Exhibit R-2, RDT&E Budget Item Justification: PB 2011 Navy										DATE: February 2010	
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*				R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*							
COST ($ in Millions)	**FY 2009 Actual**	**FY 2010 Estimate**	**FY 2011 Base Estimate**	**FY 2011 OCO Estimate**	**FY 2011 Total Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
Total Program Element	102.534	129.962	115.089	0.000	115.089	125.126	130.122	133.063	135.810	Continuing	Continuing
2223: *Marine Corps ATD*	58.003	70.421	78.087	0.000	78.087	84.475	86.827	88.785	90.616	Continuing	Continuing
2297: *Marine Corps Warfighting Lab - Core*	35.475	36.419	37.002	0.000	37.002	40.651	43.295	44.278	45.194	Continuing	Continuing
9999: *Congressional Adds*	9.056	23.122	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	94.554

A. Mission Description and Budget Item Justification

The efforts described in this Program Element (PE) are based on investment directions as defined in the Naval Science and Technology (S&T) Strategic Plan approved by the S&T Corporate Board (Feb 2009). This strategy is based on needs and capabilities from Navy and Marine Corps guidance and input from the Naval Research Enterprise (NRE) stakeholders (including the Naval enterprises, the combatant commands, the Chief of Naval Operations (CNO), and Headquarters Marine Corps). It provides the vision and key objectives for the essential S&T efforts that will enable the continued supremacy of U.S. Naval forces in the 21st century. The Strategy focuses and aligns Naval S&T with Naval missions and future capability needs that address the complex challenges presented by both rising peer competitors and irregular/asymmetric warfare.

As a key component of naval expeditionary forces, the Marine Corps has unique and technologically stressing requirements because of its expeditionary mission and intensive operational tempo, Marine Air-Ground Task Force (MAGTF) structure, and conduct of maneuver warfare. Critical requirements in this program element (PE) are: Command, Control, Communications, Computers (C4), Intelligence, Surveillance, and Reconnaissance (ISR); maneuver techniques and means; force protection; logistic sustainment; human performance, training and education; and firepower. There are ongoing actions to develop and demonstrate advanced technologies and concepts in operational environments. Joint service efforts are aligned with Defense Technology Objectives and Joint Warfighting Capability Objectives. In addition, there is funding for experimentation in warfighting concepts as well as operational assessment of emerging technologies, to include technical support of operating forces to assess military utility of selected technologies. This PE specifically supports: continued development of Distributed Operations (DO) through field experiments with Marine infantry battalions; rapid response to low-, mid-, and high-intensity conflicts in the Overseas Contingency Operation (OCO); methods for countering irregular threats; and expansion of seabasing and naval force packaging capabilities. The investment directly assists in fulfilling the forward presence requirements of Sea Shield and the transformational capabilities prescribed by Sea Strike. The Future Naval Capability (FNC) process is supported and funds are programmed accordingly. This PE is largely focused on demonstration of products and capabilities from the knowledge base and Discovery and Invention (D&I) phases of Naval Science and Technology (S&T). As Naval partners, the Navy and Marine Corps S&T Team strive to transition technologies that will implement objectives outlined in the Naval Operations Concept. This PE also funds technical solutions designed to increase Naval force capability, such as the Naval Expeditionary Combat Command.

Exhibit R-2, RDT&E Budget Item Justification: PB 2011 Navy	DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	**R-1 ITEM NOMENCLATURE** PE 0603640M: *MC Advanced Technology Demo*

Investments in S&T provide the opportunities for future capabilities and will prevent technological surprise. The PE as a whole will advance the amphibious and expeditionary capabilities for the Combatant Commanders helping to meet their emerging challenges by enhancing Naval S&T contributions to the long commitment to the OCO.

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

B. Program Change Summary ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Previous President's Budget	103.296	107.363	0.000	0.000	0.000
Current President's Budget	102.534	129.962	115.089	0.000	115.089
Total Adjustments	-0.762	22.599	115.089	0.000	115.089
• Congressional General Reductions		-0.503			
• Congressional Directed Reductions		0.000			
• Congressional Rescissions	0.000	-0.078			
• Congressional Adds		13.700			
• Congressional Directed Transfers		0.000			
• Reprogrammings	0.130	0.000			
• SBIR/STTR Transfer	-2.089	0.000			
• Program Adjustments	0.000	0.000	115.089	0.000	115.089
• Rate/Misc Adjustments	0.000	9.480	0.000	0.000	0.000
• Congressional Recision Adjustments	-0.003	0.000	0.000	0.000	0.000
• Congressional Add Adjustments	1.200	0.000	0.000	0.000	0.000

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2009	FY 2010
Project: 9999: *Congressional Adds*		
Congressional Add: *California Central Coast Partnership Research*	0.000	2.788
Congressional Add: *Enhanced Small Arms Protective Insert*	0.000	1.593
Congressional Add: *Future Immersive Training*	0.000	9.480
Congressional Add: *CRAFT INTEGRATED ELECTRONIC SUITE (CIES)*	2.872	0.000
Congressional Add: *MARINE AIR-GROUND TASK FORCE SITUATIONAL AWARENESS*	0.997	2.689

Exhibit R-2, RDT&E Budget Item Justification: PB 2011 Navy	DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	**R-1 ITEM NOMENCLATURE** PE 0603640M: *MC Advanced Technology Demo*

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2009	FY 2010
Congressional Add: *Ballistic Helmet Development*	1.197	0.000
Congressional Add: *Ground Warfare Acoustical Combat System of Netted*	1.995	4.979
Congressional Add: *Near Infrared optical (NIRO) Augmentation System*	0.798	1.593
Congressional Add: *Hybrid Capacitor Supercell for Marine Combat Vehic*	1.197	0.000
Congressional Add Subtotals for Project: 9999	9.056	23.122
Congressional Add Totals for all Projects	9.056	23.122

Change Summary Explanation

Technical: FY 2009 reflects funding for a DoD directed integrated capability demonstration supporting the Protection of Ground Forces and Systems. DoD directed this initiative in response to the determination that its S&T investment is likely too small to meet the imposing security threats that challenge our Nation, and it may not be adequately postured to take advantage of key scientific and technological opportunities that offer breakthrough advantages to our warfighters. This broad, multi-year (through the FYDP) initiative will expand existing technology integration and increase/spur the application of more fundamental technologies to force and platform protection. The goal is multiple broad phased force protection applications and technologies, with off-ramps for fielding successes; therefore, funding associated with this DoD initiative is reflected throughout the PE. In FY 2010 preparation efforts continue in areas of technology that are ready for major, integrated technology demonstration. All technical work is being coordinated throughout DoD on these demonstrations. In areas such as vehicle technology demonstrations, the goal is to deliver multiple classes of advanced technology ground vehicle demonstrations leading to new classes of protective, efficient, ground vehicles.

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

FY11 from previous President's Budget is shown as zero because no FY11-15 data was presented in President's Budget 2010.

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy			DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 2223: *Marine Corps ATD*	

COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
2223: *Marine Corps ATD*	58.003	70.421	78.087	0.000	78.087	84.475	86.827	88.785	90.616	Continuing	Continuing

A. Mission Description and Budget Item Justification

Critical Marine Corps requirements/imperatives addressed in this Project are: Maneuver; Force Protection; Human Performance, Training and Education; Logistics; Command, Control, Communications and Computers (C4); Intelligence, Surveillance and Reconnaissance (ISR) and Firepower. These are ongoing efforts to develop and demonstrate advanced technologies and system concepts in an operational environment. Multiple transitions into the Sub-system/Component Advanced Development Phase are planned, as well as fieldable prototyped to reduce risk in System Concept Development and Demonstration. A tactically effective Mine Countermeasures (MCM) capability is vital to Force Protection and necessary if Maneuver on land is to become a functional component of Naval Expeditionary Maneuver Warfare. Maneuver, supported by MCM provides synchronization and speed of detection, breaching, clearance, proofing, and marking operations. This project supports: 1) engaging regional forces in decisive combat on a global basis; 2) responding to all other contingencies and missions in the full spectrum of combat operations (high, middle, and low intensity), in Military Operations in Urban Terrain (MOUT), and in Operations other than War (OOTW); and 3) warfighting experimentation. By providing the technologies to enable these capabilities, this project supports the goals and objectives of the Strike, Littoral Warfare and Surveillance Joint Mission Areas. These are ongoing efforts to develop and demonstrate advanced technologies and system concepts in an operational environment.

In addition, this project supports the goals and objectives of the Littoral Combat/Power Projection related Enabling Capability (EC) within the Future Naval Capabilities (FNC) portfolio. The focus of the EC within this PE is technology related to Urban, Asymmetric, and Expeditionary Operations (UAEO). The UAEO Capability Gap is a science and technology developmental area that is of the highest importance to Marine Corps operations in Iraq and Afghanistan and is one of the highest ranked Capability Gaps prioritized by the Chief of Naval Operations and the Marine Corps Combat Development Command (MCCDC). The UAEO technology gap is being pursued as part of an overall effort that addresses the Sea Strike Capability Gap.

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
COMMAND, CONTROL, COMMUNICATIONS, COMPUTERS (C4)	3.613	5.987	5.432	0.000	5.432
This activity integrates and demonstrates enhanced communications and situational awareness in warfighting environments and communication and situational awareness technologies for near term USMC operations. The focus is on development and leveraging advanced C4 technologies to					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 2223: *Marine Corps ATD*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
enable enhanced Distributed Operations, Irregular Warfare, and Marine Corps Expeditionary Warfare. Specifically, the C4 Thrust intends to demonstrate markedly improved capabilities in over-the-horizon (OTH), beyond line-of-sight, and restricted environment communications; mobile networking; tactical decision making; tactical situational awareness; and small unit position location and navigation. Advanced technology resources will be applied to complement commercial, other service, and defense agency investments to produce a technology base to address identified Marine Corps technology gaps. FY 2009 to FY 2010 reflects a funding increase for a DoD directed integrated capability demonstration supporting the Protection of Ground Forces and Systems. This capability demonstration has been directed to be wide ranging and encompass technologies for: - Pre-detonation of IEDs; - Personal protection materials; - Personal power generation; - Micro power sources; and - Augmented reality. The C4 activity directly supports the integrated demonstration program, which will be a broad, multi-year thrust to both investigate technology integration as well as spur application of more fundamental technologies to force and platform protection. The goal is multiple broad phased force protection applications and technologies, with off-ramps for fielding successes. The FY 2009 to FY 2010 increase in funding is due to acceleration of the schedule of the Software Reprogrammable Payload and Satellite Communications On-The-Move Integration efforts in order to meet transition milestones. The FY 2010 resources complete the SRP program S&T and enables transition the capability to 6.4. SRP is a high priority Navy/MC Aviation program that will enable on-the-fly reconfigurable, multiple, simultaneous missions and applications in a single payload. Navy will deliver an integrated hardware prototype, software, firmware, and supporting documentation to the transition sponsor (Navy/MC Aviation).					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 2223: *Marine Corps ATD*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2009 Accomplishments: - Continued urban navigation with limited Global Positioning System availability demonstrations. (Realigned from C4ISR Activity) - Continued demonstrations of improved urban communications capabilities. (Realigned from C4ISR Activity) - Continued creating a service oriented sensor network for expeditionary forces' current and future tactical sensors. (Realigned from C4ISR Activity) - Continued developing tailored tactical Human to Machine Interfaces aligned to primary operational functions and non-intrusive within the battlespace. (Realigned from C4ISR Activity) - Continued creating services for the tactical network that are fully operable with DCGS and the DCGS Integration Backbone. (Realigned from C4ISR Activity) - Completed conformal antenna integration and demonstrations. (Realigned from C4ISR Activity) - Initiated an Assured Connectivity effort to develop waveforms suited to maintaining low data rate links under extreme conditions. *FY 2010 Plans:* - Continue all efforts of FY 2009, less those noted as completed above. - Complete Common Operational Picture Fusion Tools efforts, Software Reprogrammable Payload, Satellite Communications On-The-Move integration and demonstration, and C3 for the Individual Marine Spiral One. *FY 2011 Base Plans:* - Continue all efforts of FY 2010, less those noted as completed above. - Complete Fires interoperability, Advanced HF Communications and Restricted Communications. - Initiate Application-Network Architectures, Conformal Antenna Integration and Demonstration Spiral 2 and C3 for the Individual Marine Spiral Two.					
FIREPOWER	5.957	5.935	7.044	0.000	7.044

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 2223: *Marine Corps ATD*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
This activity develops technology for application on current and future expeditionary weapons and elements of the kill chain. It includes, but is not limited to, the following technologies: fuze, fire control, launch/propulsion, lethality, and accuracy. The resources reflect an increase for emerging priority requirements in lightening the load of the individual Marine while simultaneously enhancing the combat capabilities of the Marine Corps Rifle Squad and for a DoD directed integrated capability demonstration supporting the Protection of Ground Forces and Systems. This capability demonstration has been directed to be wide ranging and encompass technologies for: - Pre-detonation of IEDs; - Personal protection materials; - Personal power generation; - Micro power sources; and - Augmented reality. The Firepower activity directly supports the integrated demonstration program, which will be a broad, multi-year thrust to both investigate technology integration as well as spur application of more fundamental technologies to force and platform protection. The goal is multiple broad phased force protection applications and technologies, with off-ramps for fielding successes. The FY 2010 to FY 2011 funding increase is due to the acceleration and completion of a Non-Magnetic Azimuth Sensing technology effort. This will allow early transition of warfighting capability to Marine Corps forces. *FY 2009 Accomplishments:* - Continued scalable effects conventional warhead concept development. - Continued MACHSI advanced technology development. - Continued improved mortar munition integration and demonstrations.					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 2223: *Marine Corps ATD*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Continued development of targeting and engagement technologies for distributed operations collaborative fires integration and demonstrations. - Continued a Wind Sensing Program to provide technology that senses wind velocity & direction at firing point to apogee and supporting algorithms to compensate the computed/predicted wind effects on the ballistic flight of the 81mm mortar round in order to enhance weapon accuracy. - Completed shipboard submunition Microelectromechanical System (MEMS) fuze safety and reliability enhancement effort. - Completed enhanced lethality and extended range ammunition demonstrations. - Initiated an effort in Ballistic Flight Compensation Aiming in support of Distributed Operations Precision Engagement. - Initiated design and prototyping of lightweight technologies that provide individual Marines enhanced capabilities to detect and identify man-size targets out to at least the maximum effective range of their personal weapons during all conditions (daylight, limited visibility, & darkness) by integrating multiple capabilities into a single system. - Initiated a Flight Control Kinematic Unit effort. Design & develop technology that provides guidance, navigation, and controls (GNC) to 81mm mortar rounds to enable trajectory shaping in urban environment to precisely & accurately strike specific targets. *FY 2010 Plans:* - Continue all efforts of FY 2009, less those noted as completed above. - Complete research on Lightweight Machine Gun Barrel technology to develop a lighter weight machine gun barrel with longer service life. (Relates to the FY 2009 Flight Control Kinematic Unit effort). *FY 2011 Base Plans:* - Continue all efforts of FY 2010, less those noted as completed above. - Complete development of Non-Magnetic Azimuth Sensing technology.					
FORCE PROTECTION	5.981	7.048	8.215	0.000	8.215

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 2223: *Marine Corps ATD*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
This activity supports the Force Protection Thrust's Advanced Technology Demonstration efforts in the areas of individual Marine platforms, equipment and autonomous systems. This includes technologies to enable detection, neutralization, breaching, and clearing of mines, Improvised Explosive Devices (IEDs), and unexploded ordnance from the beach exit to inland objectives. Efforts supported under Force Protection also include the demonstration of technologies such as Counter Rocket, Artillery, and Mortar (CRAM) and Counter Sniper technologies in support of maneuver warfare, small unit distributed operations, and fixed installation protection and technologies for improved Personnel Protective Equipment for individual protection against blast, ballistic, and blunt impact threats as well as in a chemical, radiological, and biological environment. Physical Security technologies to support expeditionary maneuver warfare, pier/port and base infrastructure are also addressed under this thrust. Beginning in FY 2009, Mine Countermeasures (MCM) efforts will be funded within the Force Protection activity. FY 2009 is the first reporting cycle where Force Protection Thrust efforts are separated from the Maneuver activity. Counter-IED and Counter-RPG Technologies remain high priority Marine Corps focal areas. FY 2009 reflects additional funding for a DoD directed integrated capability demonstration supporting the Protection of Ground Forces and Systems. This capability demonstration has been directed to be wide ranging and encompass technologies for: - Pre-detonation of IEDs; - Personal protection materials; - Personal power generation; - Micro power sources; and - Augmented reality. The Force Protection activity is central to the integrated demonstration program, which will be a broad, multi-year thrust to both investigate technology integration as well as spur application of more fundamental technologies to force and platform protection. The goal is multiple broad phased force protection applications and technologies, with off-ramps for fielding successes.					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 2223: *Marine Corps ATD*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
The FY2009 to FY 2010 increase in funding results from acceleration of effort needed to complete advanced countermeasures technology development against magnetic fuzed landmines and to complete development of point detection of explosives associated with Improvised Explosive Devices (IEDs). The FY 2010 to FY 2011 increase in funding is due to operational requests to explore S&T solutions to neutralize incoming rocket, artillery, and mortar threats via non-kinetic means. *FY 2009 Accomplishments:* - Continued development of technologies to defeat side/top attack and advanced fuze mines through signature reduction and advanced signature duplication. - Continued development of technologies to locate and defeat IEDs. - Continued development of technologies to defeat advanced mine fuzes (seismic, acoustic, and infrared). - Continued efforts to detect IEDs using radio frequency sources. - Continued technology development programs to address force protection capability gaps. - Completed studies to identify technology development plans and develop roadmaps to close identified force protection capability gaps. - Completed design of a novel low passive inter-modulation wideband antenna for use against multiple classes of radio frequency triggered IEDs. - Completed investigation of polarization diversity designs to counter specific placements and orientations of radio frequency triggered IEDs. - Initiated new Explosives Hazard Defeat to address the Suicide-Bomber threat. This effort will combine multiple sensor modalities, analysis algorithms, and data fusion to demonstrate high Pd, low FAR detection of suicide bombers from standoff distances from multiple aspect angles. - Initiated a new Anti-Tank Guided Missile (ATGM) effort to defeat ATGMs in complex urban environment.					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 2223: *Marine Corps ATD*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Initiated Warfighter modeling and simulation efforts for the Warfighter-as-a-System analysis approach and methodology combining survivability, mobility, and warfighter performance parameters. *FY 2010 Plans:* - Continue all efforts of FY 2009 less those noted as completed above. - Complete advanced countermeasures technology development against magnetic fuzed landmines. - Complete development of point detection of explosives associated with IEDs. (Relates to the FY 2009 plan to detect IEDs using radio frequency sources). - Initiate high-power solid state source development for IED neutralization. - Initiate vulnerability assessment of threat targeting sensors to directed energy. *FY 2011 Base Plans:* - Continue all efforts of FY 2010, less those noted as completed above. - Complete modeling and simulation (M&S) efforts for the Warfighter-as-a-System analysis approach and methodology combining survivability, mobility, and warfighter performance parameters. - Complete countermeasures technology development against seismic fuzed landmines. - Complete development of stand-off detection of explosives utilizing Raman and Laser Induced Breakdown Spectroscopy sensor modalities. (Relates to FY 2009 initiation of new Explosives Hazard Defeat Plan). - Initiate efforts to neutralize incoming rocket, artillery, and mortar threats via non-kinetic means. - Initiate development and evaluation of landmine detection utilizing ground penetrating radar from an airborne platform.					
HUMAN PERFORMANCE, TRAINING & EDUCATION 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.	7.249	9.172	10.693	0.000	10.693

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 2223: *Marine Corps ATD*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
The resources reflect an increase for enhanced requirements in support of Distributed Operations and for a DoD directed integrated capability demonstration supporting the Protection of Ground Forces and Systems. This capability demonstration has been directed to be wide ranging and encompass technologies for: - Pre-detonation of IEDs; - Personal protection materials; - Personal power generation; - Micro power sources; and - Augmented reality. The Human Performance, Training and Education activity is key to the integrated demonstration program, which will be a broad, multi-year thrust to both investigate technology integration as well as spur application of more fundamental technologies to force and platform protection. The goal is multiple broad phased force protection applications and technologies, with off-ramps for fielding successes. The FY 2009 to FY 2010 funding increase is due to enhanced development of early prototype systems for Human Performance and Training efforts (Cognitive and physical enhancement, modeling and simulation, and virtual reality and mixed reality squad level training in support of the Marine Corps concept for Distributed Operations). The FY 2010 to FY 2011 funding increase is due to planned initiation of efforts to apply learning theories for language and culture training and to initiation of related efforts in team immersive language and cultural learning in simulation environments. *FY 2009 Accomplishments:* - Continued the development of tools to capture metrics and lessons learned from a variety of simulation and training sources.					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 2223: *Marine Corps ATD*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Continued Marine Advanced Combat Headborne Initiative (MACHSI): physical protection of the head, neck and face. (Transitioned from the Firepower activity.) - Continued development of the Distributed Operations Training/Virtual Test Bed. - Continued research into environmental effects on cognitive and team performance. - Initiated development of adaptive experiential learning tools for Distributed Operations Training. - Initiated in-depth analysis, state-of-the-art report, and testing on all USMC physical training regimens, their effectiveness and their injury incidence rates. - Initiated development of "Warfighter as a System" modeling tools. - Initiated development of automated behavioral and neurophysiological performance measurement technologies for Distributed Operations Warfighter assessment, classification and assignment to training. - Initiated Human Performance and Training capabilities (Cognitive and physical enhancement, modeling and simulation, virtual reality squad level training) in support of Distributed Operations. - Initiated demonstrations and field studies of mitigation/augmentation capabilities that enhance squad level communication in support of Distributed Operations. - Initiated development of a Distributed Operations virtual reality simulation training system prototype that will be scalable across fire team, squad, and platoon. - Initiated Lightening the Load efforts aimed at developing the software necessary to conduct trade off analysis on a physically and ergonomically accurate model of the United States Marine and its infantry equipment. - Initiated new Experiential Learning Technologies to improve the Infantry Immersive Trainer to support the Squad Immersive Training Environment (SITE) Marine Corps Urgent Needs Statement. This includes developing tracking, Helmet Mounted Displays, and software technologies to enable Augmented Reality in unimproved locations. *FY 2010 Plans:* - Continue all efforts of FY 2009, less those noted as completed above.					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 2223: *Marine Corps ATD*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Initiate evaluations and validations of applications geared towards peak neural and cognitive performance-in distributed operations. - Initiate Distributed Operations training system investigations into perceptual skills enhancement that lead to enhanced cognition and decision making. - Initiate development of early prototype systems for Human Performance and Training efforts (Cognitive and physical enhancement, modeling and simulation, and virtual reality and mixed reality squad level training in support of Distributed Operations). *FY 2011 Base Plans:* - Continue all efforts of FY 2010, less those noted as completed above. - Complete development of adaptive experiential learning tools for Distributed Operations Training. - Complete in-depth analysis, state-of-the-art report, and testing on all USMC physical training regimens, their effectiveness, and their injury incidence rates. - Complete development of "Warfighter as a System" modeling tools. - Initiate efforts to apply learning theories for language and culture training. - Initiate team immersive language and cultural learning in simulation environments. - Initiate classroom/field testing of learning theories extended to complex tasks for a range of expertise levels; training mitigation strategies triggered by neurophysiological markers of learning, cognition and expertise; and principles of expertise development on a continuum of novice to expert. - Initiate field evaluations of training mitigation strategies triggered by behavioral and neurophysiological markers of learning, cognition, and expertise. - Initiate effectiveness and validation studies of Advanced Mobile Assessment and Field Readiness Technologies to improve the capability to assess situational awareness in the field and predict physical performance by developing mobile and rugged tools, algorithms, and models.					
INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE (ISR) This activity supports the demonstration of technologies to enhance situational awareness and tactical decision making through automated analysis, fusion of data, rapid integration of information,	2.271	3.124	3.644	0.000	3.644

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 2223: *Marine Corps ATD*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
and acquired knowledge resulting in actionable intelligence at the lower command levels. The activity includes the demonstration of ISR efforts involving enhanced reconnaissance and persistent surveillance, and sensors for unmanned ground and aerial vehicles. Advanced Technology demonstrations also include the collection of information [monitoring, sensing, and locating] in the 3D urban battlespace as well as exploiting information [identifying and classifying data] as part of the intelligence preparation of the battlespace in order to facilitate operational maneuver and distributed operations. The funding reflect an increase for a DoD directed integrated capability demonstration supporting the Protection of Ground Forces and Systems. This capability demonstration has been directed to be wide ranging and encompass technologies for: - Pre-detonation of IEDs; - Personal protection materials; - Personal power generation; - Micro power sources; and - Augmented reality. The ISR activity directly supports the integrated demonstration program, which will be a broad, multi-year thrust to both investigate technology integration as well as spur application of more fundamental technologies to force and platform protection. The goal is multiple broad phased force protection applications and technologies, with off-ramps for fielding successes. The FY 2009 to FY 2010 funding increase is due to planned acceleration of work to refine enemy course of action prediction software to adapt to stimuli. The FY2010 to FY2011 funding increase is due to initiation of robust efforts to automatically fuse data across all identifiers (TTL, biometrics, symbols) based on similarity measures.					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 2223: *Marine Corps ATD*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2009 Accomplishments: - Continued development of advanced tactical sensor nets that localize mobile detection of threats in a complex environment. (Realigned from C4ISR Activity) - Continued development and demonstration of measurement and signature intelligence data management and integration capability. (Realigned from C4ISR Activity) - Continued integration and demonstration of naval tactical warfighting applications and network connectivity. - Continued tagging, tracking, and locating efforts to demonstrate the effectiveness of tactically relevant tag readers which support track classification algorithms. (Realigned from C4ISR Activity) - Continued efforts to refine enemy course of action prediction software to adapt to stimuli. (Realigned from C4ISR Activity) - Continued and initiate new Actionable Intelligence for Expeditionary and Irregular Warfare efforts which include Human Network Decision Modeling and the fusion across modeling approaches to increase prediction accuracy. (Realigned from C4ISR Activity) - Initiated development of tactical sensor nets with organic unattended multi-level security processing and information dissemination. - Initiated new Relevant and Situational Information on Demand such as Identity Dominance Enabled by an Integrated Biometric/Tag Track and Locate (TTL) Capability, providing human tracking algorithms based on models of biometric (face, voice and soft) and TTL (optical taggant) capabilities and modeling a biometric/optical taggant system relevant to human tracking across an urban 5 km x 2 km area. - Initiated new Sensor Fields efforts such as Nanotechnology Enabled Witness Fields, development of sensors that provide near real time decision support to distributed operations by detecting specific interactions, and nanotechnology efforts which offer the potential to revolutionize tactical sensors. To enable this capability, nanomaterials that change state in the presence of another nanomaterial will be developed.					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 2223: *Marine Corps ATD*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2010 Plans: - Continue all efforts of FY 2009, less those noted as completed above. - Complete efforts to refine enemy course of action prediction software to adapt to stimuli. - Initiate tagging, tracking, and locating efforts to demonstrate a system that will automatically translate large amounts of wide area surveillance data into tracks, useful to expose entity to entity associations; build urban context, as well as detect events and anomalies; and associate objects, tasks, locations and events for creating actionable intelligence. - Initiate algorithm development for base classification on context, similarity to clutter, and nearness to suspicion. - Initiate efforts to analyze and expose enemy networks using close observations of entity to entity associations and social network analysis. - Initiate efforts to develop methods and techniques for investigating open source information on the Internet to form a human terrain map indicating space and time features to aid network identification and prediction of enemy activity. - Initiate efforts to incorporate social models for human decision making with statistical models. *FY 2011 Base Plans:* - Continue all efforts of FY 2010, less those noted as completed above. - Initiate new Operational Adaptation Enablers effort to provide one analysis framework for the incorporation of interdisciplinary techniques related to addressing contextual questions. - Initiate efforts to extend the utility of track classification algorithms to sparse data. - Initiate efforts to automatically fuse data across all identifiers (TTL, biometrics, symbols) based on similarity measures. - Initiate efforts to show entity tracking using disparate ground and air sensors.					
LITTORAL COMBAT/POWER PROJECTION (LC/PP)	16.675	17.111	17.622	0.000	17.622

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 2223: *Marine Corps ATD*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
This activity is aligned with the Sea Strike, Sea Shield, Sea Basing, FORCEnet and the Expeditionary Maneuver Warfare pillars as well as Force Health Protection and Platform Enablers. It provides the capability for the demonstration and transition of technologies developed through the related Marine Corps S&T programs directly to an acquisition program of record. Littoral Combat/Power Projection is the Enabling Capability (EC). The funding profile reflects the alignment of the FNC program investments into ECs. Funding for each EC is aligned to a 6.2 or 6.3 Budget Activity (BA) as appropriate. The focus of the ECs within this PE will be on technology related to Urban, Asymmetric, Littoral and Expeditionary Operations. The related science and technology development is of the highest importance to Marine Corps operations in Iraq, Afghanistan and the OCO. Understandably, these Warfighter Capability Gaps are among those highest ranked of the prioritized Capability Gaps (prioritized by the OPNAV and the MCCDC). The technologies associated with these gaps are being pursued as part of an overall effort that addresses Sea Strike, Sea Shield, Sea Basing and FORCEnet Capability Gaps. Warfighter Capability Gaps are made up of ECs and supporting products. This activity includes support to the Urban, Asymmetric Operations-related to EC's for IED's, Modular Scalable Effects Weapons, Advanced Naval Fires Technology, Dynamic Target Engagement, Position Location Information, Transparent Urban Structures, Hostile Fire Detection and Response, Lightweight Protective Systems, and Lightening the Load of Dismounted Combatants. *FY 2009 Accomplishments:* - Continued development of improved lightweight computational fire control interface technology. (Concurrent funding from PE 0602131M, PE 0602236N, PE 0603236N and PE 0603782N) - Continued development of improved fire control systems technologies to Expeditionary Fire Support System artillery and mortar systems (concurrent funding from PE 0602131M and 0602114N. These PEs complete the effort in FY 2010). - Continued development of transparent urban structures technologies. (Concurrent funding from PE 0602131M)					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 2223: *Marine Corps ATD*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Continued development of modular scalable effects prototype weapon. (Concurrent funding from PE 0602131M) - Continued development of counter improvised explosive devices technologies. (Concurrent funding from PE 0602131M) - Continued development of tactical urban breaching technologies. - Completed development of tools and technologies to support Marine Corps Intelligence, Surveillance and Reconnaissance (ISR) efforts Measurement and Signature Intelligence Tactical Remote Sensor System (MASINT/TRSS) in remote sensor integration within the Distributed Common Ground/Surface System (DCGS). - Completed design and development of advanced weapons materials for use in artillery and mortar systems to reduce weight while maintaining strength, and increasing operational life and capability. (Concurrent funding in PE 0602131M and 0602236N) - Completed effort to incorporate advanced target acquisition target hand-off technologies to reduce sensor to shooter loop and improve target location. (Concurrent effort funded in PE 0602131M). - Completed development of ammunition packaging techniques to lower weight and have the packaging provide additional use on the battlefield. (Concurrent funding provided by PE 0602131M). - Completed integration of hostile fire detection and counter-fire system (GUNSLINGER). (Concurrent funding in PE 0602131M). - Completed development of innovative relay Beyond Line of Sight (BLOS) technology through integration and demonstration of secure wireless networks/secure wireless local area network (LAN) communication technologies. (Concurrent funding in PE 0602131M, PE 0602236N, PE 0603236N and PE 0603782N). - Initiated development of individual Warfighter protection technologies. (Concurrent funding in PE 0602131M; funding will also be provided by PE 0603236N in FY 2009). - Initiated development of advanced survivability and mobility technologies for Marine Corps tactical and combat vehicles. (Concurrent funding in PE 0602131M; funding will also be provided by PE 0603236N in FY 2010).					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 2223: *Marine Corps ATD*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2010 Plans: - Continue all efforts of FY 2009. - Complete development and transition of improved fire control technologies based on small-scale hardened non-magnetic azimuth sensor to improve timeliness and accuracy of mortars/howitzers. *FY 2011 Base Plans:* - Continue all efforts of FY 2010, less those noted as complete above. - Complete development and transition transparent urban structures technologies which will enable tactical units to detect, classify and discriminate between friendly and enemy personnel in urban structures, and to gather ground data to dynamically develop 3D models to map urban areas using a UAV (Unmanned Air Vehicle)/UGV (Unmanned Ground Vehicle)-based system. (Concurrent funding provided by PE 0602131M.) - Complete development of individual warfighter lightweight protective system technologies that will reduce body armor weight, improve survivability and increase the mobility of the warfighter. - Initiate development of technologies to lighten the load of warfighters by 1) reducing the weight of and improving the capability of the day/night weapon sight, 2) eliminating battery incompatibility, and 3) providing Graphical User Interface (GUI-based) software for tradeoff analyses based on Military Operational Posture. (Concurrent funding provided by PE 0602131M and PE 0603236N.)					
LOGISTICS 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.	7.612	11.468	13.125	0.000	13.125

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 2223: *Marine Corps ATD*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
The resources reflect an increase for sustainability/logistics programs (includes fuel, water, ammunition, rations, and casualty care /MEDEVAC) in support of Distributed Operations; new USMC priorities in lightening the load of the individual Marine and enhancing the Marine Corps rifle squad's overall capabilities; and for a DoD directed integrated capability demonstration supporting the Protection of Ground Forces and Systems. This capability demonstration has been directed to be wide ranging and encompass technologies for: - Pre-detonation of IEDs; - Personal protection materials; - Personal power generation; - Micro power sources; and - Augmented reality. The Logistics activity directly supports the integrated demonstration program, which will be a broad, multi-year thrust to both investigate technology integration as well as spur application of more fundamental technologies to force and platform protection. The goal is multiple broad phased force protection applications and technologies, with off-ramps for fielding successes. The FY 2009 to FY 2010 funding increase results from plans to accelerate and complete development of both the portable fuel analyzer and the lightweight thermoelectric generator efforts. The FY 2010 to FY 2011 funding increase results from enhanced emphasis on the development of advanced lightweight fuel to energy conversion concepts. *FY 2009 Accomplishments:* - Continued exploring the development of portable fuel cell technologies capable of providing power in the 100 Watt to 500 Watt power range. - Continued efforts to develop a micro turbine generator capable of 100W average power.					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 2223: *Marine Corps ATD*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Continued research into developing a replaceable electrode battery power source that consists of a metallic structure that is consumed during power generation and then easily replaced with a new metallic component that restores a full charge. (Realigned from PE 0602131M.) - Continued analysis of material alternatives for automated vehicle health monitoring and reporting. - Continued development of a tracking capability for major classes of supplies, forces & equipment. - Initiated technology demonstration for responsive precision aerial logistic transport from Seabase to Distributed Operations Squad or Platoon. - Initiated technology demonstration of an innovative bridge structure constructed from highly versatile modular composite components, thus expanding site-specific assembly options while simplifying logistic transport. - Initiated development of a backpack that prevents oscillatory and transient peak loading forces from causing skeletal injury while enhancing human mobility with heavy loads. - Initiated development of a man-portable capability to analyze captured fuel for adulterants and contaminants. - Initiated development of a lightweight man-portable multi-fuel thermoelectric battery charger. *FY 2010 Plans:* - Continue all efforts of FY 2009. - Complete development of portable fuel analyzer. - Complete development of lightweight thermoelectric generator. - Initiate the development and demonstration of advanced materials for corrosion prevention and wear reduction for USMC vehicles and equipment. *FY 2011 Base Plans:* - Continue all efforts of FY 2010, less those noted as completed above. - Complete development of backpack designed to minimize injurious peak oscillatory skeletal loading. - Complete technology demonstration of a full scale bridge constructed from lightweight versatile modular composite components.					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 2223: *Marine Corps ATD*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Initiate development of advanced lightweight fuel to energy conversion concepts.					
MANEUVER The Maneuver Thrust Technology Area focuses on the development, demonstration, and transition of technologies that will increase the warfighting capabilities and effectiveness of current and future Marine Corps maneuver systems. This Thrust aims at capturing emerging and "leap ahead" technologies in the areas of mobility, materials, propulsion, survivability, durability, signature reduction, modularity, and unmanned systems. Beginning in FY 2009, Mine Countermeasures (MCM) efforts are funded under the Force Protection activity. Presently, MCM supports and enhances the maneuver and force protection Marine landing forces with the development of technologies to enable detection, neutralization, breaching, and clearing of mines, Improvised Explosive Devices (IEDs), and unexploded ordnance from the beach exit to inland objectives. MAGTF MCM is a functional component of Naval Expeditionary Maneuver Warfare and includes Ship to Objective Maneuver (STOM), Expeditionary Operations from a Sea Base, sustained Operations Ashore, Urban and Asymmetric Operations, and OOTW. The resources reflect an increase for a DoD directed integrated capability demonstration supporting the Protection of Ground Forces and Systems. This capability demonstration has been directed to be wide ranging and encompass technologies for: - Pre-detonation of IEDs; - Personal protection materials; - Personal power generation; - Micro power sources; and - Augmented reality. The Maneuver activity directly supports this integrated demonstration which will be a broad, multi-year thrust to both investigate technology integration as well as spur application of more fundamental technologies to force and platform protection. The goal is multiple broad phased force protection applications and technologies, with off-ramps for fielding successes.	8.645	10.576	12.312	0.000	12.312

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 2223: *Marine Corps ATD*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
The FY 2009 to FY 2010 increase in funding is due to expanded Survivability/Active Protection Systems Improvement efforts to increase effectiveness of defeat (Pdefeat) of shoulder launched Rocket-Propelled Grenade (RPG) type threats and Anti-Tank Guided Missile (ATGM) threats on light platforms utilizing non-kinetic kill technologies. The FY 2010 to FY 2011 increase in funding is to due to plans for a major demonstration of Integrated Armor Solutions that provide lighter weight armor materials with enhanced protection to vehicle occupants. *FY 2009 Accomplishments:* - Continued Advanced Electromagnetic Armor technology development efforts. - Continued development of technologies to defeat side/top attack and advanced fuze mines through signature reduction and advanced signature duplication. - Continued S&T programs to address MAGTF Land MCM Master Plan capability gaps. - Continued development of technologies to defeat advanced mine fuzes (seismic, acoustic, and infrared). - Continued the formation of blast consortia to foster the increased understanding of blast and fragmentation interaction with vehicles and biological effects. - Continued development of a Combat S&T vehicle prototype to enhance crew survivability and vehicle fuel efficiency. - Continued efforts to detect IEDs using radio frequency sources. - Continued studies to identify technology development plans to close identified force protection capability gaps. - Continued development of a test bed to demonstrate advanced survivability concepts. - Continued technology development programs to address force protection capability gaps. - Continued development of fuel efficiency and battlefield power systems for improved performance.					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 2223: *Marine Corps ATD*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Initiated development of a Combat S&T Vehicle demonstrator to enhance crew survivability and vehicle fuel efficiency. - Initiated survivability improvements and technologies to mitigate acceleration and traumatic brain injuries to occupants to enhance tactical mobility and survivability in support of Distributed Operations. - Initiated advanced suspension systems development with ride height adjustment, ride quality adjustment, rollover prevention, and load equalizing systems for USMC tactical wheeled platforms to enhance tactical mobility in support of Distributed Operations. - Initiated a Survivability/ Active Protection Systems Improvement effort to increase effectiveness of defeat (Pdefeat) of shoulder launched RPG type threats and ATGM threats on light platforms utilizing non-kinetic kill technologies. - Initiated new mobility efforts for On-Board Vehicle Power to increase mobile exportable power for Diesel Electric Propulsion Concepts and a Fuels effort to investigate future fuel alternatives for internal combustion engines to include Fischer-Tropsch and coal gasification processes for use in military tactical wheeled vehicles. - Initiated Maneuver Enabling Technologies such as Vehicle Stabilization to improve vehicle suspension and control technologies to stabilize the platforms themselves to improve ride quality, shoot on the move capability and human systems integration. - Initiated a Vehicle Demonstrator program to design and fabricate an Integrated Power Demonstrator platform capable of producing the power needs for mobility and survivability concept demonstrations. Acquisition Workforce Fund - Funded DoD Acquisition Workforce Fund. *FY 2010 Plans:* - Continue all efforts of FY 2009. *FY 2011 Base Plans:* - Continue all efforts of FY 2010.					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 2223: *Marine Corps ATD*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Initiate efforts to demonstrate Integrated Armor Solutions that provide lighter weight armor materials with enhanced protection to vehicle occupants thereby enhancing tactical Mobility and Survivability in support of Distributed Operations.					
Accomplishments/Planned Programs Subtotals	58.003	70.421	78.087	0.000	78.087

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total	FY 2012	FY 2013	FY 2014	FY 2015	Cost To Complete	Total Cost
• 0603236N: *WARFIGHTER SUSTAINMENT ADVANCED TECHNOLOGY*	0.000	0.000	2.141	0.000	2.141	0.000	0.000	0.000	0.000	0.000	2.141
• 0602131M: *MARINE CORPS LANDING FORCE TECHNOLOGY*	8.698	7.278	8.981	0.000	8.981	7.219	3.648	1.155	0.000	0.000	36.979

D. Acquisition Strategy

N/A

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. 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.

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy			DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 2297: *Marine Corps Warfighting Lab - Core*	

COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
2297: *Marine Corps Warfighting Lab - Core*	35.475	36.419	37.002	0.000	37.002	40.651	43.295	44.278	45.194	Continuing	Continuing

A. Mission Description and Budget Item Justification

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

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

Using operational forces, MCWL conducts Advanced Warfighting Experiments (AWEs) supported by Limited Objective Experiments (LOEs), Limited Technical Assessments (LTAs), Wargames, and Studies. AWEs, LOEs, and LTAs examine discrete variables in as much isolation as can be achieved. Technologies assessed in LTAs are incorporated in LOEs while LOEs are building blocks from which resulting AWE-level campaigns are constructed. These campaigns (e.g., the Sea Viking (SV) experimentation series) are executed under the guidance of the Commandant of the Marine Corps (CMC) and in support of the Marine Air-Ground Task Force (MAGTF) Requirements List (MRL). The following provides an overview of MCWL experimentation:
- The Enhanced Company Operations (ECO) experiment series represents a major evolution in Marine infantry company operations. In the extended battlespace encountered in current and future operations, companies are required to execute functions normally conducted at battalion level and higher. ECO seeks to investigate structure, TTPs, training and equipment that will enable companies to effectively conduct full spectrum combat operations across an extended battlespace. ECO also seeks to use computer based simulation systems to expand the training opportunities and mission rehearsal capabilities.

- MCWL experimentation in FY 2010 and beyond will continue to address the broad challenges of seabased expeditionary warfare focused on the tactical levels. Specific areas of interest are reflected in the projects listed below which deal with outcomes impacting today's Marine Corps, the next Marine Corps, and Marine Corps after next.

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 2297: *Marine Corps Warfighting Lab - Core*

In FY 2011, MCWL experimentation will initiate an examination of Enhanced MAGTF Operations (EMO) that fully exploit capabilities achieved in ECO experimentation to the greater MAGTF beyond the infantry company focus of the past in the areas of C4, ISR, CSS, Fires, Targeting, and Maneuver. Additionally, FY 2011 investments will continue to support the immediate needs of deployed forces and exploit opportunities presented by emerging technologies.

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
COMBAT SERVICE SUPPORT (CSS) AND FORCE PROTECTION	6.480	4.937	4.902	0.000	4.902

This activity includes MCWL CSS and force protection experimentation efforts including assessment of equipment, new TTPs, training programs, and proposed organizational changes associated with enhanced capabilities. Although this category covers several small (less than $500K per FY) efforts being pursued by MCWL, most programs listed below are considered major (valued at $500K or more) or have near real-time operational impact.

The decrease in funding from FY 2009 to FY 2010 is due to the completion of the Improvised Explosive Device (IED) Detector Dog Extended User Evaluation (EUE) and immediate cargo Unmanned Aerial Systems (UAS)demonstration efforts.

FY 2009 Accomplishments:
- Continued to develop and experiment with bio-science (medical) technologies.
- Continued experimentation of simulation based training technologies to enhance small unit leader decision-making ability (transitions to Warfighting Excellence activity in FY 2010).
- Completed Mine Counter Measures (MCM)/Counter-IED efforts for mine and IED clearance, detection, and neutralization.
- Completed IED Detector Dog EUE.
- Completed development and experimentation with logistics-related equipment tailored to requirements of ECO.
- Completed development and experimentation with concept demonstrators that enable distribution of material from the seabase to small, widely dispersed, units ashore.

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 2297: *Marine Corps Warfighting Lab - Core*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Initiated assessment of unmanned ground logistics delivery technologies that support infantry small unit operations. - Initiated and completed technology demonstrations in immediate cargo Unmanned Aerial Systems (UAS). *FY 2010 Plans:* - Continue all efforts of FY 2009, less those noted as completed above. - Initiate assessment of technologies for sustainment of tactical level units from the sea-base. - Initiate new investigations into point-of-wound stabilization and emerging technologies that support casualty evacuation (CASEVAC)/casualty extractions using robots. *FY 2011 Base Plans:* - Continue all efforts of FY 2010.					
FIRES, TARGETING, AND MANEUVER This activity includes MCWL experimentation efforts in the areas of fires, targeting, and maneuver including assessment of equipment, new TTPs, training programs, and proposed organizational changes associated with enhanced capabilities. Although this category covers several small (less than $500K per FY) efforts being pursued by MCWL, most programs listed below are considered major (valued at $500K or more) or have near real-time operational impact. *FY 2009 Accomplishments:* - Continued evaluation of alternative counter shooter technologies. - Completed development and assessment of Heavy Machine Gun Initiative (HMGI), an effort to design advanced mounts for United States Marine Corps (USMC) crew served weapons.	1.447	1.587	1.648	0.000	1.648

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 2297: *Marine Corps Warfighting Lab - Core*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Initiated and completed assessment of an automated aviation and surface fires de-confliction system concept demonstrator. - Initiated assessment of small unit precision munitions/loitering weapons/armed UAS concept demonstrators. *FY 2010 Plans:* - Continue all efforts in FY 2009, less those noted as completed above. - Initiate assessment of concept demonstrator precision targeting device. *FY 2011 Base Plans:* - Continue all efforts in FY 2010. - Complete evaluation of alternative counter shooter technologies. - Complete assessment of small unit precision munitions/loitering weapons/armed UAS concept demonstrators. - Initiate assessment of improved meteorological measurement system.					
COMMAND, CONTROL, COMMUNICATIONS, COMPUTERS (C4)	9.157	9.470	9.785	0.000	9.785
This activity encompasses all MCWL C4 related experimentation efforts including assessment of equipment, new TTPs, training programs, and proposed organizational changes associated with enhanced C4 capabilities. Although this category covers several small (less than $500K per FY) efforts being pursued by MCWL, most programs listed below are considered major (valued at $500K or more) or have near real-time operational impact. *FY 2009 Accomplishments:* - Continued C4 extended user assessments of selected prototype technologies in support of forces engaged in Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF). - Continued experimentation of concept demonstrators to support company and below alternative C2 architectures.					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 2297: *Marine Corps Warfighting Lab - Core*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Continued C4 related small unit enhancements against irregular forces, including urban terrain. - Initiated and completed C4 support for ECO experiments. - Initiated and completed experimentation of enhanced communications concept demonstrators as part of ECO. - Initiated and completed development and assessment of a voice-to-voice automated language translator concept demonstrator. *FY 2010 Plans:* - Continue all efforts of FY 2009. - Complete C4 related small unit enhancements against irregular forces, including urban terrain. - Initiate assessment of network management systems for Capability Set (CAPSET) V (all C2 below Battalion) networks. *FY 2011 Base Plans:* - Continue all efforts of FY 2010, less those noted as completed above. - Complete experimentation of concept demonstrators to support company and below alternative C2 architectures. - Complete assessment of network management systems for CAPSET V(all C2 below Battalion) networks. - Initiate assessment of fuzzy logic (artificial intelligence based) network management systems. - Initiate assessment of non-Radio Frequency based communications systems.					
INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE (ISR) This activity includes MCWL ISR related experimentation efforts including assessment of equipment, new TTPs, training programs, and proposed organizational changes associated with enhanced ISR capabilities. Although this category covers several small (less than $500K per FY) efforts being pursued by MCWL, most programs listed below are considered major (valued at $500K or more) or have near real-time operational impact.	5.345	5.358	4.974	0.000	4.974

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 2297: *Marine Corps Warfighting Lab - Core*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2009 Accomplishments: - Continued additional IED investigations into promising detect and neutralize technologies. - Continued experimentation with TTPs and payloads for a Tier II Unmanned Aerial System (UAS) concept demonstrator to provide persistent ISR at regimental and battalion level. - Continued efforts to develop the TTPs required for small infantry units to employ Unmanned Ground Vehicles (UGVs), UASs, and unattended ground sensors. - Completed experimentation with the Small Unit Surveillance System (SUSS) and the Mobile Wearable Computer (MOWC). - Initiated and completed development and experimentation with a networked suite of small unit disposable sensors to enhance small unit force protection. - Initiated development and experimentation with a system that integrated tactical human intelligence collection, fusion, and visualization tools. - Initiate assessment of an integrated company level C4 ISR network. *FY 2010 Plans:* - Continue all efforts of FY 2009, less those noted as completed above. - Initiate investigations into rotary wing/hovering tactical level UAS concept demonstrators. *FY 2011 Base Plans:* - Continue all efforts of FY 2010. - Complete experimentation with TTPs and payloads for a Tier II UAS concept demonstrator to provide persistent ISR at regimental and battalion level. - Complete assessment of an integrated company level C4ISR network. - Complete development and experimentation with a system that integrates tactical human intelligence collection, usion, and visualization tools.					
MARINE CORPS WARFIGHTING LABORATORY (MCWL) OPERATIONS (SUPPORT)	8.110	8.428	8.851	0.000	8.851

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 2297: *Marine Corps Warfighting Lab - Core*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
MCWL Operations (Support) efforts include overall MCWL experimentation doctrine, planning, analysis, data collection, as well as technology transition tracking efforts. Although this category covers several small (less than $500K per FY) efforts being pursued by MCWL, most programs listed below are considered major (valued at $500K or more) or have near real-time operational impact. *FY 2009 Accomplishments:* - Continued to synthesize results and lessons learned into proposed DOTMLPF recommendations for the Marine Corps. - Continued to provide technical, strategic, and managerial support to Marine Corps experimentation. - Continued to provide overall analysis and reporting of experimentation efforts, analytical assistance during experiment design, and maintenance of an ad-hoc analysis capability. - Provided Acquisition Workforce support. *FY 2010 Plans:* - Continue all efforts of FY 2009. *FY 2011 Base Plans:* - Continue all efforts of FY 2010.					
WARFIGHTING EXCELLENCE This activity includes MCWL efforts in the development and assessment of joint and service warfighting concepts, joint and service missions, analysis of emerging threats and opportunities, and joint capability experimentation. It also includes MCWL service experimentation in areas that impact multiple warfighting functions. Although this category covers several small (less than $500K per FY) efforts being pursued by MCWL, most programs listed below are considered major (valued at $500K or more) or have near-real-time operational impact. FY 2010 and beyond funding was realigned from CSS and Force Protection area in support of experimentation of simulation based training technologies.	4.936	6.639	6.842	0.000	6.842

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 2297: *Marine Corps Warfighting Lab - Core*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2009 Accomplishments: - Continued executive agent responsibilities for Joint Title X programs, such as Unified Quest, Unified Course, and Unified Engagement. Title X war games address future capabilities in the context of Title X readiness responsibilities. - Continued management and oversight of non-Title X Wargaming, including the highly visible Office of the Secretary of Defense Net Assessment Transformation War Game series and the Special Operations Command wargaming series. - Continued to conduct quarterly Emerald Express seminars that resulted in collection and dissemination of insights and observations from the Operating Forces. Produced reports for the purpose of professional military education and advancing the lessons-learned process. - Continued to support the Center for Emerging Threats and Opportunities (CETO) mission: 1) prevent operational and tactical surprises to senior Warfighting Commanders by assessing future security environments in light of emerging threats and potential conceptual and technological opportunities; 2) help focus science, technology, and experimental efforts by appraising promising concepts and technologies; 3) serve as a catalyst to stimulate thought and debate on issues of importance to the Marine Corps. - Continued funding contributions to Joint Concept Technology Demonstrations (JCTDs) and Advanced Concept Technology Demonstrations (ACTDs). Both JCTDs and ACTDs are intended to rapidly field needed capabilities by using emergent mature technologies matched with innovative operational concepts. - Continued technology assessment and operational evaluation of Defense Advanced Research Projects Agency (DARPA)-developed robotic prototypes in support of ECO experimentation. *FY 2010 Plans:* - Continue all efforts of FY 2009, less those noted as completed above.- Continue experimentation of simulation based training technologies to enhance small unit leader decision-making ability (transitions from CSS activity).					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 2297: *Marine Corps Warfighting Lab - Core*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
- Initiate a MCWL-DARPA partnership for the development and demonstration of a legged robot in an effort to "Lighten the Load". Due to urgent operational commitments, driven by Operation Enduring Freedom, the Marine Corps will initiate a partnership with DARPA, beginning in FY2010, for the development and demonstration of a legged robot in an effort to "Lighten the Load" of the individual Marine. The MCWL-DARPA partnership represents an expansion of a large body of ongoing technical work aimed at a reduction in the base weight of the equipment, providing modular protection, enhancing warfighter mobility and improving load carriage to reduce fatigue and improve perceived weight. *FY 2011 Base Plans:* - Continue all efforts of FY 2010.					
Accomplishments/Planned Programs Subtotals	35.475	36.419	37.002	0.000	37.002

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

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. 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.

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy			DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 9999: *Congressional Adds*	

COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
9999: *Congressional Adds*	9.056	23.122	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	94.554

A. Mission Description and Budget Item Justification

Congressional Interest Items not included in other Projects.

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010
Congressional Add: California Central Coast Partnership Research *FY 2010 Plans:* This effort supports California Central Coast Partnership Research.	0.000	2.788
Congressional Add: Enhanced Small Arms Protective Insert *FY 2010 Plans:* This effort supports Enhanced Small Arms Protective Insert research.	0.000	1.593
Congressional Add: Future Immersive Training *FY 2010 Plans:* This effort provides for improvements to the Future Immersive Training Environment (FITE) an interoperable & reconfigurable hardware and software integrated training capability that enables the warfighter to train to accomplish close combat tasks in a realistic, fully immersive training environment that creates and reinforces complex (tactical and human dimension) decision making skills. Funding was transferred to this PE for FY 2010 from Operations and Maintenance, Navy line number 1C6C Combat Support Services in the FY 2010 Defense Appropriations Act.	0.000	9.480

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 9999: *Congressional Adds*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010
- Continue support and improvement to the Future Immersive Training Environment (FITE) Joint Concept Technology Demonstration during FY 2010.		
Congressional Add: CRAFT INTEGRATED ELECTRONIC SUITE (CIES) *FY 2009 Accomplishments:* This add continues to demonstrate the value of an integrated system for craft control and all C4ISR functions. CIES was first installed on the SEA LION II, where after an evaluation period, it has become an active combatant craft operated by SOCOM. The second system was delivered to SOUTHCOM in late FY2008 and a six week evaluation period was completed with highly successful results. This add continues that evaluation and provides a third system for installation installed on the Guardian. Additional ISR capabilities, including biometrics, have been incorporated into the design for use by Naval Forces.	2.872	0.000
Congressional Add: MARINE AIR-GROUND TASK FORCE SITUATIONAL AWARENESS *FY 2009 Accomplishments:* This 2009 Congressional add is for the development of capability using Unmanned Systems for persistent Intelligence Surveillance Reconnaissance (ISR) as a part of the Navy Expeditionary Overwatch (NEO) system-of-systems. These systems include the Nighthawk USV, Gunslinger HMMWV and the Scan Eagle UAV. This integration of unmanned vehicle mission management capability supports the NEO Program and continues the integration of data between the Common Operational Picture (COP) and unmanned platforms. *FY 2010 Plans:* This effort supports Marine Air-Ground Task Force situational Awareness research.	0.997	2.689
	1.197	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 9999: *Congressional Adds*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010
Congressional Add: Ballistic Helmet Development *FY 2009 Accomplishments:* The goal of the Ballistic Helmet Development add is demonstrating various levels of protection for a lightweight small arms protective helmets able to defeat small arms fire. A contact award has been completed. The work is focused on functional areas of materials, ballistics and helmet manufacturing with end state goal of demonstrating a ballistic shell capable against a specific threat. The maximum areal densities for each variant will be specified and in-line with desired weight bogeys. The same general form factor as the current Marine Light Weight Helmet LWH (complex shape, suspension system, area of coverage, shell/cranium standoff, etc.) will be utilized. Armor material and systems will be validated through ballistic coupon testing as an interim deliverable prior to helmet shell fabrication. It is anticipated that approximately 10 helmets for each design will be delivered to the government for independent verification of performance. Ballistic verification testing, areal density and weight measurements will be performed by the US Army Aberdeen test center.		
Congressional Add: Ground Warfare Acoustical Combat System of Netted *FY 2009 Accomplishments:* This effort will investigate cost effective, light weight, man wearable shot/fire event detection systems that enable quick response to direct shots or indirect fire from snipers, front line combatants, or other field assets. The Marine Corps Warfighting Laboratory (MCWL) will conduct proof of concept experimentation with GWACS in order to determine its utility within a Marine Corps rifle squad. *FY 2010 Plans:* This effort will investigate cost-effective, light weight, man-wearable shot/fire event detection systems that enable quick response to direct shots or indirect fire from snipers, front line combatants, or other field assets. Pending results of ongoing FY09 Congressionally-funded efforts, the Marine Corps	1.995	4.979

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	**R-1 ITEM NOMENCLATURE** PE 0603640M: *MC Advanced Technology Demo*	**PROJECT** 9999: *Congressional Adds*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010
Warfighting Laboratory (MCWL) will conduct proof of concept experimentation with GWACS and/or other GWACS-type system(s) in order to determine the concept's utility within a Marine Corps rifle unit.		
Congressional Add: Near Infrared optical (NIRO) Augmentation System *FY 2009 Accomplishments:* The Near Infrared Optical (NIRO) Augmentation System will detect surveillance and targeting activities such as snipers and cameras by detection of the spectral return when illuminated. The effort is focused on functional areas of lasers, image intensifiers, and automated image analysis with the end goal of demonstrating various implementations of detection capabilities for the Marine Corps. *FY 2010 Plans:* This effort supports Near Infrared Optical Augmentation System research.	0.798	1.593
Congressional Add: Hybrid Capacitor Supercell for Marine Combat Vehic *FY 2009 Accomplishments:* This FY2009 Congressional add is developing a new power source that merges the best qualities of a battery (energy) with those of a supercapacitor (power). The Hybrid Capacitor Supercell may allow the Marine Corps to replace the heavy, lead acid battery in their vehicles with a new, more reliable and less temperature dependant energy source that will likely be 25-40% lighter. Initial cost targets are only 2 to 3 times the cost of the existing lead acid batteries, compared to 8 to 10 times for li-ion and NiMH, because the new Hybrid Capacitor Supercell construction and manufacturing techniques are closely aligned with conventional lead acid battery production. The add is executing in accordance with Congressional intent.	1.197	0.000
Congressional Adds Subtotals	9.056	23.122

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 3: *Advanced Technology Development (ATD)*	R-1 ITEM NOMENCLATURE PE 0603640M: *MC Advanced Technology Demo*	PROJECT 9999: *Congressional Adds*

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Congressional Interest Items not included in other Projects.