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NATIONAL WAR COLLEGE

**The Marine Corps Warfighting Laboratory and Concept Based
Experimentation:
Armed To Fight in the 21st Century**

**5605: U.S. Military Strategy and Joint Operations
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The U.S. Commission on National Security/21st Century concluded that the emerging security environment in the next quarter century would require different military capabilities. Further, the Commission determined that it is essential that the U.S. maintain technological superiority, despite the unavoidable tension between acquisition of advanced (future) capabilities and the required maintenance of current capabilities.¹ The Marine Corps faces this dilemma as well. How to innovate for the 21st century while fulfilling its operational commitments today.

The U.S. Commission's belief was penned in September 1999. The United States Marine Corps, however, began its transition thought process within the scope of Joint Vision 2010 (updated version JV 2020) in 1995 with the creation of the Marine Corps Warfighting Laboratory (MCWL). This paper will focus on whether the MCWL is successful in its approach to shaping the Corps' future with Concept Based Experimentation (CBE) as a credible concept and technology validation tool in the Corps' transformation to achieve JV2020 and National Military Strategy goals. I contend that it has been and continues to be successful as the principle methodology in validating concepts and creating capabilities for the Corps' operational forces.

Consensus For and Movement Towards Change

By identifying the need to transform to meet the future conflict environment, JV2020 and the 1997 QDR stipulated that the U.S. Armed Forces must continue to invest

¹ United States. The United States Commission on National Security/21st Century. New World Coming: American Security in the 21st Century, Major Themes and Implications, The Phase I Report on the Emerging Global Security Environment for the First Quarter of the 21st Century. September 15, 1999. P. 7.

in and develop new military capabilities. These visions described the transformation endstate, but were weak on identifying the specific measures required to achieve this ideal military force. The National Defense Panel (NDP), chartered by Congress to review the 1997 QDR, was even more strongly persuaded of the need for transformation. The NDP argued that the United States must undertake a broad transformation of the military and its operational concepts and equipment. One of the methods to transform that is available today is experimentation. In fact, Andrew Krepinevich at the Center for Strategic and Budgetary Assessments, recommended that DOD provide about \$7 billion over the next six years to create or enhance operational experimentation sites. These would include, for example, a Joint Anti-Access/Area-Denial National Training Center and Joint Urban Warfare Training Center with the formation of a Joint Standing Opposing Force designed to resemble the kinds of asymmetrical threats U.S. forces are likely to face in the future.² The challenge that each service faces can be summed up with the question, “What will it take to win and what will it take for transformation to become a reality?”

As a result of this consensus for change, in May 1998 the then U.S. Atlantic Command, now Joint Forces Command (JFC) was designated the Defense Department’s executive agent for joint experimentation. The goal was to make JFC DOD’s focal point for exploring, demonstrating and evaluating the joint warfighting concepts and capabilities required in implementing JV2020. To date, JFC has undertaken experiments – albeit in synthetic environments rather than in the field – aimed at exploring DOD’s

² Center for Strategic and Budgetary Assessments. A Study for a Long Peace. Washington, D.C. January 2001. p. 69.

grandiose developmental concept of Rapid Decisive Operations.³ Although the JFC has outlined an aggressive experimentation plan, it will take time for the experimentation team to mature to provide applicable benefits to the operating joint force.

The Corps' Vision for Innovation: The MCWL

Before these initiatives were published, the Marine Corps' previous Commandant, General Charles Krulak, had the vision to begin the Corps' transition into the 21st century when he created the MCWL. The importance of the Warfighting Lab as the Corps' engine for innovative change was clearly articulated in a recent Krulak interview. He stated, "The Warfighting Lab is a treasure for our Corps...but only so long as it concentrates on the future and not on the present...the intention is not to produce 'deliverables' for today's Division/Wing Commanding Generals, but, rather, for the day after tomorrow."⁴

MCWL's original purpose was easily understandable. It was to think about future warfare, develop operational concepts of how to fight, investigate advanced technologies to support these operational concepts, conduct Concept Based Experimentation (CBE) to test visionary concepts and technologies, incorporate the successes into the Marine Corps Concept Development Program (CDP) and provide deliverables to the Fleet Marine Forces, sister services, and allies. The mandate also included augmenting the CDP by providing the 'means' for the Concepts Branch of the Marine Corps Combat Development Command in Quantico, Virginia to refine its warfighting concepts and capabilities development. The Warfighting Lab was therefore responsible for the

³ Northrop Grumman Analysis Center. "Revolutions in Military Affairs" (RMAs): A Pre-Quadrennial Defense Review (QDR) Update on Transformation in the Department of Defense (DOD). Washington, D.C. 7 February 2001. p. 4-5.

development, field-testing and implementation of future operational and functional concepts. These concepts, once validated, would then be entered into the CDP.

At the heart of the Corps' CDP is the Concept Based Requirements System (CBRS), a linear process where concepts are used to produce the development of military requirements, or sourcing of materials, equipment and platforms, to fulfill operational capabilities. Prior to the inclusion of the Warfighting Lab, the CDP often times floundered because the institutional concept based requirement process did not allow budding concepts to guide technology development and tactical thought. In fact, technology development often drove concept and strategy development, essentially putting the cart before the horse. The intent behind including MCWL in the CDP was to improve operational and tactical agility, with technology as a support mechanism and conceptual thought driving technology acquisition and force structure modifications. The addition of MCWL's CBE concepts and technology validation process solidified, refined and accelerated the CDP with thoroughly tested requirements. CBE, therefore, increased the Corps' modernization rate.

Thus, over time, MCWL's mission has become fourfold. First, to be the validation mechanism in the Marine Corps' CDP. Second, to enable future change through the identification and validation of future warfighting concepts and supporting technologies. Third, to accelerate tangible deliverables (capabilities in the form of doctrine, tactics, techniques, procedures and technologies) to the operating forces – to include the joint and allied forces. Lastly, to be the engine of transition for which the Corps could gain congressional funding and DOD support for continued CBE at MCWL. On this last point,

⁴ Morris, Roger J. Reality Has Bitten Hard into the Corps' "Dragon of Change", Marine Corps Command and Staff College – School of Advanced Warfighting, Quantico, Va. 21 November 2000. p. 1.

General Krulak understood that congressional resources flowed to those that were perceived as seeking innovation and internal transformation in response to JV2020 and QDR requirements.

Origin of MCWL

How did General Krulak's vision for MCWL get off the ground? In 1995, General Krulak brought to Quantico several Marine Corps Colonels from Marine Forces Pacific to lead the newly formed MCWL. These officers, in particular Colonel's Wood, Roques and Gangle, were wargaming new concepts in Hawaii and provided the structure and vision to complement General Krulak's transition mandate. Krulak provided further specific guidance to the MCWL Director, Colonel Wood, to focus the Warfighting Lab on developing operational warfighting concepts/capabilities and appropriate supporting technologies for executing the Navy/Marine Corps' Operational Maneuver From the Sea (OMFTS) and the Marine Corps' Ship To Objective Maneuver (STOM). Krulak's vision for the Lab was explicitly spelled out in his 1995 Commandant's Planning Guidance.

Specifically, Krulak's conceptual process for innovation designed to prepare the Corps for the 21st century was entitled 'Sea Dragon'. As a process, Sea Dragon had four aims: to achieve enhanced Naval and joint expeditionary capabilities; to create rapid military innovation while meeting current commitments; to serve as a process for change; and to use science and technology to enable the warfighter. Sea Dragon was outlined in a Five-year Experimentation Plan that included three experimental phases: Hunter Warrior (1995 – 1997), Urban Warrior (1997 – 1999) and Capable Warrior 2000 – 2001).

To increase congressional funding for MCWL, General Krulak believed that the Marine Corps needed to provide an immediate deliverable, while continuing to develop

the Warfighting Lab and procedures for CBE. The first of its deliverables was the Chemical Biological Incident Response Force (CBIRF). CBIRF was designed to provide the nation with a standing chemical and biological reaction force that could expertly handle the likes of a Tokyo Subway attack here in the United States. It stood up in early 1996 and stands ready today. General Krulak's hunch was correct. As a result of CBIRF, the Marine Corps received nearly \$40 million in additional funding for MCWL.

Concept Based Field Experimentation

Hunter Warrior was the Lab's first Advanced Warfighting Experiment (AWE). This AWE was developed to validate a warfighting concept that supported OMFTS and STOM. It was a force-on-force field experiment that took place at Camp Pendleton and Twenty-nine Palms, California, lasting 12 days and involving more than 7,000 Marines. The experiment scenario pitted a sea-based STOM delivered battalion sized blue force made up of small squad-sized teams against a mechanized regimental-sized red force. The experiment tested C4ISR concepts and technologies. The experimental concept tested whether a Marine Expeditionary Unit (MEU), equipped with organizational, technological, training and tactical enhancements, can significantly increase its area of influence and also increase its effectiveness within that area.

The results were that the Marine Corps could significantly extend the area of influence of a modest forward afloat expeditionary force, and significantly increase its effectiveness within that expanded area of influence. It did so by combining: detection and targeting by Long-Range Contact Patrols, ground and overhead sensors in the battlespace with long-range precision fires; the development of an enhanced combat operations center with vastly improved situation awareness, capable of managing and

directing detection, targeting and fires; and by coupling concepts and technologies with tactics, techniques and procedures with training and certain organizational changes. Building upon experimenting experience gained in Hunter Warrior, MCWL set off on the next phase of the Five-year Experimentation Plan.

Urban Warrior was the Lab's second AWE, again designed to validate a warfighting concept that supported OMFTS and STOM. Urban Warrior examined new concepts, tactics, and technologies for combat in cities and urban environments. Concept development for the urban environment was conducted because many both inside and outside the Corps believed that future conflict would occur in urban areas. By 2020, for example, the Corps purports that approximately 70 percent of the world's population will live in cities and that 70 percent of these cities will be located within the world's littoral regions (within 150 miles of the coastline). Since 1977, U.S. forces have deployed 34 times. Twenty-six of these deployments have been to urban environments and the trend is likely to continue.⁵ The Corps focused on this conflict environment to test its urban warfighting concepts and supporting technologies.

The Warfighting Lab tackled difficult questions regarding urban warfighting such as mission requirements; effective organization, doctrine and technology possibilities for Military Operations in Urban Terrain (MOUT) operations; and how to build, train, maintain and deploy the required force.

Urban Warrior had two phases. The first phase took place on the East Coast and was comprised of two Limited Objective Experiments (LOE) and a Culminating Phase Experiment (CPE). The LOEs were small-scale, focused field experiments concentrated

⁵ Urban Warrior Information Packet, Marine Corps Warfighting Laboratory, Marine Corps Combat Development Command, Quantico, Va. March 1999. P. 7.

on MOUT tactics, techniques, technologies and procedures. The LOEs were building blocks for follow-on, larger experiments. East Coast experimentation concluded with the CPE that took place simultaneously at Camp LeJeune, North Carolina and Charleston, South Carolina. In the CPE, a MEU-sized blue force conducted STOM and operated against a battalion-sized red force in the urban environment at both locations. Throughout this phase, Limited Technical Assessments on technology and weapons (both lethal and non-lethal) were also conducted. Of note was the significant progress made in identifying non-lethal weapons and applying appropriate tactics, techniques and procedures to create a capability for their use by Marines in the urban environment.

The second phase of Urban Warrior took place on the West Coast, culminating with the AWE. The AWE was conducted in the San Francisco Bay area over a one-week period in March 1999. It included a Naval Amphibious ready Group of twelve ships, over 8,000 Marines with Marine Corps Reserve augmentation. Concurrent with this field-CBE was the Navy/Marine Corps execution of the future concept “Extending the Littoral Battlespace (ELB) Advanced Concept and Technology Demonstration (ACTD)”, managed by the Navy’s Office of Naval Research. The results from the AWE were mixed, as operating in a large and complex city like San Francisco created unforeseen problems; problems that would never have been uncovered if the experimentation was limited to a board game or computer simulation. The Corps’ third AWE, Capable Warrior, has not yet been completed.

MCWL is not limited to parochial experimentation as it has joint and combined participation. The Warfighting Lab has four liaison officers assigned to U.S. Army battlelabs at Ft. Benning, Ft. Knox, Ft. Sill, and Ft. Leavenworth. These officers serve as

a conduit for sharing information and are the Corps' 'eyes and ears' in Army – Marine Corps Interoperability experimentation. MCWL also co-sponsors the MOUT ACTD with the U.S. Army. The MOUT ACTD to date has identified 32 requirements for the urban environment and develops systems to meet these requirements. The Lab has also worked closely with the U.S. Army and Oak Ridge National Lab on the development of the Advanced Surgical Suite for Trauma Casualties and with the Navy's Fleet Battle Experiments. Other cooperative efforts involve a wide variety of ACTDs and agencies. The Lab is working with the Extended Littoral Battlespace ACTD, the Small Unit Operations ACTD, the Joint Countermine Warfare ACTD, the Defense Advanced Research Projects Agency and with the National Reconnaissance Office. The Lab has also participated with civilian agencies such as police departments, the FBI, the DEA and the National Institute for Urban Search and Rescue on urban related issues.

MCWL also works with foreign military services as coalition forces had a major role in Urban Warrior experimentation and will also in Capable Warrior experimentation. Three British Royal Marines, a Royal Navy officer, an Australian Defense Force officer and a French Army officer are on the staff at the Warfighting Lab. The Canadian Armed Forces and Royal Dutch Marines are also involved in MCWL activities. Liaison Officers and observers from the Israeli Defense Forces, the Polish Army, the German Army and the Spanish Army have attended the experimentation.

All this begs the question, so what? Will MCWL's CBE continue with the new Commandant? How does MCWL's CBE contribute to the NMS of the United States? The current Commandant of the Marine Corps, General James Jones, outlined his intent for the Corps' future in Marine Corps Strategy 21. He reinforced General Krulak's vision

of transforming the Corps through innovative CBE, with MCWL as the engine to deliver change. MCWL's efforts contribute to the National Military Strategy in three primary ways.

First, by accepting the fact that warfare in the 21st century will be different and that internal innovation is necessary to capture warfighting success as a Marine Corps and member of joint expeditionary forces. The Corps was the first to dedicate its best visionaries and a dedicated budget to thinking about future warfare and to develop specific concepts on which to focus. It created a Warfighting Lab to focus on validating these concepts through CBE. As with any experimentation, some things worked and others did not. Those tactics, techniques, technologies and procedures that did work were developed into capabilities and introduced into the Corps' CDP. This process then produced doctrine, training standards, equipment procurement, funding requirements, R&D and acquisition. The end products were then introduced into the Marine Corps, sister services and allied operating forces.

Second, MCWL and the Corps' CDP provide deliverables to the operating forces that participate in Engagement Operations in support of the NSS and the NMS. MCWL provides innovative capabilities in the form of tactics, techniques, technologies and procedures to Marine forces in combat, combat service support and supporting forces that in turn support the CINC's Theater Engagement Plans (TEPs). Marine forces support these TEPs by providing combined-arms forward-deployed forces with the capabilities to execute peace and stability operations as well as direct combat.

Lastly, MCWL contributes to the Corps' capability for crisis response. The Corps ability to respond to the full spectrum of contingencies with a flexible, balanced and

tailored forward-deployed sea-based forces with its Marine Expeditionary Units (MEUs) provides the CINCs with immediate force projection and crisis response assets. MCWL provides the MEUs with training, innovative technology and capability enhancement.

Conclusion

There is a broad consensus that emerging conflict in the 21st century will require different U.S. military forces than we have today. Embracing the challenges of ‘What it will take to win and what will it take for transformation to become a reality?’, the Marine Corps began examining possible solutions when its Commandant created the MCWL to study visionary concepts, tactics, techniques, technologies and procedures. The ‘Sea Dragon’ experimentation process that MCWL was to execute was laid out in a Five-year Experimentation Plan. MCWL conducted CBE to test and validate these innovations through field experimentation. The CBE process also provided the Corps’ CDP with a validation tool, thus accelerating the Corps’ modernization rate.

MCWL and its CBE process over the past five years has provided numerous capabilities to the Corps’ operational forces, as well as to its sister services and allies, through its concept and technology field testing and validation process. MCWL is a prudent investment in time, people and money that should continue to reap the Corps future benefits. By making this investment in innovation and experimentation, MCWL and the CBE process quantitatively impacted the Corps’ ability to support the NSS and NMS through capability enhancement, force modernization and readiness that support engagement operations within the CINCs’ TEP. Additionally, it has provided the CINCs with state-of-the-art, forward deployed, balanced combined-arms Marine Air-Ground Task Forces (MEUs) capable of being reinforced with Marine Expeditionary Brigades

and Marine Expeditionary Forces. Although the Marine Corps does has not yet arrived at the solution to transformation, it continues to address future warfare requirements while it modernizes as a concept based force. Today, MCWL's CBE continues to be the engine of innovative change while leading the Marine Corps into the 21st century.