Exhibit R-2, RDT&E Budget Item Justification: PB 2014 Navy											DATE: April 2013	
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)	**All Prior Years**	**FY 2012**	**FY 2013#**	**FY 2014 Base**	**FY 2014 OCO ##**	**FY 2014 Total**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**Cost To Complete**	**Total Cost**
Total Program Element	0.000	120.141	130.598	132.400	-	132.400	135.244	137.678	140.396	142.922	Continuing	Continuing
2223: *Marine Corps ATD*	0.000	80.372	87.138	88.335	-	88.335	90.233	91.857	93.671	95.357	Continuing	Continuing
2297: *Marine Corps Warfighting Lab - Core*	0.000	39.769	43.460	44.065	-	44.065	45.011	45.821	46.725	47.565	Continuing	Continuing

FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012

The FY 2014 OCO Request will be submitted at a later date

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 (Sep 2011). 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 United States 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 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 enhanced warfighting capabilities through field experiments with Marine operating forces; 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 S&T. As Naval partners, the Navy and Marine Corps S&T Team strive to transition technologies that will implement objectives outlined in the Naval Operations Concept. This PE also funds technical solutions designed to increase Naval force capability, such as the Naval Expeditionary Combat Command. Investments in S&T provide the opportunities for future capabilities and will prevent technological surprise. The PE as a whole will advance the amphibious and expeditionary capabilities for the Combatant Commanders helping to meet their emerging challenges by enhancing Naval S&T contributions to the long commitment to the OCO. The Marine Corps Service Campaign Plan (MCSCP) is the lens through which USMC S&T priorities are acted upon in order to support the future development of the Total Force.

Exhibit R-2, RDT&E Budget Item Justification: PB 2014 Navy	DATE: April 2013
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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 2012	FY 2013	FY 2014 Base	FY 2014 OCO	FY 2014 Total
Previous President's Budget	124.115	130.598	132.400	-	132.400
Current President's Budget	120.141	130.598	132.400	-	132.400
Total Adjustments	-3.974	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	0.208	0.000			
• SBIR/STTR Transfer	-4.182	0.000			

Change Summary Explanation

Technical: Not applicable.

Schedule: Project 2297, Worldwide contingency and combat operations (e.g., Operation Enduring Freedom (OEF) and humanitarian efforts) have increased the operations tempo of the operating forces to the extent that their support of, and participation in, the Marine Corps Warfighting Laboratory (MCWL) experimentation was/remains challenging to coordinate and often directly impacts planned projects. Additionally, rapid responses to emergent warfighter needs impacts planned projects. Also, experimentation itself is not a precise business and information gained throughout the process can also effect program plans. Thus, executing planned projects becomes "an art" in an effort to balance complicated and competing needs.

Exhibit R-2A, RDT&E Project Justification: PB 2014 Navy			DATE: April 2013
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)	All Prior Years	FY 2012	FY 2013#	FY 2014 Base	FY 2014 OCO ##	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
2223: *Marine Corps ATD*	0.000	80.372	87.138	88.335	-	88.335	90.233	91.857	93.671	95.357	Continuing	Continuing

FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012

The FY 2014 OCO Request will be submitted at a later date

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 Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
Title: COMMAND, CONTROL, COMMUNICATIONS, COMPUTERS (C4)	5.474	6.043	6.134
Description: 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 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.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
FY 2012 Accomplishments: - Continued urban navigation with limited Global Positioning System availability demonstrations. - Continued demonstrations of improved urban communications capabilities. - Continued creating a service oriented sensor network for expeditionary forces' current and future tactical sensors. - Continued developing tailored tactical Human to Machine Interfaces aligned to primary operational functions and non-intrusive within the battlespace. - Continued creating services for the tactical network that are fully operable with DCGS and the DCGS Integration Backbone. - Continued Application-Network Architectures, Conformal Antenna Integration and Demonstration Spiral 2 and C3 for the Individual Marine Spiral Two. - Completed Tactical Information Services. - Initiated Application Network Architecture (reprioritized from FY11) and Automated Small. ***FY 2013 Plans:*** - Continue all efforts of FY 2012, less those noted as completed above. - Complete Application Network Architecture and Advanced Software Reconfigurable Relay. - Initiate Advanced Communications Systems and Small Unit C3. ***FY 2014 Plans:*** - Continue all efforts of FY 2013, less those noted as completed above. - Complete Small Unit Decision Aids program. - Initiate smart radio efforts.			
Title: FIREPOWER ***Description:*** 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 increase in the Firepower funding from FY2012 to FY2013 is due to the acceleration and completion of the Caseless (CL) Ammunition project. This priority effort directly supports the Commandant of the Marine Corps Guidance to Lighten the Marine Air-Ground Task Force. ***FY 2012 Accomplishments:*** - Continued scalable effects conventional warhead concept development. - Continued improved mortar munition integration and demonstrations. - Continued development of targeting and engagement technologies for distributed operations collaborative fires integration and demonstrations.	7.567	8.914	9.020

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- Continued design, development, prototyping and testing 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. - Continued a Flight Control Kinematic Unit effort (effort renamed Flight Control Mortar). 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. - Continued Non-Magnetic Azimuth Sensing (NMAS previously identified as completed in PB 2011). - Completed development and testing of enhanced range mortar munitions. - Initiated development of Miniature Urban Missile, leveraging technology from MEMS, designation, guidance and control, and warhead design, to develop a shoulder launched missile capable of defeating a variety of targets. - Initiated development of precision 60mm mortar system, to demonstrate increased precision, range, and lethality in a light mortar, providing indirect fire support through projectile flight trajectory shaping.			
FY 2013 Plans: Narrative Clarification: FY 2012 plans to initiate development of Miniature Urban Missile, leveraging technology from MEMS, designation, guidance and control, and warhead design, to develop a shoulder launched missile capable of defeating a variety of targets has been delayed due to technical difficulties. FY 2012 plans to initiate development of precision 60mm mortar system, to demonstrate increased precision, range, and lethality in a light mortar, providing indirect fire support through projectile flight trajectory shaping has been delayed due to technical difficulties. - Continue all efforts of FY 2012, less those noted as completed above - Complete MEMS Initiation Safety Device (ISD) development and testing, for MilStd 1901A compliant igniters, to incorporate into current and developmental weapons propulsion systems. - Complete development of MEMS S&A. - Complete development of Caseless (CL) Ammunition.(Caseless (CL) Ammunition Effort.			
FY 2014 Plans: - Continue all efforts of FY 2013, less those noted as completed above. - Complete Exploitation and Development (E&D) portion of Non-Magnetic Azimuth Sensing (NMAS), with transition of mature technologies to newly initiated PE 0602750N Azimuth and Inertial Micro-electromechanical System (MEMS) Navigation System (AIM) to develop low cost, precision, inertial navigation systems for use in highly accurate handheld targeting systems, shoulder launched missiles, and munitions.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- Complete development, prototyping, and testing of lightweight technologies that provide individual Marine enhanced capabilities to detect and identify man-size targets out to maximum effective ranges of individual weapons during all visibility conditions (daylight, limited visibility, and darkness) by integrating multiple capabilities into a single system. - Initiate E&D portion of Awareness for Lightweight Engagements and Remote Targeting (ALERT) to develop large aperture, lightweight lens with enhanced fields of view. - Initiate E&D portion of Semi-Autonomous Fires Technology (SAFT) to develop semi-autonomous fire control systems for use in next generation remote weapons systems, to enhance performance and minimize gunner/operator burden. - Initiate Weapons Spectral Signature Characterization and Mitigation (WSSCM) to develop pigments, dyes, and polymers to mitigate Short Wave Infrared (SWIR) signature for weapons systems applications.			
Title: FORCE PROTECTION	8.609	9.354	9.469
Description: 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 explosive hazards from the beach exit to inland objectives. Efforts supported under Force Protection also include the demonstration of technologies such as Air Defense/Counter Rocket, Artillery, and Mortar (CRAM) and counter tactical surveillance and targeting, including pre-shot sniper detection, technologies in support of maneuver warfare, small unit distributed operations, and technologies for improved Personnel Protective Equipment for individual protection against blast, ballistic, and blunt impact threats. ***FY 2012 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. - Continued 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. - Continued a new Anti-Tank Guided Missile (ATGM) effort to defeat ATGMs in complex urban environment. - Continued Warfighter modeling and simulation efforts for the Warfighter-as-a-System analysis approach and methodology combining survivability, mobility, and warfighter performance parameters. - Continued the Urgent Theater Warfighting Requirement for countering Improvised Explosive Devices (IED) and vehicle bourne IED.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- Continued high-power solid state source development for IED neutralization. - Continued vulnerability assessment of threat targeting sensors to directed energy. - Continued efforts to neutralize incoming rocket, artillery, and mortar threats via non-kinetic means. - Continued development and evaluation of landmine detection utilizing ground penetrating radar from an airborne platform. - Continued development and evaluation of landmine detection utilizing synthetic aperture radar from an airborne platform. ***FY 2013 Plans:*** - Continue all efforts of FY 2012, less those noted as completed above. - Initiate the development of detecting and locating sniper weapons using the return of their unique radar signatures. - Initiate the development automated human detection via spectral imaging during low-light level operation conditions (e.g. dusk/ dawn/moonlit/starlit night). - Initiate fusion of technologies that will detect and classify optics (sniper scopes, ccds, eyeball, etc) from a moving platform. - Initiate the demonstration of the feasibility of a deployable mission package consisting of technologies capable of screening multiple individuals rapidly over a wide area to detect, classify and track suicide bombers at relevant distances within a critical time frame for action. - Initiate demonstration of laser technology readiness for battlefield employment. ***FY 2014 Plans:*** - Continue all efforts of FY 2013, less those noted as completed above. - Complete technology development programs to address force protection capability gaps. - Complete 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. - Complete the Urgent Theater Warfighting Requirement for countering Improvised Explosive Devices (IED) and vehicle bourne IED. - Complete high-power solid state source development for IED neutralization. - Complete vulnerability assessment of threat targeting sensors to directed energy. - Complete development and evaluation of landmine detection utilizing ground penetrating radar from an airborne platform. - Complete efforts to neutralize incoming rocket, artillery, and mortar threats via non-kinetic means. - Complete development and evaluation of landmine detection utilizing synthetic aperture radar from an airborne platform. - Complete to develop and demonstrate technologies that will detect RPGs and ATGMs prior to launch and countermeasures after launch. - Complete efforts to detect IEDs using radio frequency sources. - Initiate the development automated human detection via spectral imaging during low-light level operation conditions (e.g. dusk/ dawn/moonlit/starlit night).			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- Initiate physics-based characterization of signatures of proud/buried targets/EH Indicators across the spectrum of applicable detection modalities using knowledge/investigation of target physics - Initiate a program to demonstrate the fusion of multiple modes of detection of explosive hazards into a single system. - Initiate development of advance modular and scalable personal protective equipment utilizing advances in mobility/survivability modeling and simulation, materials, and bio-fidelic surrogates. - Initiate development of materials and helmet systems that absorb/dissipate blast shock waves.			
Title: HUMAN PERFORMANCE, TRAINING & EDUCATION	10.926	12.035	12.181
Description: This activity addresses the advanced technology development associated with the Human Performance Training and Education thrust (HPT&E). The HPT&E thrust ATD investment profile is the delivery-oriented portion of HPT&Es technology investment areas, Warfighter Resilience, and Decision Making and Expertise Development. The funding aligned to Warfighter Resilience is focused on advanced training technology and technologies that enhance neural, cognitive and physical aspects of human performance including mental resilience, cognitive agility, and enhanced physical readiness in extreme combat environments. Those funds aligned to Expertise Development refers specifically to those technologies and training strategies that enhance learning methods and strategies that accelerate the development and improve the retention of skills in decision making, adaptability, team leadership, and resilience. Decision Making refers specifically to those technologies and training strategies that enable superior performance of critical decision making by enhancing perceptual and decision-making skills, situation awareness, and individual and team adaptability and coordination on decentralized, dynamic and dispersed battlefields. ***FY 2012 Accomplishments:*** - Continued development of "Warfighter as a System" modeling tools. (Effort renamed to Enhancing warfighter psycho-physical performance). - Continued development of adaptive experiential learning tools for Distributed Operations Training. (Effort renamed to Real-time adaptive training environments). - Continued evaluations and validations of applications geared towards peak neural and cognitive performance-in distributed operations. - Continued 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). - Continued efforts to apply learning theories for language and culture training. - Continued team immersive language and cultural learning in simulation environments. - Continued 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			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
development on a continuum of novice to expert. (Rename effort Algorithms Physiologically-derived to Promote Learning Efficiency (APPLE)). - Continued field evaluations of training mitigation strategies triggered by behavioral and neurophysiological markers of learning, cognition, and expertise. - Continued effectiveness and validation studies of Advanced Mobile Field Assessment and 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. - Completed development of adaptive experiential learning tools for Distributed Operations Training. (Effort renamed to Real-time Adaptive Training Environments). - Completed development of "Warfighter as a System" modeling tools. (Effort renamed to Enhancing warfighter psycho-physical performance). - Completed development of algorithms physiologically derived to promote learning efficiency (Relates to early prototype systems for Human Performance and Training efforts initiated in FY10). - Completed development of expressive interactions for desktop virtual environments (Relates to early prototype systems for Human Performance and Training efforts initiated in FY10). - Completed efforts to apply learning theories for language and culture training. - Completed team immersive language and cultural learning in simulation environments. - Completed 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. (Rename effort Algorithms Physiologically derived to Promote Learning Efficiency (APPLE)). - Completed field evaluations of training mitigation strategies triggered by behavioral and neurophysiological markers of learning, cognition, and expertise. - Initiated development of sleep deprivation mitigations (phase II) to enhance warfighter performance during extended operations (initial phase completed in FY10). - Initiated development of technologies supporting peak cognitive performance of warfighters. - Initiated development of physical conditioning assessment and training optimization methods to improve warfighter performance (previous efforts related to physical conditioning impacts on combat readiness resourced by PE 0602131M). - Initiated development of applied training technologies for Squad Immersive Training Environments (SITE). - Initiated evaluation of neurological symptoms of performance at altitude to reduce the incidences of acute mountain sickness (AMS).			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- Initiated development and demonstrate immersive training communication analysis systems to support instructor assessment of infantry units.			
FY 2013 Plans: - Continue all efforts of FY2012, less those noted as completed above. - Complete development of an autonomous robotic adversarial target system to extend simulation marksmanship training to live-fire ranges with the use of robotic targets (all-terrain, mobile, tactical, return fire) and integrate with simulation feedback and scoring for transition to Marine Corps Systems Command (PM-Training Systems). - Complete the demonstration of the utility of a comprehensive instructional strategies framework that takes as input learner and knowledge characteristics and then provides as output recommended strategies to developers for enhancing training within simulation based training environments (APPLE). - Complete development of automated capture, measurement, performance assessment & after-action-review (AAR) for small team communications during training, showing improved situational awareness and team coordination among warfighters in a MOUT training environment (Relates to FY09 initiated effort to demonstrate and field studies of mitigation /augmentation capabilities that enhance squad communications). - Complete studies into next generation physical performance enhancement methodologies and technologies (enhanced warfighter psycho-physical performance). - Initiate mobile field technologies for predicting readiness and performance into more advanced development and demonstration of utility. - Initiate development of technologies and methodologies for integrated mental skills resilience training (previous efforts neural mechanisms of mental skills resilience).			
FY 2014 Plans: - Continue all efforts of FY 2013, less those noted as completed above. - Complete development of "Warfighter as a System" modeling tools. (Effort renamed to Enhancing warfighter psycho-physical performance). - Complete development of adaptive experiential learning tools for Distributed Operations Training. (Effort renamed to Real-time adaptive training environments). - Complete evaluations and validations of applications geared towards peak neural and cognitive performance-in distributed operations. - Complete 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). - Complete efforts to apply learning theories for language and culture training.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- Complete 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. (Rename effort Algorithms Physiologically-derived to Promote Learning Efficiency (APPLE)). - Complete field evaluations of training mitigation strategies triggered by behavioral and neurophysiological markers of learning, cognition, and expertise. - Complete effectiveness and validation studies of Advanced Mobile Field Assessment and 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. - Complete development of an autonomous robotic adversarial target system to extend simulation marksmanship training to live-fire ranges with the use of robotic targets (all-terrain, mobile, tactical, return fire) and integrate with simulation feedback and scoring for transition to Marine Corps Systems Command (PM-Training Systems). - Complete/ effectiveness and validation studies of Advanced Mobile Field Assessment and 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. - Complete evaluation of neurological symptoms of performance at altitude to reduce the incidences of acute mountain sickness (AMS). - Complete development and demonstrate immersive training communication analysis systems to support instructor assessment of infantry units. - Complete development of sleep deprivation mitigations (phase II) to enhance warfighter performance during extended operations (initial phase completed in FY10). - Complete development of technologies supporting peak cognitive performance of warfighters. - Complete the demonstration of the utility of using Tyrosine supplementation for reducing stress in irregular warfare, asymmetric environments. - Complete the development of the utility of analyzing neural mechanisms for affecting mental skills resilience. - Complete the development of Integrated Models for Warfighter Performance Enhancement. - Complete development of applied training technologies for Squad Immersive Training Environments(SITE). - Complete development and demonstrate immersive training communication analysis systems to support instructor assessment of infantry units. - Complete the demonstration of the utility of Integrated Learning Management System (LMS). - Complete the assessment and validation of an injury prevention methodology for use in-theater (CoRE) - Complete effectiveness and validation studies of Advanced Mobile Field Assessment and 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.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- Complete research into heat stress mitigations for the individual Warfighter, and develop intervention strategies to improve performance in hot environments. - Initiate the development of small-unit training for adaptability and resiliency in decision making (STAR-DM), to enhance the Marine Air Ground Task Force's capabilities by training and equipping small-unit leaders to handle the demanding complexities and possess the adaptive mindset necessary to operate across the spectrum of conflict; empowering our strategic corporals as well as all of our junior leaders to fight, operate, and win in this challenging security environment. - Initiate the development of rapid auto cognitive task analysis(AutoCTA), to address the problems associated with accurately determining training system requirements, to develop a standardized, theory driven and JCIDS aligned, rapid CTA technique for extracting knowledge from experts and efficiently modeling tasks. - Initiate development of technology to improve the transfer and maintenance of resilience training in the Marine Corps, to include measures of climate for Warfighter resilience, and small unit leader and team member training to enhance climate resilience, social support, and relapse prevention modules for deployment.			
Title: INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE (ISR)	3.689	4.497	4.553
Description: 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, 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 increase in the ISR Thrust funding from FY2012 to FY2013 is due to the initiation of 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 in on-board firmware which is a USMC and United States Special Operations Command (SOCOM) priority. Efforts to mature the semantic web construct needed to enable information dissemination and utilization will also be initiated. Efforts to infer and disambiguate graphs generated from structured and unstructured data will be accelerated as will development in processing low signal to noise audio data. ***FY 2012 Accomplishments:*** - Continued development of advanced tactical sensor nets that localize mobile detection of threats in a complex environment. - Continued development and demonstration of measurement and signature intelligence data management and integration capability.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- 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. - Continued efforts to refine enemy course of action prediction software to adapt to stimuli. - Continued 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. - Continued development of tactical sensor nets with organic unattended multi-level security processing and information dissemination. - Continued 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. - Continued 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. - Continued 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. - Continued algorithm development for base classification on context, similarity to clutter, and nearness to suspicion. - Continued efforts to analyze and expose enemy networks using close observations of entity to entity associations and social network analysis. This includes development of audio tools which enable automated understanding of analog and digital recordings, as well as text files. - Continued 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. - Continued efforts to incorporate social models for human decision making with statistical models. - Completed efforts to use the warfighter as a supplementary sensor in the battlespace to improve ISR to C2 connectivity. - Completed efforts to develop agile tactical sensor nets to improve the availability, timeliness, and usefulness of battlespace intelligence. - Continued new Operational Adaptation Enablers effort to provide one analysis framework for the incorporation of interdisciplinary techniques related to addressing contextual questions. - Continued efforts to extend the utility of track classification algorithms to sparse data. - Continued efforts to automatically fuse data across all identifiers (TTL, biometrics, symbols) based on similarity measures.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- Continued efforts to show entity tracking using disparate ground and air sensors and tools that automatically compute latent area atmospheric measures. - Initiated development of model based own force decision tools based on adversarial decision making models. - Initiated development of an active layered sensing capability. ***FY 2013 Plans:*** - Continue all efforts of FY 2012, less those noted as completed above. - Complete development of an active dynamic resource manager to make collected data better available to decision makers. - Complete Operational Adaptation Enablers effort to provide one analysis framework for the incorporation of interdisciplinary techniques related to addressing contextual questions. - Complete efforts to analyze and expose enemy networks using close observations of entity to entity associations and social network analysis. This includes development of audio tools which enable automated understanding of analog and digital recordings, as well as text files. - Initiate research on the development of automated data tagging algorithms that enable connected graphs of structured and unstructured data. - Initiate research to develop more audio exploitation algorithms that can be used on audio files with a low signal to noise. - Initiate technology development required to enable tactical UAS on-board processing of terabytes of data in real time. - Initiate development of a user composable search and display capability enabled by map reduce technology. - 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. ***FY 2014 Plans:*** - Continue all efforts of FY 2013, less those noted as completed above. - Complete 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. - Complete algorithm development for base classification on context, similarity to clutter, and nearness to suspicion. - Complete integration and demonstration of naval tactical warfighting applications and network connectivity. - Complete tagging, tracking, and locating efforts to demonstrate the effectiveness of tactically relevant tag readers which support track classification algorithms. - Initiate the development of a workflow manager capable of cloud service discovery and configuration.			
Title: LITTORAL COMBAT/POWER PROJECTION (LC/PP)	18.075	18.616	18.988

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014

Description: This activity addresses the advanced technology development associated with associated with the Marine Corps participation in the Department of the Navy's (DoN) Science and Technology Future Naval Capabilities (FNC) Program. The FNC Program represents the requirements-driven, delivery-oriented portion of the DoN Science and Technology (S&T) portfolio. FNC investments respond to Naval S&T Gaps that are generated by the Navy and Marine Corps after receiving input from Naval Research Enterprise (NRE) stakeholders. The funding is aligned with the Naval challenges associated with projecting power despite anti-access and area denial, specifically the Sea Shield, Power and Energy, FORCEnet, and the Naval Expeditionary Maneuver Warfare warfighting capability gaps. The funding profile reflects the alignment of the FNC program investments into Enabling Capabilities (ECs); ECs respond to priority Naval warfighting capability gaps. Funding for each EC is aligned to a 6.2 or 6.3 Budget Activity (BA) as appropriate. Concurrent funding for Naval expeditionary warfare capability ECs is also provided from Navy PE0602750N and PE0603673N. Both of the Navy PE's were included in the FY 2013 President's Budget Request and are now the only Navy program elements funding Navy FNC work. In previous submissions 7 Navy 6.2 PEs and 8 Navy 6.3 PEs funded FNC efforts.

FY 2012 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).
- Continued development of modular scalable effects prototype weapon. (Concurrent funding from PE 0602131M).
- Continued development of tactical urban breaching technologies.
- Continued development of counter improvised explosive devices technologies. (Concurrent funding from PE 0602131M).
- Continued development of individual Warfighter protection technologies. (Concurrent funding in PE 0602131M; funding will also be provided by PE 0603236N in FY 2009).
- Continued 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).
- Continued 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. (Previous FY10 effort resourced by PE 0602236N and PE 0603236N. Concurrent FY11 funding provided by PE 0602131M and PE 0603236N).
- Completed development of counter Improvised Explosive Device (IED) technologies. (Concurrent funding in PE 0602131M.)
- Completed development of advanced survivability and mobility technologies for Marine Corps tactical and combat vehicles. (Concurrent funding in PE 0602131M and 0603236N).

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- Initiated development of wide area surgical and persistent surveillance technologies. (Concurrent funding in PE 0602271N and PE 0602131M). ***FY 2013 Plans:*** - Continue all efforts of FY 2012, less those noted as completed above. - Complete development of improved lightweight computational fire control interface technology. - Complete development of improved fire control systems technologies to Expeditionary Fire Support System artillery and mortar systems. - Complete development of transparent urban structures technologies. - Complete development of individual Warfighter protection technologies. - Initiate development of precision urban mortar attack technologies in FY11 due to operation contingencies. (Concurrent funding in PE 0602131M). - Initiate development of fuel efficient Medium Tactical Vehicle Replacement (MTVR) technologies. (Concurrent funding in PE 0602131M). - Initiate development of the Ground Based Air Defense On-the-move high energy laser demonstrator. (Concurrent funding in PE0602750N and PE0603673N) ***FY 2014 Plans:*** - Continue all efforts of FY 2013, less those noted as completed above. - Complete development of technologies to lighten-the-load of warfighters by 1) reducing the weight and improving the capability of the day/night weapon sight 2) eliminating battery incompatibility, 3) providing Graphical User Interface (GUI)-based software for tradeoff analyses based on Military Operational Posture. - Complete development of precision universal mortar attack technologies. (Concurrent funding in PE 0602131M).			
Title: LOGISTICS	13.131	13.211	13.367
Description: This activity supports Marine Corps Expeditionary Logistics which is the practical discipline and real world application of the deployment, sustainment, reconstitution, and re-deployment of forces engaged in expeditionary operations. Expeditionary Logistics replaces mass with assured knowledge and speed, is equally capable ashore or afloat in austere environments, and is fully scalable to meet uncertain requirements. Expeditionary Logistics logically divides into five pillars: deployment support, force closure, sustainment, reconstitution/redeployment, and command and control. These pillars are thoroughly integrated and perpetually related in execution. ***FY 2012 Accomplishments:*** - Continued exploring the development of portable fuel cell technologies capable of providing Power in the 100 Watt to 500 Watt power range.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- Continued efforts to develop a micro turbine generator capable of 100W average power. - 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 backpack that prevents oscillatory and transient peak loading forces from causing skeletal injury while enhancing human mobility with heavy loads. - Continued the development and demonstration of advanced materials for corrosion prevention and wear reduction for USMC vehicles and equipment. - Continued development of advanced lightweight fuel to energy conversion concepts. This includes development of power management electronics for reducing power requirements for military radios. - Completed development of backpacks designed to minimize injurious peak oscillatory skeletal loading and generate electric power while walking. Narrative Clarification: This effort was planned for completion in FY 2011 but was delayed due to technical challenges. - Initiated demonstration of advanced concepts for mobile infrastructure. ***FY 2013 Plans:*** - Continue all efforts of FY 2012, less those noted as completed above. - Complete the development and demonstration of advanced materials for corrosion prevention and wear reduction for USMC vehicles and equipment. - Initiate integration and demonstration of electrochemical ultracapacitors into hybrid electric power systems. - Initiate efforts to improve advanced electrical power generation from fuel cells and renewable sources as well as to improve the efficiency of conventional generation via hybridization and smart-grid technologies. - Initiate integration and demonstration of advanced materials to reduce maintenance into selected vehicle and machinery components. - Initiate the development of robotic systems to facilitate the packaging and handling of logistic supplies. ***FY 2014 Plans:*** - Continue all efforts of FY 2013, less those noted as completed above. - Initiate a field demonstration of renewable energy devices and deployable equipment showing fewer liabilities when delivering expensive fuel, thereby lowering Marine Corps operational costs.			
Title: MANEUVER	12.901	14.468	14.623
Description: 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			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
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. ***FY 2012 Accomplishments:*** - Continued Advanced Electromagnetic Armor technology development efforts. - Continued development of fuel efficiency and battlefield power systems for improved performance. - Continued development of a Combat S&T Vehicle demonstrator to enhance crew survivability and vehicle fuel efficiency. - Continued survivability improvements and technologies to mitigate acceleration and traumatic brain injuries to occupants to enhance tactical mobility and survivability. - Continued 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 - Continued 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. - Continued 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. - Continued 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. - Continued studies to identify technology development plans to close identified force protection capability gaps. - Continued 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. - Continued efforts to evaluate current ground fleet platforms for their mobility and control capabilities as they relate to potential inclusion of an autonomous vehicle capability that will provide mobility and logistics support to the dismounted Marine during Enhanced Company Operations (ECO). - Continued 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.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- Initiated programs to address and enhance maneuver capability gaps in mobility such as efforts, transitioned from 6.2, aimed at the development of an autonomous vehicle capability that will provide mobility and logistics support to the dismounted Marine during Enhanced Company Operations (ECO). ***FY 2013 Plans:*** - Continue all efforts of FY 2012. ***FY 2014 Plans:*** - Continue all efforts of FY 2013. - Initiate the development of autonomy technologies and system concepts that will enable unmanned ground vehicles (UGVs) to be used as autonomous logistic connector vehicles. - Initiate the development of fuel saving vehicle technologies, including advanced transmission, power train, and electrical power system technologies. - Initiate mobility technologies that enable improved vehicle agility and stability. - Initiate lightweight armor, material, and structural technologies that enable maneuver and survivability of small, light expeditionary platforms. - Initiate survivability technologies that enable defeat of all unitary and tandem RPG and select ATGM threats, and the demonstration of survivable vehicles. - Initiate the development of technologies that enable vehicle component modularity and reduce life cycle costs.			
Accomplishments/Planned Programs Subtotals	80.372	87.138	88.335

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

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.

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COST ($ in Millions)	All Prior Years	FY 2012	FY 2013#	FY 2014 Base	FY 2014 OCO ##	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
2297: *Marine Corps Warfighting Lab - Core*	0.000	39.769	43.460	44.065	-	44.065	45.011	45.821	46.725	47.565	Continuing	Continuing

FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012

The FY 2014 OCO Request will be submitted at a later date

A. Mission Description and Budget Item Justification

The Marine Corps Warfighting Laboratory (MCWL) supports the Deputy Commandant of the Marine Corps for Combat Development and Integration (DC, CD&I) in his mission to define what the Marine Corps of the future should look like in combat development terms. More specifically, MCWL develops and evaluates future Marine Corps warfighting concepts using an integrated combination of live force experimentation, technology assessment, modeling and simulation, wargaming, and analysis. MCWL's principal outputs improve current (and inform future) United States Marine Corps (USMC) doctrine, organization, training, materiel, leadership, personnel, and facilities (DOTMLPF) requirements. MCWL conducts service-specific experiments and participates in joint service experimentation.

Wargames are conducted to frame emerging warfighting concepts, establish the Joint context for the Marine Corps Force Development System, and establish priorities for development of experimental and non-experimental capabilities.

Modeling and Simulation (M&S)-based events allow MCWL to examine capabilities with larger scale venues and forces than is practical with live forces at lower cost in terms of funding and in terms of operating force personnel and equipment. M&S also enables assessment of proposed capabilities before making investments in costly concept demonstrator technologies required in live force experiments.

Technical assessments are conducted to ensure that prototype or surrogate technologies are ready for insertion into live force experiments, and to explore the military utility of promising new commercial or government technologies.

Live force 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 DOTMLPF initiatives needed to produce future capabilities. Experimentation encompasses inquiries into multiple warfighting areas, including: Combat Service Support (CSS) and Force Protection; Command, Control, Communications, and Computers (C4); Intelligence, Surveillance, and Reconnaissance (ISR); Fires, Targeting, and Maneuver; 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. These events are planned and scheduled as part of a series of experimentation campaigns focused on one or more central warfighting concepts. These campaigns are executed under the guidance of the Commandant of the Marine Corps (CMC) and under the auspices of the DC, CD&I.

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The current MCWL Campaign Plan (MCP), formerly called the MCWL Experiment Campaign Plan (ECP), is focused on the challenges associated with the Enhanced Marine Air-Ground Task Force (MAGTF) Operations (EMO), ShipTo Objective Maneuver (STOM), and Seabasing concepts. This campaign began in FY 2011 and is projected to culminate with an AWE in 2014. EMO experimentation seeks to capitalize on the enhancements achieved during the previous MCWL campaign, Enhanced Company Operations (ECO), completed in FY 2010, which centered on expanding the combat capabilities of the Marine Infantry Company. EMO experimentation examines and develops the capabilities of other elements of the MAGTF beyond the infantry company. Focus areas for this effort are logistics, command and control (C2), and fires, targeting, and maneuver.

The next MCWL Campaign, beginning in FY 2014, will shift focus to Future Maritime Operations (FMO) line of effort. FMO will pursue themes of experimentation that support a flexible and sustainable Marine Expeditionary Brigade (MEB)-sized force involved in immediate crisis response operations across the range of military operations within the emerging "Single Naval Battle" concept. FMO will examine future enhancements in training, organization, and equipment for a crisis response MEB. The goal of this concept-based line of experimentation is to operationalize the concepts of Operational Maneuver From The Sea (OMFTS), STOM, and Seabasing.

Furthermore, during FY 2010, the Commandant of the Marine Corps (CMC) designated MCWL as the lead agency for all USMC Counter Improvised Explosive Device (CIED) activities, thereby expending MCWL's responsibilities in this critical area. Additionally, MCWL will continue to support the immediate needs of deployed forces and exploit opportunities presented by promising emerging technologies.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
Title: COMBAT SERVICE SUPPORT (CSS) AND FORCE PROTECTION	5.389	6.249	6.392
Description: 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 increase in MCWL CSS and Force Protection activity funding FY 2012 to FY 2013 is due to larger investments in the MCWL specific Defense Advanced Research Projects Agency (DARPA)-legged robot and technologies that reduce the demand required to support the MAGTF, such as Adaptive Logistics pursuits. ***FY 2012 Accomplishments:*** - Continued to develop and experiment with bio-sciences (medical) technologies. - Continued assessment of unmanned ground logistics delivery technologies that support infantry small unit operations. - Continued assessment of technologies for sustainment of tactical level units from the sea-base. - Continued a MCWL-DARPA partnership for the development and demonstration of a MCWL centric legged robot in an effort to "Lighten the Load" of individual Marines.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- Completed investigations into point-of-wound stabilization and emerging technologies that support casualty evacuation (CASEVAC). - Initiated research and assessment of technologies that reduce the demand required to support the MAGTF. - Initiated development, and tested unmanned versions of current cargo vehicles. - Initiated testing and evaluation of blast sensors that may improve the medical treatment for potential Traumatic Brain Injury casualties. ***FY 2013 Plans:*** - Continue all efforts of FY 2012, less those noted as completed above. - Continue research and assessment of technologies that reduce the demand required to support the MAGTF by completing development and assessment of a Marine Corps version of an Adaptive Logistics System as an operational as well as tactical level logistics decision support tool. - Complete development, and testing of unmanned versions of current cargo vehicles. ***FY 2014 Plans:*** - Continue all efforts of FY 2013, less those noted as complete above. - Complete assessment of technologies for sustainment of tactical level units from the sea-base. - Complete testing and evaluation of blast sensors that may improve the medical treatment for potential Traumatic Brain Injury casualties. - Initiate testing and evaluation of logistics enablers in support of FMO experimentation.			
Title: FIRES, TARGETING, AND MANEUVER	1.811	3.980	4.071
Description: 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. The increase in MCWL Fires, Targeting, and Maneuver activity funding from FY 2012 to FY 2013 is due to the pursuit of investigations into weaponized unmanned ground robotic as well as advanced sniper sighting systems. ***FY 2012 Accomplishments:*** - Continued assessment of concept demonstrator precision targeting devices. - Initiated investigation, development, and testing of concept demonstrator technologies and TTPs for enhanced fire support and fire support coordination associated with the EMO concept.			

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- Initiated development and assessment of weaponized unmanned ground robotic systems. ***FY 2013 Plans:*** - Continue all efforts from FY 2012. - Complete assessment of concept demonstrator precision targeting devices. - Initiate and complete development and evaluation of an enhanced sniper sighting system. ***FY 2014 Plans:*** - Continue all efforts from FY 2013, less those noted as complete above. - Complete investigation, development, and testing of concept demonstrator technologies and TTPs for enhanced fire support and fire support coordination associated with the EMO concept. - Initiate development of technologies that enhance the utility of autonomous systems. - Initiate test and evaluation of future ship to shore connectors that support FMO.			
Title: COMMAND, CONTROL, COMMUNICATIONS, AND COMPUTERS (C4) ***Description:*** 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. The decrease in MCWL C4 activity funding from FY 2012 to FY 2013 is due to cost savings encountered by being able to adapt many ECO technologies that enable on-going experimentation in the area of EMO venues being purused by MCWL in the C4 arena. ***FY 2012 Accomplishments:*** - Continued C4 extended user assessments of selected prototype technologies in support of forces engaged in Operation Enduring Freedom (OEF). - Completed C4 extended user assessments of selected prototype technologies in support of forces engaged in Operation Iraqi Freedom (OIF). - Initiated assessment of enhanced MAGTF communications concept demonstrators. - Initiated development and assessment of Internally Transportable Vehicle (ITV) based C4 concept demonstrator. - Initiate investigation and assessment of a MAGTF C2 architecture and an integrated C2 application in support of the EMO concept. - Initiated development and assessment of a MAGTF network management system. ***FY 2013 Plans:***	11.900	9.697	9.919

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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 Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- Continue all efforts of FY 2012, less those noted as completed above. ***FY 2014 Plans:*** - Continue all efforts of FY 2013. - Complete C4 extended user assessments of selected prototype technologies in support of forces engaged in OEF. - Complete assessment of enhanced MAGTF communications concept demonstrators. - Complete development and assessment of ITV based C4 concept demonstrator. - Complete investigation and assessment of a MAGTF C2 architecture and an integrated C2 application in support of the EMO concept. - Initiate development and assessment of a configurable C2 suite that enables operations from alternate seabased platforms in support of FMO experimentation. - Initiate development and assessment of a configurable C2 suite that enhances operations from L-Class shipping in support of FMO experimentation. - Initiate a follow-on effort to continue test and evaluation of an integrated C2 application in support of FMO experimentation.			
Title: INTELLIGENCE, SURVEILLANCE, AND RECONNAISSANCE (ISR) ***Description:*** 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. The decrease in MCWL ISR activity funding from FY 2012 to FY 2013 is due to the earlier than anticipated completion of small infantry unit Unmanned Ground Vehicle (UGV), Unmanned Aerial System (UAS), and unattended ground sensor employment methods as well as integrated company level C4 ISR network assessments. ***FY 2012 Accomplishments:*** - Continued additional IED investigations into promising detect and neutralize technologies. - Continued investigations into rotary wing/hovering tactical level UAS concept demonstrators. - Completed efforts to develop TTPs required for small infantry units to employ UGVs, UASs, and unattended ground sensors. - Completed assessment of integrated company level C4 ISR network. - Initiated and completed experimentation with sensors tailored to the requirements of a Combat Logistics Patrol. ***FY 2013 Plans:*** - Continue all efforts of FY 2012, less those noted as completed above. - Completed investigations into rotary wing/hovering tactical level UAS concept demonstrators.	4.842	3.954	4.044

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
- Initiate assessment of integrated MAGTF level C4 ISR network in support of EMO efforts. ***FY 2014 Plans:*** - Continue all efforts of FY 2013, less those noted as completed above. - Complete assessment of integrated MAGTF level C4 ISR network in support of EMO efforts. - Initiate development and assessment of seabased and landing force ISR capabilities that enable FMO experimentation. - Initiate development and assessment of counter-UAS systems and TTPs.			
Title: MARINE CORPS WARFIGHTING LABORATORY (MCWL) OPERATIONS (SUPPORT) ***Description:*** 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. The increase in MCWL Operations funding from FY 2012 to FY 2013 is due to a re-classification/categorization of efforts. The FY 2012 Small Business Innovation Research (SBIR) assessment was applied solely to this activity. In FY 2013 and beyond, MCWL plans to spread the assessment to all effected areas instead of applying to only one area. ***FY 2012 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. ***FY 2013 Plans:*** - Continue all efforts of FY 2012. ***FY 2014 Plans:*** - Continue all efforts of FY 2013.	8.890	10.798	10.656
Title: WARFIGHTING EXCELLENCE ***Description:*** 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.	6.937	8.782	8.983

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
The increase in MCWL Warfighting Excellence activity funding from FY 2012 to FY 2013 is due to increased focus on M&S based training, to include investment into improving Wargaming abilities. ***FY 2012 Accomplishments:*** - Continued executive agent responsibilities for Joint Title Ten (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 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 experimentation of simulation based training technologies to enhance individual and small unit combat task proficiency and decision making. ***FY 2013 Plans:*** - Continue all efforts of FY 2012. ***FY 2014 Plans:*** - Continue all efforts of FY 2013. - Complete experimentation of simulation based training technologies to enhance individual and small unit combat task proficiency and decision making.			
Accomplishments/Planned Programs Subtotals	39.769	43.460	44.065

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

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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.