utility tractors in support of airfield and rapid runway repair and rapidly constructed field fortifications and revetments. The MUTT initiative was performed in concert with the establishment of JEFF program efforts, augmented by the Rapid Deployment Fortification Wall (RDFW) Congressional plus-up (Project C9154).

C9154	FY 2003	FY 2004
TELEPRESENT RAPID AIMING PLATFORM (TRAP) ADVANCEMENT PROGRAM	0	1,741

This effort will focus on multi-spectral sensor suites and wireless command and control (C2) systems integration. Begin design overhaul of current system human interface. Begin upgrade of weapon integration, magazine, and batteries.

C9154	FY 2003	FY 2004
TRANSPORTABLE TRANSPONDER LANDING SYSTEM (TTLS)	2,177	3,481

The Marine Corps Warfighting Laboratory (MCWL) investigated technology developments in support of TTLS concept demonstration. Efforts included:
System Specification Documentation
Final System Demonstration Plan
Demonstration of tracking aircraft in 360 degree service volume and providing guidance to reciprocal ends of a main runway.
Final Project Reporting, to include executive summary, program accomplishments, and appendix listing of applicable program documentation.

C9154	FY 2003	FY 2004
USMC UAV/UGV WEARABLE COMPUTER PROJECT	0	2,537

Effort will provide for prototype development, software development, testing, and purchase of limited numbers of prototype MOWC computers. The Marine Corps Warfighting Laboratory (MCWL) will then experiment and assess the prototype MOWCs to determine the efficacy of such a computer system at the Marine small unit level.

R2995	FY 2003	FY 2004
CALIFORNIA CENTRAL COAST RESEARCH PARTNERSHIP (C3RP) INITIATIVE	2,931	3,857

Defined an area of core excellence and 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 the University, government agencies and units (both federal and state), and the private sector, which can evolve into an exceptional national resource. Efforts continue to explore this potential and to identify and support relevant research and expertise.

R9167	FY 2003	FY 2004
MAN-PORTABLE QUADRUPOLE RESONANCE	0	3,500

This effort will focus on advanced development and demonstration of landmine countermeasures technologies; specifically, a landmine detection system on quadrupole resonance technology, engineered into a man-portable configuration. ($2,445 was appropriated in FY 2003 PE 0603792N).

R9290	FY 2003	FY 2004
EXPEDITIONARY WATER PURIFICATION TECHNOLOGY	5,977	5,537

FY 03 - Efforts addressed large capacity water production capabilities in the 100K-500K gallons per day range. These efforts focused on developing new technologies that reduced the logistics footprint making these large scale systems much more expeditionary and C130 transportable. This effort culminated with the development of a proof of concept system.

FY 04 - Efforts will continue modeling and developing data farming techniques to allow decision-makers to deal with asymmetric threats and the uncertainty inherent in conflicts in today's world. Specific areas of application include surf zone/beach obstacle reduction and mine counter measures, human decision-making and command and control, and defense against enhanced blast weapons. Other areas of potential application include ship-to-objective maneuver, urban operations, homeland defense, force protection, and uninhabited vehicles.

R9333	FY 2003	FY 2004
CENTER FOR EXCELLENCE FOR ROBOTICS, ADVANCED TECHNOLOGY DEMO	0	1,384

This effort is related to development and deployment of robotic systems, to include the use of autonomous and semi-autonomous vehicles in military and civil application domains.

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

Exhibit R-2a

BA: 03 PROGRAM ELEMENT: 0603640M PROGRAM ELEMENT TITLE: USMC Advanced Technology Demonstration (ATD)

PROJECT NUMBER: Various PROJECT TITLE: Congressional Plus-Ups

R9334	FY 2003	FY 2004
RAPID REPAIR, PORTABLE PRODUCTION (R2P2)	0	989

This effort will provide new capabilities in basic infrastructure technologies such as construction materials. New lighter materials that are thermally resistant, bio-resistant, and more rapidly deployable are mission critical to Expeditionary Forces.