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

DATE: February 2007

BUDGET ACTIVITY: 02
PROGRAM ELEMENT: 0602131M
PROGRAM ELEMENT TITLE: MARINE CORPS LANDING FORCE TECHNOLOGY

COST: (Dollars in Thousands)

Project Number & Title	FY 2006 Actual	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate
MARINE CORPS LANDING FORCE TECHNOLOGY	37,433	42,031	26,785	26,902	28,090	29,057	26,541	27,258

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This Program Element (PE) is organized into five amphibious expeditionary warfighting capability areas. These are: Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR); Maneuver; Logistics; Human Performance, Training and Education; and, Firepower. The primary objective of this PE is to develop and demonstrate the technologies needed to meet the Marine Corps' unique responsibility of training and equipping the Marine Air/Ground Task Force (MAGTF) for Expeditionary Maneuver Warfare. This PE provides the knowledge base to support Advanced Technology Development (6.3) and is the technology base for future expeditionary warfare capabilities. This PE supports the Expeditionary Force Development System of the Marine Corps Combat Development Command and responds directly to the Marine Corps Science and Technology (S&T) process as well as supporting related Littoral and Expeditionary Maneuver Warfare capabilities developed by the Navy's Mission Capability Program. The Future Naval Capabilities (FNC) process is supported and funds are programmed accordingly. The FNC program explores and demonstrates technologies that enable Sea Strike, Sea Shield, Sea Basing and FORCENet pillars. The core program also supports Discovery and Invention (D&I) and Innovation and Transformation (I&T). Within the Naval Transformation Roadmap, this investment will achieve key transformational capabilities required by the Sea Power 21 Pillars, as well as enable the Ship to Objective Maneuver (STOM), Persistent Intelligence, Surveillance and Reconnaissance (ISR) and the Global War on Terrorism (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	38,016	37,741	39,414	40,245
Congressional Action	0	4,450	0	0
Congressional Undistributed Reductions/Rescissions	14	-160	0	0
Execution Adjustments	24	0	0	0
Non-Pay Inflation Adjustments	0	0	-82	75
Program Adjustments	0	0	-12,546	-13,425
Rate Adjustments	0	0	-1	7
SBIR Assessment	-621	0	0	0
FY 2008/FY 2009 President's Budget Submission	37,433	42,031	26,785	26,902

PROGRAM CHANGE SUMMARY EXPLANATION:

Technical: Not applicable.

Schedule: Not applicable.

C. OTHER PROGRAM FUNDING SUMMARY:

Not applicable.

D. ACQUISITION STRATEGY:

Not applicable.

E. PERFORMANCE METRICS:

The primary objective of this PE is the development of technologies to meet unique Marine Corps needs in conducting Expeditionary Maneuver Warfare and Combating Terrorism. 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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MARINE CORPS LANDING FORCE TECHNOLOGY	37,433	42,031	26,785	26,902	28,090	29,057	26,541	27,258

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project is organized into seven activities which are represented as five Expeditionary Warfighting Capability Areas; Future Concepts, Technology Assessment, and Roadmapping; and the Littoral Combat/Power Projection (LC/PP) FNC. The five Expeditionary Warfighting Areas support the Discovery and Invention (D&I) and the Innovation and Transformation (I&T) investment. The LC/PP FNC supports the Exploitation and Deployment (E&D) investment.

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2006	FY 2007	FY 2008	FY 2009
LITTORAL COMBAT/POWER PROJECTION	21,968	21,753	9,589	9,657

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.

Through 2005, the focus of the FNC efforts has been on satisfying technology gaps related to Power Projection and Littoral Combat as the products of those efforts are transitioned to acquisition programs of record. The funding profile from FY 2006 to FY 2007 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 FNC within this PE in FY 2006 and beyond will be on technology related to Urban, Asymmetric, Littoral and Expeditionary Maneuver Warfare Operations. The related S&T development is of the highest importance to Marine Corps operations in Iraq, Afghanistan and the Global War On Terrorism (GWOT). Understandably, these Warfighter Capability Gaps are among those highest rated of the 34 prioritized Capability Gaps (prioritized by the Office of the Chief of Naval Operations and the Marine Corps Combat Development Command). The technologies associated with these gaps are being pursued as part of an overall

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effort that addresses Sea Strike, Sea Shield, Sea Basing and FORCEnet Capability Gaps. Warfighter Capability Gaps are made up of ECs and supporting products.

Some of the efforts in this activity transition to the following PEs: 0602114N, 0602235N, 0602123N, 0603235N, and 0603640M.

The decrease in funding from FY 2007 to FY 2008 is due to a net zero realignment that was processed to correctly align EC products with the right S&T budget activity funding category to correct an imbalance between 6.2 and 6.3 efforts for the FNCs. Funding and efforts are moved to PE 0603640M during FY 2008 to effect this change.

FY 2006 Accomplishments:

- Continued Expeditionary Fighting Vehicle (EFV) obstacle avoidance subsystem design, integrated subsystems and prepared for demonstration.
- Continued integration and testing of secure mobile network/wireless LAN technologies, including advanced protocols, frequency conversion and power amplification. (Concurrent funding in PE 0603640M.)
- Continued efforts to provide urban direction finding of Radio Frequency (RF) emitters from moving platforms. (Concurrent funding in PE 0603640M. Realigns to PE 0603640M in FY 2007.)
- Continued effort in Distributed Common Ground/Surface System (DCGS) that involves the migration of tactical intelligence systems (sensor networks) to a net-ready architecture and the development of enterprise services that translate this data. (Realigns to PEs 0602235N and 0603235N in FY 2007.)
- Continued development of advanced weapons materials for use in artillery and mortar systems to reduce weight while maintaining strength, and increasing operational life and capability. (Realigns to PE 0603114N in FY 2007.)
- Continued investigation of ammunition packaging techniques to lower weight and have the packaging provide additional use on the battlefield. (Realigns to PE 0602114N in FY 2007.)
- Continued development of target acquisition architecture, information exchange, connectivity and interoperability of target hand-off and fire control and coordination systems. (Previous and concurrent funding in PE 0603640M. Realigns to PEs 0602114N and 0603114N in FY 2007.)
- Continued development of a fires coordination architecture to network existing expeditionary fires systems to enable MAGTF/Joint Fires. (Realigns to PE 0603114N in FY 2007.)
- Continued design and test of hostile fire detection and counter-fire system (GUNSLINGER). (Realigns to PEs 0602114N and 0603114N in FY 2007.)

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- Continued transition of expeditionary maneuver planning and decision-making tools for Marine ground forces to Navy and Marine Corps acquisition. (Concurrent funding in PE 0603782N. Realigns to PE 0602114N in FY 2007.)
- Continued development of integrated vehicle self-defense system technologies to defeat incoming Rocket Propelled Grenades (RPGs). (Concurrent funding in PE 0602782N.)
- Continued development and integration of network monitoring and management tools technology and transition to acquisition. (Concurrent funding in PE 0603782N. Realigns to PE 0603235N in FY 2007.)
- Continued integration and demonstration of innovative relays Beyond Line Of Sight (BLOS) in the areas of wideband communications and advanced modular systems. (Concurrent funding in PE 0603782N. Realigns to PE 0603235N in FY 2007.)
- Continued development of algorithms and initiated modifications of hardware and software for use in discriminating between individual single channel RF emitters on the battlefield and determining their locations; provide algorithms to MARCORSYSCOM Program Manager (PM) INTEL. (Concurrent funding in PE 0603782N. Realigns to PE 0603640M in FY 2007.)
- Continued development of algorithms to derive maps of water depths, current speed and direction, terrain elevation, and sandbar and obstacle location using digital imagery from airborne ISR assets for MARCORSYSCOM PM INTEL and initiate integration testing with ISR platform (tactical littoral sensing). (Concurrent funding in PE 0603782N.)
- Continued development and began transitioning EFV obstacle detection capability to EFV Direct Reporting Program Manager. (Realigns to PE 0603640M in FY 2007.)
- Continued development of land mine countermeasure insensitive munitions technology.
- Continued development of integrated vehicle self-defense system to defeat incoming RPGs.
- Completed development and fabrication of full scale demonstration systems for landmine countermeasure insensitive munitions technology. (Concurrent funding in PE 0602236N.)
- Initiated the development of tactical ISR data structures and pattern recognition algorithms. (Realigns to PE 0602114N in FY 2007.)
- Initiated advanced concept development to alert approaching targets with an unambiguous warning that, if ignored, will clearly demonstrate hostile intent of the approaching target. (Realigned from PE 0602123N.)

FY 2007 Plans:

- Continue all efforts of FY 2006 less those noted as completed above.
- Complete development of a fires coordination architecture to network existing expeditionary fires systems to enable MAGTF/Joint Fires; transition multiple software injectors to MARCORSYSCOM PM GC2. (Transitions to

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PE 0602114N.)

- Complete investigation of ammunition packing techniques to lower weight and have the packaging provide additional use on the battlefield; provide prototype packaging to MARCORSYSCOM PM AMMO. (Transitions to PE 0602114N.)
- Complete development and transition advanced weapons materials for use in artillery and mortar systems to reduce weight while maintaining strength, and increasing operational life and capability to acquisition; provide prototype mortar tube, bipod and baseplate to MARCORSYSCOM PM Expeditionary Fire Support System (EFSS). (Transitions to PE 0602114N.)
- Complete integration and testing of secure mobile network/secure wireless LAN technologies, including advanced protocols, frequency conversions and power amplification; provide advanced networking protocols and antennas to MARCORSYSCOM PM COMM. (Previous effort funded in PEs 0602236N and 0603236N.)
- Complete development, integration and transition of airborne ISR (tactical littoral sensing) capability to MARCORSYSCOM PM INTEL.
- Complete transition of expeditionary maneuver planning and decision-making tools for Marine ground forces to Navy and Marine Corps acquisition; Expeditionary Decision Support System (EDSS) transitions to MARCORSYSCOM and PMS 490. (Transitions to PE 0602114N.)
- Complete development of the Asymmetric Threat Weapon. (Effort partially realigned from PE 0602123N, currently being funded by both PEs.)
- Initiate transparent urban structure 'see thru the wall' and image and mapping technologies development.
- Initiate modular scalable effects weapons technologies development.
- Initiate development of an integrated company level Urban Sensor Suite. (Automated Control of Large Sensor Networks) (Transitions to PE 0602235N.)
- Initiate detect and ID facilities technology development. (Transparent Urban Structures)
- Initiate decision aids technology development. (Transparent Urban Structures)
- Initiate indirect prototype technology development. (Modular Scalable Effects Weapon)

FY 2008 Plans:

- Continue all efforts of FY 2007 less those noted as completed above.
- Initiate development of Modular Scalable Effects weapons technologies. (Concurrent funding in PE 0603640M.)
- Initiate development of counter Improvised Explosive Device (IED) technologies. (Concurrent funding in PE 0603640M.)
- Initiate development of tactical urban breaching technologies. (Concurrent funding in PE 0603640M.)

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FY 2009 Plans:

- Continue all efforts of FY 2008 less those noted as completed above.
- Develop and apply emerging technologies that support delivery of Technology Oversight Group (TOG) approved FNC enabling capabilities structured to close operational capability gaps in the Marine Corps landing force.
- Package emerging Marine Corps landing force technologies into deliverable FNC products and ECs that can be integrated into acquisition programs within a five year period.
- Mature Marine Corps landing technologies that support naval requirements identified within the Sea Strike and Sea Shield naval capability pillars.

	FY 2006	FY 2007	FY 2008	FY 2009
MANEUVER	5,172	5,994	6,239	6,174

The Maneuver thrust area focuses on the development, demonstration, and transition of technologies that will increase the warfighting capabilities and effectiveness of the MAGTF. 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. Special emphasis on survivability technologies for the defeat of small arms, IEDs, mine blast, and RPGs continue to be incorporated in this thrust area. A concentrated effort has also been made in the development of modeling and simulation tools that integrate many different physics based modeling systems with rigorous operational analysis simulations to accurately define a system's performance characteristics. These tools will aid in defining the trade space for emerging technologies and assist in providing the program manager insight and guidance into pursuing future technologies. Finally, this technology thrust area also seeks to develop technologies to enhance combat vehicle crewman effectiveness and situational awareness through the incorporation of advanced autonomous vehicle functions triggered directly by the cognitive state of the operator. Presently, Mine CounterMeasures 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, IEDs, and Unexploded Ordnance (UXO) from the beach exit to inland objectives. MAGTF MCM is a functional component of Naval Expeditionary Maneuver Warfare and includes Ship to Objective Maneuver (STOM), Expeditionary Operations from a Sea Base, sustained Operations Ashore, Urban and Asymmetric Operations, and Operations other than War.

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FY 2006 Accomplishments:

- Continued lightweight Expeditionary Systems Materials (ESM) efforts to determine feasibility of scaling and producing candidate structural armor.
- Continued Cognitive Assessment and Task Management technologies for combat vehicle crewmen (formerly Augmented Cognition effort).
- Continued development of Advanced Electromagnetic Armor (E-NERA).
- Continued the development of scalable explosive neutralization technologies for MCM.
- Completed modeling and simulation and analysis of alternative combat vehicles concepts.
- Continued USMC participation in Explosion Resistant Coatings (ERC) Advanced Concept Technology Demonstration (ACTD).
- Initiated S&T programs to address MAGTF Land MCM Master Plan capability gaps.
- Initiated technologies for stand-off detection and neutralization of mines, IEDs, and Unexploded Ordnance (UXO).
- Initiated technologies to defeat side/top attack and advanced fuse mines through signature reduction and advanced signature duplication.
- Initiated development of modeling tools to accurately determine loading and fragmentation effects on targets from mine explosions.
- Initiated development of technologies to defeat advanced mine fuzes (seismic, acoustic, and infrared).
- Initiated development of computational models to scale the effects of small-scale explosives tests to full-scale landmine explosions in order to study mine blast effects on advanced vehicle geometry.
- Initiated development of Variable Load & Ride Height Suspension System.
- Initiated Whole Vehicle Fuel Efficiency Improvement effort.

FY 2007 Plans:

- Continue all efforts of FY 2006 less those noted as completed above.
- Complete development of Variable Load & Ride Height Suspension System.
- Complete Whole Vehicle Fuel Efficiency Improvement effort.
- Complete USMC participation in ERC ACTD.
- Initiate development of countermeasures for smart mine sensors.
- Initiate mobility enhancement development effort for current and future light and medium weight Marine Corps

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vehicle programs.

- Initiate and complete development of materials to promote Combat Science and Technology Vehicle (CSTV) survivability.
- Initiate development of advanced electromagnetic armor for ground vehicle survivability.
- Initiate development of cognitive assessment and task management concept for CSTV.

FY 2008 Plans:

- Continue all efforts of FY 2007 less those noted as completed above.
- Complete development of scalable explosive neutralization methods.
- Initiate integration of CSTV capabilities.
- Initiate development of fuel efficiency and battlefield power technologies for the CSTV and ground vehicles.
- Initiate studies into mine signature classification.
- Initiate technology development programs to address force protection capability gaps.
- Initiate spectral signature classification efforts for MCM applications.

FY 2009 Plans:

- Continue all efforts of FY 2008 less those noted as completed above.
- Complete studies into mine signature classification.
- Initiate studies of sensor fields to identify and classify mine threats.

	FY 2006	FY 2007	FY 2008	FY 2009
HUMAN PERFORMANCE, TRAINING AND SURVIVABILITY	1,588	1,993	2,260	2,237

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

FY 2006 Accomplishments:

- Continued evaluation and development of tools to support real-time cognitive and behavioral assessment

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- (augmented cognition) and improvement of individuals and teams during operations and training.
- Completed research and developed tools to rapidly generate synthetic environments (3D databases, database correlation techniques) within and urban landscape applicable to Military Operations in Urban Terrain (MOUT).
 - Completed development of realistic training environments that supplement field training and provide instructors with advanced situational awareness, after action review, and mission preview capabilities.
 - Completed research to develop comprehensive performance fidelity architectures for mapping training objectives, strategies and requirements onto training system specifications.
 - Continued research in the area of team training task analyses and training effectiveness evaluation techniques to develop more effective training systems for MOUT.
 - Initiated and completed research to develop metrics for improving an individual's operational performance in stressful urban environments including use for selection and recruiting to that mission specialty.
 - Initiated research to evaluate the feasibility of integrating augmented reality technologies into current and emerging training systems.

FY 2007 Plans:

- Continue all efforts of FY 2006 less those noted as completed above.
- Complete development of a performance fidelity architecture, applying the model to develop guidelines and specifications for a to-be-built training system.
- Complete development of tools to rapidly generate synthetic environments (3D databases, database correlation techniques) within an urban landscape (MOUT), and apply to existing training programs (i.e., Virtual Technologies and Environments-(VIRTE) Demo III).
- Initiate research on combat situation awareness and its effect on combat performance.
- Initiate research on combat feeding and hydration.
- Initiate research on physiological correlates for strategic corporal assessment.
- Initiate development into a Marine performance optimization model.
- Initiate the development of training effectiveness measures and techniques as applied to disparate, multi-platform, multi-mission team training.

FY 2008 Plans:

- Continue all efforts of FY 2007 less those noted as completed above.
- Complete research on combat situation awareness and its effect on combat performance.
- Initiate research into distributed operations peak neural and cognitive performance.

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- Initiate research into next generation survivability enhancement technologies.

FY 2009 Plans:

- Continue all efforts of FY 2008 less those noted as completed above.
- Continue studies into next generation survivability enhancement technologies. (Continues in 0603640M.)
- Complete evaluation and development of tools to support real-time cognitive and behavioral assessment (augmented cognition) and improvement of individuals and teams during operations and training.
- Complete research in the area of team training task analyses and training effectiveness evaluation techniques to develop more effective training systems for MOUT.

	FY 2006	FY 2007	FY 2008	FY 2009
COMMAND, CONTROL, COMMUNICATIONS, COMPUTERS, INTELLIGENCE, SURVEILLANCE AND RECONNAISSANCE (C4ISR)	2,735	3,113	3,210	3,195

This activity provides technologies for secure, robust, self-forming, mobile communications networks (FORCENet); distributed computing to support information dissemination to all echelons; and sensors, software and data processing to support formation of appropriate common picture. Emphasis for Marine Corps efforts includes power management, low detect ability, size and weight constraints, and interoperability within the joint environment.

FY 2006 Accomplishments:

- Continued development of conformal, broadband, Ultra High Frequency-Very high Frequency (UHF-VHF) antennas.
- Continued development of non-line-of-sight communications technologies.
- Continued development of urban navigation technologies.
- Continued development of low-probability of detection random noise communications waveforms.
- Continued development of communications technologies for high attenuation and multi-path environments.
- Completed development of network management technologies for the low-bandwidth, heterogeneous communication environment.
- Initiated development of technology to provide position location in Global-Positioning System (GPS) restricted environments.
- Initiated development of information fusion technologies to allow automated construction of a common tactical picture from various sources of sensor data.

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- Initiated development of low power consumption urban sensing technologies.

FY 2007 Plans:

- Continue all efforts of FY 2006 less those noted as completed above.
- Complete development of low-probability of detection random noise communications waveforms.
- Complete development of communications technologies for high attenuation and multi-path environments. Efforts will continue to mature this technology within PE 0603640M.
- Complete development of network management capabilities for the low-bandwidth, heterogeneous communication environment.
- Complete development of urban navigation technologies.
- Initiate development of tagging, tracking and locating technologies to monitor adversary movement.
- Initiate development of information on demand technologies to provide warfighter with the right information at the right time.
- Initiate development of urban sensing technologies to detect weapons at distance.
- Initiate development of adaptable enemy course of action engine to manipulate adversary decisions.

FY 2008 Plans:

- Continue all efforts of FY 2007 less those noted as completed above.
- Complete development of conformal, broadband, UHF-VHF antennas.
- Complete development of technology to provide position location in GPS restricted environments.
- Complete development of non-line-of-sight communications technologies.
- Initiate development of advanced tactical sensor technologies to improve unit awareness.

FY 2009 Plans:

- Continue all efforts of FY 2008 less those noted as completed above.
- Initiate development of distributed information architecture technologies.

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	FY 2006	FY 2007	FY 2008	FY 2009
FIREPOWER	2,532	2,559	2,800	2,780

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

FY 2006 Accomplishments:

- Completed development of Microelectromechanical Systems (MEMS) concepts to comply with OSD submunition reliability and Navy Weapons Systems Explosive Safety Review Board requirements for submunitions to be stored aboard U.S. Navy ships.
- Completed an assessment of current and emerging technologies to be incorporated into a Marine Advanced Combat Headborne System Initiative. The goal is to increase warfighter head and neck protection while enhancing warfighter comfort and minimizing warfighter encumbrance. Transition to 6.3 effort in PE 0603640M under Human Performance Training and Education.
- Initiated development of a concept for an insensitive munition propulsion system to enable firing a shoulder launched rocket from an enclosed space.

FY 2007 Plans:

- Continue all efforts of FY 2006 less those noted as completed above.
- Initiate development of enhanced mortar munitions for more effective fire support.
- Initiate an investigation of the scalability of variable effects conventional munitions technology for improving firepower effectiveness while increasing affordability and decreasing logistical burden in support of expeditionary warfare.
- Initiate development of collaborative fires coordination technologies.
- Initiate development of precision fires engagement technologies.

FY 2008 Plans:

- Continue all efforts of FY 2007.

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FY 2009 Plans:

- Continue all efforts of FY 2008.
- Complete development of collaborative fires coordination technologies.

	FY 2006	FY 2007	FY 2008	FY 2009
LOGISTICS	1,688	1,735	2,036	2,217

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 research into using polymer gel electrolytes and novel air electrodes in next generation metal air batteries to demonstrate the feasibility of performance improvement.
- Initiated developing and assessing concepts that permit precision delivery of logistics assets while also reducing the logistics footprint ashore.
- Initiated development of an alternate power source to reduce logistics footprint and increase sustainability of Marine expeditionary forces.

FY 2007 Plans:

- Continue all efforts of FY 2006.
- Complete research into using polymer gel electrolytes and novel air electrodes in next generation metal air batteries to demonstrate the feasibility of performance improvement.
- Initiate assessment of 20W Stirling Engine for increased efficiency during distributed operations.
- Initiate assessment of portable, alternative water purification systems.
- Initiate analysis of Personal Power Network / Centralized Distributed Operations Power Generation System.

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FY 2008 Plans:

- Continue all efforts of FY 2007 less those noted as completed above.
- Initiate development of wireless vehicle health diagnosis and reporting.
- Initiate development of advanced logistics distribution system. The increase in funds supports Distributed Operations.

FY 2009 Plans:

- Continue all efforts of FY 2008.
- Complete assessment of 20W Stirling Engine for increased efficiency during distributed operations.
- Complete analysis of Personal Power Network / Centralized Distributed Operations Power Generation System.
- Complete assessment of portable, alternative water purification systems.

	FY 2006	FY 2007	FY 2008	FY 2009
FUTURE CONCEPTS, TECHNOLOGY ASSESSMENT, AND ROADMAPPING	792	451	651	642

This activity supports the planning and integration of technology development efforts across the entire PE. In conjunction with the Concepts Based Capabilities System and the Marine Corps Warfighting Laboratory, unique and novel concepts for advanced warfighting are developed and validated. Effectiveness analyses are conducted to identify the synergistic effects that can be achieved through the integration of emerging technology with innovative tactics, doctrine, and techniques. Technology assessments are conducted to determine the supporting technologies that have the highest impact across the warfare areas, and warrant further investment within this PE. Technology Roadmapping is conducted to help identify opportunities to leverage technology development within the Department of the Navy and the Department of Defense, as well as, with the commercial sector and university communities. The resultant technology investment strategy is developed and used to guide out-year technology development efforts.

The increase in funding in FY 2008 will address USMC S&T plans for distributed operations. The distributed operations study/road-mapping effort was planned for execution in FY 2006 but was delayed pending Commandant of the Marine Corps review so FY 2007 funding was redirected to unfunded priorities.

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

DATE: February 2007

BUDGET ACTIVITY: 02

PROGRAM ELEMENT: 0602131M PROGRAM ELEMENT TITLE: MARINE CORPS LANDING FORCE TECHNOLOGY

PROJECT TITLE: MARINE CORPS LANDING FORCE TECHNOLOGY

FY 2006 Accomplishments:

- Continued Technology Assessments associated with the Urban Asymmetric and Expeditionary Warfare Capability Gap.
- Continued the integrated planning of concepts and technology development.
- Initiated Technology Assessment and Roadmapping of the Maneuver; and Human Performance, Training and Survivability Thrust Areas.
- Initiated development of the Expeditionary Maneuver Warfare Investment Strategy.
- Initiated Technology Assessments and Roadmapping within Command, Control, Communication, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR); and Firepower Thrust Areas of the PE.

FY 2007 Plans:

- Continue all efforts from FY 2006.
- Complete Technology Assessment and Roadmapping of the Maneuver; and Human Performance, Training and Survivability Thrust Areas.
- Complete development of the Expeditionary Maneuver Warfare Investment Plan.
- Initiate implementation of an S&T Management Information System.
- Initiate Technology Assessment of the Combating Terrorism portfolio.

FY 2008 Plans:

- Continue all efforts from FY 2007 less those noted as completed above.
- Complete implementation of S&T Management Information System.
- Initiate assessment of the technical requirements of the Marine Corps Special Operations Command (MARSOC).

FY 2009 Plans:

- Continue all efforts from FY 2008 less those noted as completed above.
- Continue assessment of the technical requirements of the MARSOC.

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CONGRESSIONAL PLUS-UPS:

	FY 2006	FY 2007
ADVANCED LEAD ACID BATTERY DEVELOPMENT FOR MILITARY VEHICLES	958	0

This effort supported advanced lead acid battery development by incorporating horizontal plate topology and paste additives in the battery's design to increase specific energy and improve cycle life. Additionally, a hybrid electric High-Mobility Multipurpose Wheeled Vehicle (HMMWV) was modified to accept the advanced battery.

	FY 2006	FY 2007
HIGH POWER LIGHTWEIGHT ZINC-AIR BATTERIES	0	1,644

This effort addresses the potential application of highpower lightweight zinc-air batteries in addressing the battlefield needs of the Marine Corps.

	FY 2006	FY 2007
INTEGRATED ASYMMETRIC URBAN WARFARE	0	996

This effort addresses the asymmetric warfighting challenges of the urban battlefield, specifically; the need for greater speed of information, enhanced urban visualization/speed of tactical level decisions, enhanced close quarter combat capabilities and infantry equipment, greater speed of action and sustainment as well as related priority work in weapon accuracy and lethality and enhanced individual survivability.

	FY 2006	FY 2007
WARFIGHTER RAPID AWARENESS PROCESSING TECHNOLOGY FOR DISTRIBUTED OPS	0	1,793

This effort supports Distributed Operations which is a new USMC concept which describes an operating approach that will create an advantage over an adversary through the deliberate use of separation and coordinated, interdependent, tactical actions enabled by increased access to functional support, as well as by enhanced combat capabilities at the small-unit level.

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C. OTHER PROGRAM FUNDING SUMMARY:

ALL: NAVY RELATED RDT&E: This program adheres to Tri-Service Reliance Agreements in Chemical/Biological Defense; Command, Control and Communications; Conventional Air/Surface Weaponry; Electronic Devices; Ground Vehicles; Ships and Watercraft; Manpower and Personnel; and Training Systems.

PE 0204163N (Fleet Telecommunications (Tactical))
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 0602235N (Common Picture Applied Research)
PE 0602782N (Mine and Expeditionary Warfare Applied Research)
PE 0603235N (Common Picture Advanced Technology)
PE 0603612M (USMC Mine Countermeasures Systems - Adv Dev)
PE 0603635M (Marine Corps Ground Combat/Support System)
PE 0603236N (Warfighter Sustainment Advanced Technology)
PE 0603640M (USMC Advanced Technology Demonstration (ATD))
PE 0603782N (Mine and Expeditionary Warfare Advanced Technology)

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)

D. ACQUISITION STRATEGY:

Not applicable.