Attacking the Knowledge Problem

There are a lot of tools in the kit bag

by The Ellis Group, MCWL

War is a problem of knowledge. What do I know and who needs to know it? What is the enemy's most likely or most dangerous course of action? Imagining future warfare and how the Marine Corps is going to fight in it compounds the challenge. *Kriegspiel*, wargaming that derived from the 19th century German Staff, emerged as a tool with which to manage and teach the necessary uncertainties and complexities of war in order to overcome this problem of knowledge. This process has evolved and multiplied. Wargaming is now only one tool in the kit bag. The Marine Corps Warfighting Lab (MCWL) has been integrating with the Navy to rigorously attack the knowledge problem through different processes, collaborative events, and environments. In particular, this has been accomplished by establishing the Navy Capabilities Based Assessment Integrated Process-Marine Corps (NCIP-MC), supporting the Naval Integrated Force Structure Assessment (NIFSA), and developing Naval Live Virtual Constructive (LVC) simulations in support of the Defense Advanced Research Projects Agency (DARPA) Distributed Experimentation Environment (DE2).

These instances are indicative of a larger development and change in the mutual persistence and iterative interaction between concepts, wargaming, and experimentation. There is no prescribed linear process moving from concept, to wargame, to experiment, and to output. Instead, each instance is a hypothesis that is refined and probed based on the mechanism available. For example, a concept is developed that is exercised in an Advanced Naval Technical Exercise.

NCIP-MC promotes tactics and techniques that will promote naval integration. *(Photo by Sgt Ashley Lawson.)*

During the exercise, further experiments are imagined, but a new concept is required. Concurrently, there is an LVC environment that is iterating on specific tactics that the technical readiness levels of the various technologies would not otherwise be able to support testing. This feeds back into the concept refining assumptions and clarifying its purpose. Insights from the LVC environments are then tested on the spot during the exercise. This is just one way that concepts, experimentation, and wargaming are mutually supporting to develop and understand how to fight and what we need to do it.

The Commandant of the Marine Corps and Chief of Naval Operations have been pressing forward on merging procedures between the Navy and Marine Corps to create efficiencies as a naval Service. The *Commandant's Planning Guidance* (CPG [Washington, DC: HQMC, 2019]) directs the integration of Marine Corps' Program Objective Memorandum (POM) processes with the Navy to synergize capabilities as a naval Service. Explicitly the CPG directs this integration to develop "a common understanding and common baseline from which each Service can communicate their needs." Initiatives such as the NCIP-MC, the NIFSA, and Naval LVC simulations environment represent large milestones in combining POMs and force development efforts.

MCWL working in concert with Capabilities Division Directorate (CDD), Operational Analysis Directorate, and the Office of the Chief of Naval Operations (OPNAV) has developed the NCIP-MC. The CIP process began as

a way to assess capability investments in an integrated manner against future threats using modeling, simulation, and analysis to enable data-driven resourcing decisions. The end result is a threat-informed POM that focuses on the appropriate capabilities to achieve success on future battlefields. The NCIP-MC builds upon and integrates into the framework created over previous years by OPNAV elements: aviation, surface, and command, control, communications, computers, intelligence, surveillance, and reconnaissance.

The CIPs are year-long iterative processes. The first step is developing three Blue capability baselines to represent programmed and desired capabilities: the current POM, POM plus two years, and science and technology (Fiscal Year Defense Planning plus-five years). The intelligence community provides a threat environment and a common operational scenario, which are used to standardize analyses and baseline against common, real threats.

A critical CIP event is a three to five day "Concepts of Employment (CONEMP) Working Group" where operational subject matter experts (e.g., weapons and tactics instructors, planners, etc.) are given Blue and Red capabilities and tasked to develop the detailed CONEMPs and effects chains necessary to succeed in the operating scenario. Technical experts and resource sponsors are in the room to provide authoritative answers on system capabilities and fielding timelines. Analysts attend in order to collect the areas required for further analysis. The unification of warfighter and technologist under the watchful eye of analysts creates a standard that everyone had a hand in creating.

Following the CONEMP Working Group, CONEMPs are refined and presented to leadership for approval after which modeling, simulation, and analysis are conducted to determine the effectiveness and resiliency of the effects chains, and identify capability gaps in various Blue baselines. This is conducted using multi-level security to ensure all information is incorporated. Modeling uses tools such as AFSIM and BRAWLER for engagement-level modeling and STORM for campaign-level in order to gain insights at the tactical and operational levels of war.

The information gained from the NCIP-MC can be used for multiple purposes such as providing data to OPNAV NCIP working groups or new and innovative approaches to warfighters. This promotes naval integration tactics and techniques as well as provides baseline data for future wargaming and analytical events. The critical element of the NCIP-MC is that senior leaders can use the derived information—the right now naval solution to selected high priority effects chains—to make data-driven force design decisions, a necessary requirement of the CPG. Moreover, it ensures that the Marine Corps is a good steward of taxpayer dollars while providing warfighters the required equipment to succeed on the battlefield. It identifies gaps across the doctrine, organization, training, material, leadership and education, personnel, facilities, and policy spectrum and also helps craft specific requirements for capabilities.

In September 2019, CNO and CMC signed a joint memorandum to the Secretary of the Navy on integrated naval force structure assessments. This initiative directed the further examination and identification of requirements that the naval force needs to meet the challenges of great power competition. Working over a period of several months with representatives from MCWL, Operational Analysis Directorate, CDD, and multiple OPNAV agencies, the NIFSA team developed a comprehensive naval force architecture that integrated the concepts and the doctrine required to project naval power globally in 2030 and beyond. It provided specific focus on optimal force mix ratios while also looking at other capabilities above traditional platforms. Utilizing a joint operating scenario, the team developed a proposed employment solution that accounts for all warfighting functions and domains. The solution was modeled and simulated in a manner similar to the NCIP-MC process to identify successes and failures of each capability. The completion of NIFSA supports the development of a data-driven annual long-range plan for construction of naval vessels, rollout of the President's budget, and testimony for naval leadership. The integration of the naval force structure with the analysis of mission engineering threads and effects chains from NCIP provides a baseline of information and analysis useful in providing meaningful solutions for future warfighting.

Beyond processes that are meant to simulate and model how the naval force will fight and succeed in the future, MCWL is also supporting the develop-
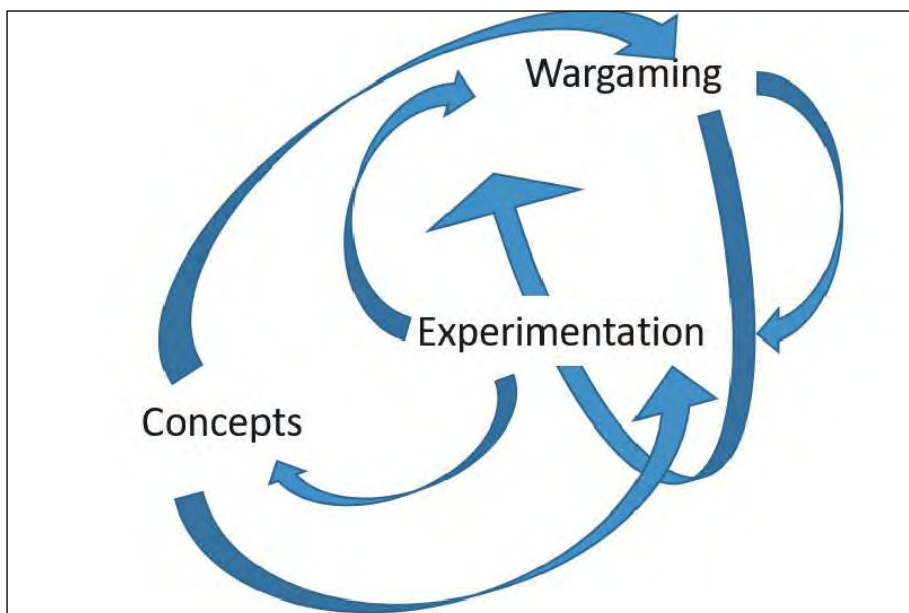
Wargaming, concepts, and experimentation. (Image provided by the Ellis Group, MCWL.)

Recommended Naval Reading

Last year the MCWL proposed adding six books to the Commandant's Reading List.[1] This year we are proposing five more:

Robert D. Kaplan, *Asia's Cauldron: The South China Sea and the End of a Stable Pacific,* (New York, NY: Random House, 2014). Kaplan examines the cultural, economic, and political conditions within each country bordering the South China Sea as a basis for understanding their aspirations, fears, and potential futures.

Toshi Yoshihara and James R. Holmes, *Red Star Over the Pacific, Second Edition: China's Rise and the Challenge to U.S. Maritime Strategy*, (Annapolis, MD: Naval Institute Press, 2018). Yoshihara and Holmes provide an essential tutorial on China's view of sea power.

Trent Hone, *Learning War: The Evolution of Fighting Doctrine in the U.S. Navy, 1898-1945*, (Annapolis, MD: Naval Institute Press, 2018). Hone provides insights into how Navy policies and practices generated a culture of innovation that effectively tested and validated new ideas and brought about rapid change before and during World War II.

Richard B. Frank, *Guadalcanal: The Definitive Account of the Landmark Battle*, (London, UK: Penguin Books, 1992). When most Marines think of Guadalcanal, their mental image is one of a beleaguered group of Leathernecks defending a tenuously held perimeter rather than what they were protecting: airfields that supported the aircraft key to denying the enemy daylight freedom of action in the surrounding waters. Without ever using the current term, Frank illustrates that "all domain operations" is not a new idea.

James D. Hornfischer, *The Fleet at Flood Tide: America at Total War in the Pacific, 1944-1945*, (New York, NY: Bantam, 2016). Hornfischer describes how Navy and Marine Corps innovation generated the Big Blue Fleet that cracked the enemy defensive barrier in the Marianas. That key maritime terrain enabled the Army Air Force to employ the B-29s that ultimately delivered the atomic bombs against Japan's mainland. Like Richard Frank, Hornfischer demonstrates that all-domain operations are not a novelty.

Note
1. *Neptune's Inferno: The U.S. Navy at Guadalcanal*, by James D. Hornfischer; *Ghost Fleet*, by P.W. Singer and August Cole; *To Rule the Waves: How the British Navy Shaped the Modern World*, by Arthur Herman; *One Hundred Years of Sea Power: The U.S. Navy, 1890-1990*, by George W. Baer; *Testing American Sea Power: U.S. Navy Strategic Exercises, 1923–1940*, by Craig C. Felker; *Fleet Tactics*, by Wayne Hughes; and *One Hundred Days: The Memoirs of the Falklands Battle Group Commander*, by Admiral Sandy Woodward.

ment levels to include the integration of advanced science and technology capabilities.

This effort includes the establishment of a DARPA DE2 node at MCWL. The DE2 enables LVC experimentation with system of system technologies and architectures that include a combination of manned and unmanned systems, battle management aids, communications protocols, message formats, and operating procedures across multiple nodes. The initial constructive environment generation for this capability will be modeled in the NAVAIR product Next Generation Threat System. One goal of this environment is to enable MCWL to participate in the Department of the Navy Modeling and Simulation Naval Integrated Live Virtual Constructive Environment events. This environment provides the perfect laboratory to test ideas and develop hypothesis necessary to fight the future fight. Plus, these perspectives will eventually be refined and iterated up through the NCIP-MC and NIFSA processes.

The NCIP-MC, NIFSA, and LVC experimentation environment all represent an extension of the *kriegspiel* of the 19th century. They are attempts to grasp and understand the complexities of war and what we can know about the future fight. Coupled with these efforts, these processes, techniques, and projects all aim to analytically evaluate ourselves to better compete with and defeat current and future adversaries. As Sun Tzu stated: "If you know the enemy and know yourself, you need not fear the result of a hundred battles." To which, MCWL would add, nor a thousand simulated ones.

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ment of a LVC experimentation environment. This is in line with the CPG's guidance on training in augmented reality prior to conducting live force exercises. The goal of this environment is to enable development and evaluation of naval concept of operations and CONEMPs at the mission and engage-