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

COST: (Dollars in Thousands)

Project Number & Title	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
MARINE CORPS LANDING FORCE TECHNOLOGY	29,541	37,036	37,590	37,516	39,136	39,986	41,125	42,059

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Marine Corps is tasked to develop, in conjunction with the Navy, Army, and Air Force, those phases of amphibious operations that pertain to tactics, techniques, and equipment used by the landing force. 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 amphibious warfare and subsequent operations ashore. This PE provides the knowledge base to support Advanced Technology Development (6.3) and is the technology base for future amphibious/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. The Future Naval Capabilities (FNC) process is supported and funds are programmed accordingly. 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 Sea Shield as well as enable the Ship to Objective Maneuver (STOM) and Persistent Intelligence, Surveillance and Reconnaissance (ISR), key transformational capabilities within Sea Strike and the enhanced Sea-borne Positioning of Joint Assets within Sea Basing.

Due to the number of efforts in this PE, the programs described herein are representative of the work included in this PE.

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

PROGRAM CHANGE SUMMARY:

	FY 2004	FY 2005	FY 2006	FY 2007
FY 2005 President's Budget Submission	32,375	35,398	38,707	38,022
Cong Rescissions/Adjustments/Undist. Reductions	0	-354	0	0
Congressional Action	0	2,000	0	0
Program Adjustments	0	-8	-1,614	-594
Execution Adjustments	-2,579	0	0	0
Non-Pay Inflation Adjustments	-30	0	0	0
Rate Adjustments	0	0	497	88
SBIR Assessment	-225	0	0	0
FY 2006/2007 President's Budget Submission	29,541	37,036	37,590	37,516

PROGRAM CHANGE SUMMARY EXPLANATION:
Technical: Not applicable.

Schedule: Not applicable.

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

COST: (Dollars in Thousands)

Project Number & Title	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
MARINE CORPS LANDING FORCE TECHNOLOGY	29,541	37,036	37,590	37,516	39,136	39,986	41,125	42,059

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project is organized into six activities which are represented as five Expeditionary Warfighting Capability Areas and the Littoral Combat/Power Projection (LC/PP) Future Naval Capability (FNC). The five Expeditionary Warfighting Areas support the Discovery and Inventions (D&I) and the Innovation and Transformation (I&T) investment. The LC/PP FNC supports the Exploitation and Deployment (E&D) investment. Within the Naval Transformation Roadmap, this investment will achieve key transformational capabilities required by Sea Shield as well as enable the Ship to Objective Maneuver (STOM) and Persistent Intelligence, Surveillance and Reconnaissance (ISR), key transformational capabilities within Sea Strike and the enhanced Sea-borne Positioning of Joint Assets within Sea Basing.

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2004	FY 2005	FY 2006	FY 2007
LITTORAL COMBAT/POWER PROJECTION	13,757	16,874	22,062	21,464

This activity provides the capability for the demonstration and transition of technologies developed through the Marine Corps Science and Technology program 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 these efforts are transitioned to acquisition programs of record, the focus of the FNC within this PE in FY 2006 and beyond will be on technology related to Urban, Asymmetric, and Expeditionary Operations (UAEO). The UAEO Capability Gap is a science and technology developmental area that is of the highest importance to Marine Corps operations in Iraq and Afghanistan. The UAEO Capability Gap is one of 25 prioritized Capability Gaps (prioritized by OPNAV N-6/7 and the Marine Corps Combat Development Command) that are made up of Enabling Capabilities (ECs) and supporting products. The UAEO technology gap is being pursued as part of an overall effort that addresses the Sea Strike Capability Gap.

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

FY 2004 Accomplishments:

- Continued development of advanced target acquisition technologies for achieving interoperability among US/Joint/Coalition close air support platforms.
- 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.
- Continued development of Expeditionary Fighting Vehicle (EFV) obstacle avoidance system.
- Continued design, development and integration of hostile fire detection and counter-fire system (GUNSLINGER) spiral 1.
- Continued development of expeditionary maneuver planning and decision-making tools for Marine ground forces. Tested the software and evaluated during training exercises.
- Continued development of secure mobile network/secure wireless LAN technologies, including advanced protocols, frequency conversion and power amplification.
- Continued development and integration of innovative relays Beyond-Line-of-Sight (BLOS) in the areas of wideband communications.
- Continued development and demonstrated the Over-the-Horizon/Beyond-Line-of-Sight/On-the-Move (OTH/BLOS/OTM) tactical data network system for use by maneuver forces. (FY 05 efforts funded by PE 0603236N)
- Continued development and integration of advanced Position Location Information (PLI) system with range instrumentation enhancements. (FY 05 efforts funded by PE 0603236N)
- Initiated efforts to enhance and refine an automated Radio Frequency (RF) emitter mapping tool for Radio Battalions. (FY 05 efforts funded by PE 0603640M)
- Initiated development of advanced sensing algorithms to derive maps of water depths, current speed and direction, terrain elevation, and sandbar and obstacle location using digital imagery from airborne Intelligence, Surveillance, and Reconnaissance (ISR) assets to support expeditionary maneuver planning.
- Initiated development of algorithms for use in discriminating between individual single channel RF emitters on the battlefield and determining their locations.
- Initiated design of extended range and improved lethality mortar munitions.
- Initiated development efforts for a network monitoring and management tools technology.
- Initiated development and integration of organic light emitting diode (OLED) display technology for use by Marine Corps units. (FY 05 efforts funded by PE 0603236N)

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

FY 2005 Plans:

- Complete development of technologies to enhance lethality and extend range for mortar munitions.
- Continue development of algorithms for use in discriminating between individual single channel RF emitters on the battlefield and determining their locations.
- Continue 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.
- Continue development of advanced weapons materials for use in artillery and mortar systems to reduce weight while maintaining strength, and increasing operational life and capability.
- Continue development and test target acquisition technologies for achieving interoperability among US/Joint/Coalition close air support platforms and commence transition to acquisition.
- Continue EFV obstacle avoidance subsystem design, integrate subsystems and prepare for demonstration.
- Continue hostile fire detection and counter-fire subsystem design (GUNSLINGER).
- Continue development and integration of network monitoring and management tools technology.
- Continue integration and demonstration of innovative relays (BLOS) in the areas of wideband communications and advanced modular systems.
- Continue integration and testing of secure mobile network/wireless LAN technologies, including advanced protocols, frequency conversion and power amplification. (FY 06 efforts funded by PE 0603640M)
- Continue development of expeditionary maneuver planning and decision-making tools for Marine ground forces.
- Initiate effort in Distributed Common Ground/Surface System (DCGS) to improve integrated forecasting and planning and battlefield information integration.
- Initiate effort in DCGS that involves the migration of tactical intelligence systems (sensor networks) to a net-ready architecture and the development of enterprise services that translates and distributes this data.
- Initiate investigation of ammunition packaging techniques to lower weight and have the packaging provide additional use on the battlefield.
- Initiate development of an architecture to network existing expeditionary fires systems to enable MAGTF/ Joint Fires (fires coordination). (Concurrent effort funded by PE 0602236N)
- Initiate development of land mine countermeasure insensitive munitions technology.
- Initiate development of integrated vehicle self-defense system to defeat incoming Rocket Propelled Grenades (RPGs).

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

FY 2006 Plans:

- Complete development of algorithms and commence modifications of hardware and software for use in discriminating between individual single channel RF emitters on the battlefield and determining their locations.
- Complete 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 and initiate integration testing with ISR platform.
- Complete development and transition EFV obstacle avoidance capability to acquisition.
- Continue effort in 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.
- Continue development of advanced weapons materials for use in artillery and mortar systems to reduce weight while maintaining strength, and increasing operational life and capability.
- Continue investigation of ammunition packaging techniques to lower weight and have the packaging provide additional use on the battlefield.
- Continue development of architecture, information exchange, connectivity and interoperability of target hand-off and fire control and coordination systems. (Previous and concurrent efforts funded by PE 0603640M; FY 07 effort will be funded by PE 0603640M))
- Continue design and test of hostile fire detection and counter-fire system (GUNSLINGER).
- Continue transition of expeditionary maneuver planning and decision-making tools for Marine ground forces to Navy and Marine Corps acquisition.
- Continue development of integrated vehicle self-defense system technologies to defeat incoming RPGs.
- Continue development and fabrication of full scale demonstration systems for landmine countermeasure insensitive munitions technology.
- Continue development and integration of network monitoring and management tools technology and transition to acquisition.
- Continue integration and demonstration of innovative relays (BLOS) in the areas of wideband communications and advanced modular systems.
- Initiate development of tactical ISR data pattern recognition material.

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

FY 2007 Plans:

- Complete modifications of hardware and software for use in discriminating between individual single channel RF emitters on the battlefield and determining their locations.
- Complete development and transition airborne ISR (tactical littoral sensing) capability to acquisition.
- Complete transition and transition support of expeditionary maneuver planning and decision-making tools for Marine ground forces to Navy and Marine Corps acquisition.
- Complete investigation of ammunition packaging techniques to lower weight and have the packaging provide additional use on the battlefield.
- 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.
- Complete integration and testing of secure mobile network/secure wireless LAN technologies, including advanced protocols, frequency conversion and power amplification. (Previous effort funded by PE 0602236N and PE 0603236N)
- Continue development of tactical ISR data pattern recognition material.
- Continue development of architecture, information exchange, connectivity and interoperability of target hand-off and fire control systems.
- Continue development and fabrication of full scale demonstration systems for landmine countermeasure insensitive munitions technology.
- Continue design and test of hostile fire detection and counter-fire system (GUNSLINGER).
- Continue development of integrated vehicle self-defense system to defeat incoming RPGs.
- Continue development and integration of network monitoring and management tools technology and transition to acquisition.
- Continue integration and demonstration of innovative relays (BLOS) in the areas of wideband communications and advanced modular systems. Complete transition to the acquisition community.
- Initiate development of an integrated company level Urban Sensor Suite (Automated Control of Large Sensor Networks).

	FY 2004	FY 2005	FY 2006	FY 2007
MANEUVER	3,707	6,115	5,468	5,769

This activity supports and enhances the overall maneuver of forces ashore through the development of mobility, survivability, and unmanned ground vehicle technologies. The Maneuver Thrust Area focuses on the development,

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

demonstration, and transition of technologies that will increase the warfighting capabilities and effectiveness of the Marine Corps Air Ground Task Force (MAGTF). This Thrust aims at capturing emerging and "leap ahead" technologies in the areas of mobility, materials, propulsion, survivability, durability, signature reduction, and modularity. A concentrated effort has 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. Beginning in FY 2006, this activity also develops technologies to enable land-mine detection, neutralization, breaching, and clearing from Beach Exit Zone to inland objectives. Therefore, efforts formerly reported under Mine Countermeasures (MCM) activity are now reflected under this activity. Mine Countermeasures (MCM) encompasses countermine, counter-Improvised Explosive Device (IED), and counter-Unexploded Ordnance (UXO) enabling technologies. Current Naval Mine Countermine (MCM) efforts address MCM capabilities through the Beach Exit Zone, but do not address a seamless, end-to-end MCM capability. MAGTF MCM must be a functional component of Naval Expeditionary Maneuver Warfare (EMW); to include Ship to Objective Maneuver, Expeditionary Operations from a Sea Base, Sustained Operations Ashore, and Operations Other Than War. In 2001 the Institute for Defense Analyses (IDA)/Office of Naval Research (ONR) "Mine Countermeasures (MCM) for Beach Exit Zone to Objectives Study" comprehensively looked at all on-going MCM programs and technologies, particularly U.S. Army MCM plans. The IDA/ONR MCM Study identified major MAGTF deficiencies (inadequately addressed in current Army, Navy, and Marine Corps programs). The IDA/ONR MCM Study's execution strategy was endorsed by senior Marine Corps leadership and is partially executed through this activity.

FY 2004 Accomplishments:

- Developed MAGTF Expeditionary Family of Fighting Vehicles (MEFFV) and Maneuver Technology Investment Strategies. Received MEFFV & Maneuver Technology Roadmaps.
- Completed Expeditionary Fighting Vehicle (EFV) band track redesign based on lessons learned and results from Phase I Assault Amphibian Vehicle (AAV) testing. Fabricated new tracks and tested on higher weight AAV.
- Completed Tactical Unmanned Ground Vehicle (TUGV) technology development and insertion into the Acquisition Program of Record improvements in propulsion, sensors, and data fusion capabilities. Conducted Mobility and Scout/Surveillance Demonstration at the Severe Off-road Track at Quantico.
- Continued lightweight Expeditionary Systems Materials (ESM) efforts to determine feasibility of scaling and producing candidate structural armor.
- Continued simulation based acquisition tool for conducting future combat vehicle design tradeoffs.

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

FY 2005 Plans:

- Continue MEFFV technology development by initiating concept development and design using the simulation based design tool previously developed and results of subsystem developments.
- Continue Phase II ESM efforts and prepare for Phase III down selection process.
- Initiate Augmented Cognition efforts related ground vehicle applications.
- Initiate combat vehicle survivability study to develop armor solutions for application to current and future combat vehicles.
- Initiate Energetic Non-Explosive Reactive Armor (E NERA) technology development effort.
- Initiate USMC participation in Explosion Resistant Coatings (ERC) ACTD.

FY 2006 Plans:

- Complete USMC participation in Explosion Resistant Coatings (ERC) ACTD.
- Continue Phase III ESM efforts to determine feasibility of scaling and producing candidate structural armor and multifunctional materials.
- Continue modeling and simulation and analysis of alternative MEFFV concepts.
- Continue Augmented Cognition efforts related ground vehicle application.
- Continue Energetic Non-Explosive Reactive Armor development efforts.
- Initiate MAGTF Land MCM S&T initiatives to address detection and neutralization deficiencies within the MAGTF.

FY 2007 Plans:

- Continue Phase III ESM efforts including tests and demonstrations and prepare for transition of technology to the MEFFV program office.
- Continue Energetic Non-Explosive Reactive Armor development efforts.
- Continue MAGTF Land MCM S&T initiatives to address detection and neutralization deficiencies within the MAGTF.

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

	FY 2004	FY 2005	FY 2006	FY 2007
HUMAN PERFORMANCE, TRAINING & EDUCATION (HPT&E)	2,344	3,350	1,784	1,993

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.

FY 2004 Accomplishments:

- Completed development of a Proof of Concept Anti-Terrorism (AT) Tactical Decision Simulation (TDS) and performed a Cognitive Task Analysis (CTA).
- Completed development of a Logistics TDS.
- Continued development of technologies for Radio Frequency (RF) tracking and video tracking fusion for enhanced situational awareness in a Military Operations in Urban Terrain (MOUT) training environment.
- Continued development and evaluation of technologies for producing a common three dimensional (3D) database format and toolset suitable for use with rapid portable synthetic environment generation technology and tactical decision-making simulation technology.
- Initiated development of a Joint Terminal Attack Controller (JTAC) TDS including a CTA.
- Initiated evaluation of the suitability of cognitive performance enhancement (augmented cognition) technologies to improve human cognition via multiple sensory modalities.

FY 2005 Plans:

- Complete development of a JTAC TDS.
- Complete development of technologies supporting rapid and dynamic generation of 3D real-world terrain features suitable for Marine Corps training application.
- Complete the development of RF tracking and video tracking fusion for enhanced situational awareness in a MOUT training environment.
- Continue 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.
- Continue to research and develop tools to rapidly generate synthetic environments (3D databases, database correlation techniques) within and urban landscape (MOUT).
- Initiate development of realistic training environments that supplement field training and provide instructors with advanced situational awareness, after action review, and mission preview capabilities.

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

- Initiate research to develop a comprehensive performance fidelity architectures for mapping training objectives, strategies and requirements onto training system specifications.
- Initiate research in the area of team training task analyses and training effectiveness evaluation techniques to develop more effective training systems for MOUT.

FY 2006 Plans:

- Continue 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.
- Continue developing a performance fidelity architecture, validating against existing USMC based training systems.
- Continue research in the area of team training task analyses and training effectiveness evaluation techniques to develop more effective training systems for MOUT.
- Continue to create validated realistic training environments that supplement field training and provide instructors with advanced situational awareness, after action review, and mission preview capabilities.
- Continue to research and develop tools to rapidly generate synthetic environments (3D databases, database correlation techniques) within and urban landscape (MOUT).
- Continue research to develop a comprehensive performance fidelity architectures for mapping training objectives, strategies and requirements onto training system specifications.
- Initiate 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.
- Initiate research to evaluate the feasibility of integrating augmented reality technologies into current and emerging training systems.

FY 2007 Plans:

- 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).
- Continue 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.
- Continue research in the area of team training task analyses and training effectiveness evaluation

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

techniques to develop more effective training systems for MOUT.
- Continue to create validated realistic training environments that supplement field training and provide instructors with advanced situational awareness, after action review, and mission preview capabilities.
- Continue 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.
- Continue research to evaluate the feasibility of integrating augmented reality technologies into current and emerging training systems.
- Initiate the development of training effectiveness measures and techniques as applied to disparate, multi-platform, multi-mission team training.

	FY 2004	FY 2005	FY 2006	FY 2007
COMMAND, CONTROL, COMMUNICATIONS, COMPUTERS, INTELLIGENCE, SURVEILLANCE AND RECONNAISSANCE (C4ISR)	3,719	3,350	3,031	3,113

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 2004 Accomplishments:

- Completed development of high-density, solid-state data storage devices.
- Continued development of conformal, broadband, Ultra High Frequency-Very high Frequency (UHF-VHF) antennas.
- Continued development of network mobility capabilities for the low-bandwidth, heterogeneous communication environment.
- Continued development of network security technologies for low-bandwidth wireless distributed environments.
- Initiated development of network management capabilities for the low-bandwidth, heterogeneous communication environment.
- Initiated development of low-probability of detection random noise communications waveforms.

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

FY 2005 Plans:

- Complete development of network security technologies for low-bandwidth distributed environments.
- Continue development of FY2004 efforts less those noted as completed above.
- Initiate development of communications technologies for high attenuation and multi-path environments.
- Initiate development of technology to provide position location in global-positioning system restricted environments.

FY 2006 Plans:

- Complete development of conformal, broadband, UHF-VHF antennas.
- Continue development of FY 2005 efforts less those noted as completed above.
- Initiate development of information fusion technologies to allow automated construction of a common tactical picture from various sources of sensor data.
- Initiate development of low power consumption urban sensing technologies.

FY 2007 Plans:

- Complete development of low-probability of detection random noise communications waveforms.
- Complete development of communications technologies for high attenuation and multi-path environments.
- Complete development of technology to provide position location in global-positioning system restricted environments.
- Complete development of network management capabilities for the low-bandwidth, heterogeneous communication environment.
- Continue development of FY 2006 efforts less those noted as completed above.
- Initiate development of information management technologies to reduce information overload.
- Initiate development of processor-efficient measurements and signature intelligence information fusion algorithms.
- Initiate development of information management technologies to reduce information overload.

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

	FY 2004	FY 2005	FY 2006	FY 2007
FIREPOWER	2,709	3,304	2,735	2,702

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 2004 Accomplishments:

- Completed Phase 2 of electromuscular disruption non-lethal weapon efforts. (Transitioned to PE 0603640M for FY05 advanced development)
- Completed investigation of in-service mortar barrel wear and materials and related processes to enhance the durability of future mortar systems.
- Completed an assessment of existing and evolving fuze technologies to enhance the reliability and safety of submunitions to be stored aboard U.S. Navy ships.
- Completed concept development effort for a mortar reconnaissance round to support warfighter situational awareness.
- Continued improved far target location and extended range performance and detection of camouflaged/hidden targets in support of M1A1 Firepower Enhancement Program. (Transitioned to PE 0603640M for FY05 advanced development)
- Initiated and completed development of concepts for the small arms sensor fusion to enhance the effectiveness of the individual warfighter in conjunction with the Joint Service Small Arms Program.

FY 2005 Plans:

- Initiate 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. This includes development of a MEMS process micro detonator enabling technology.
- Initiate development of a concept for an insensitive munition (IM) propulsion system to enable firing a shoulder launched rocket from an enclosed space. Establish initial feasibility and practicality of solutions for improving firepower effectiveness.
- Initiate an assessment of current and emerging technologies to be incorporated into a Marine Advanced Combat Headborne System Initiative (MACHSI). The goal is to increase warfighter head and neck protection while

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

enhancing warfighter comfort and minimizing warfighter encumbrance.

FY 2006 Plans:

- Complete MACHSI 6.2 effort and transition to 6.3 effort.
- Continue all efforts of FY05 less those noted as completed above.

FY 2007 Plans:

- Continue MEMS shipboard submunition fuze safety and reliability effort.
- Continue IM propulsion system above.
- Initiate assessment of current and emerging IM technologies for broad application to munitions for improving firepower effectiveness while increasing affordability and decreasing logistical burden in support of expeditionary warfare.
- Initiate an investigation of the scalability of variable yield conventional munitions technologies for improving firepower effectiveness while increasing affordability and decreasing logistical burden in support of expeditionary warfare.

	FY 2004	FY 2005	FY 2006	FY 2007
LOGISTICS	2,344	1,370	1,784	1,735

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.

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

FY 2004 Accomplishments:

- Completed initial exploration of the feasibility for lightweight expeditionary bridging capability through assessment of alternative bridging techniques, bridge design, and material solutions.
- Continued exploring the development of individual handheld water purification and desalination devices that can purify any source of water (fresh, brackish, and salt).
- Commenced research into the feasibility of using new polymer gel electrolytes and novel air electrodes in next generation metal air batteries.

FY 2005 Plans:

- Continue exploratory development of individual handheld water purification and desalinization devices to demonstrate the feasibility of performance improvement.
- Continue research into using polymer gel electrolytes and novel air electrodes in next generation metal air batteries to demonstrate the feasibility of performance improvement.

FY 2006 Plans:

- Complete exploratory development of individual handheld water purification and desalinization devices to demonstrate the feasibility of performance improvement.
- Continue research into using polymer gel electrolytes and novel air electrodes in next generation metal air batteries to demonstrate the feasibility of performance improvement.

FY 2007 Plans:

- 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 research into developing a replaceable electrode battery power source that consists of a metallic structure that is consumed during power generation and then easily replaced with a new metallic component that restores a full charge.
- Initiate research into developing an organic photovoltaic rechargeable, thin film Lithium Ion battery on a flexible substrate with onboard charging and power distribution electronics.

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

	FY 2004	FY 2005	FY 2006	FY 2007
FUTURE CONCEPTS, TECHNOLOGY ASSESSMENT, AND ROADMAPPING	0	693	726	740

This activity supports the planning and integration of technology development efforts across the entire Program Element. 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 Program Element. 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.

FY 2005 Plans:

- Initiate Technology Assessments associated with the Urban Asymmetric and Expeditionary Warfare Capability Gap.
- Initiate the integrated planning of concepts and technology development.

FY 2006 Plans:

- Continue integrated planning of concepts and technology development.
- Initiate Technology Assessment of the Maneuver, and Human Performance, Training and Education Thrust Areas.
- Initiate Technology Roadmapping of the Maneuver, and Human Performance, Training and Education Thrust Areas.
- Initiate development of the Expeditionary Maneuver Warfare Investment Strategy.
- Initiate Technology Assessments within Command, Control, Communication, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR); and Firepower Thrust Areas of the Program Element.
- Initiate Technology Roadmapping Efforts within C4ISR and Firepower Thrust Areas.

FY 2007 Plans:

- Complete Technology Assessments of C4ISR and Firepower Thrust Areas.
- Complete Technology Roadmapping Efforts within C4ISR and Firepower Thrust Areas.

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

- Complete Technology Assessment of the Maneuver, and Human Performance, Training and Education Thrust Areas.
- Complete Technology Roadmapping of the Maneuver, and Human Performance, Training and Education Thrust Areas.
- Continue development of the Expeditionary Maneuver Warfare Investment Strategy.
- Continue integrated planning of concepts and technology development.

CONGRESSIONAL PLUS-UPS:

	FY 2004	FY 2005
ADVANCED LEAD ACID BATTERY DEVELOPMENT FOR MILITARY VEHICLES	961	990

FY04: This effort developed lead acid battery technology to increase the life, energy and power output of lead acid batteries used by the Marine Corps and Navy. Novel approaches were explored including the use of a horizontal plate design, and conductive additives to the electrodes. High performance batteries have improved performance to their cycle life and energy density, while maintaining high power capabilities which translated directly into cost reductions, increased efficiency and improved sea basing of naval expeditionary forces.

FY05: Continue to explore novel approaches including the use of a horizontal plate design, and conductive additives to the electrodes.

	FY 2004	FY 2005
EXPEDITIONARY FORCE INFRASTRUCTURE INITIATIVE (EFI)	0	990

The EFI2 effort is designed to develop a large placement and dispersion salt water capability, as well as an austere surface treatment capability in support of expeditionary water crossing missions. This new surface treatment approach using lightweight composite materials is particularly important in support of Marine amphibious operations in areas of extremely soluble soils. The EFI2 effort is also designed to assess and develop effective techniques for large batch processing of composite repair material in the rapid repair of airfield runways in an expeditionary environment. This will improve mission readiness by getting airfields back on line quicker. It will also reduce the use of matting on expeditionary airfields thereby decreasing damage to aircraft airframes upon landing.

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

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 0601152N (In-House Laboratory Independent Research)
PE 0601153N (Defense Research Sciences)
PE 0204163N (Fleet Telecommunications (Tactical))
PE 0602235N (Common Picture Applied Research)
PE 0602782N (Mine and Expeditionary Warfare Applied Research)
PE 0603782N (Mine and Expeditionary Warfare Advanced Technology)
PE 0603235N (Common Picture Advanced Technology)
PE 0206623M (Marine Corps Ground/Supporting Arms Systems)
PE 0603640M (Marine Corps Advanced Technology Demonstrations)
PE 0603612M (Marine Corps Mine Countermeasures)
PE 0603635M (Marine Corps Ground Combat/Support System)
PE 0206313M (Marine Corps Communications Systems)
PE 0603236N (Warfighter Sustainment 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)
PE 0603607A (Joint Service Small Arms Programs)
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/Barrier Engineering Development)
PE 0602301E (Computing Systems and Communications Technology)
PE 0602702E (Tactical Technology)

D. ACQUISITION STRATEGY:
Not applicable.