Preparing for War,
Keeping the Peace

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In the years after World War I, the U.S. military's exhaustive wargaming paved the way for victory in World War II—we need to revive that approach today for the conflicts of tomorrow.

The United States faces a dynamic environment characterized by extraordinary technological changes, increasing weapons proliferation, and violent global upheaval. The U.S. military must prepare and adapt to an uncertain future while struggling with decreasing budgets. History tells us that we have weathered such rough seas before. During the 30 years following the end of World War I, the United States employed a process now known as the Cycle of Research to prepare itself for future conflicts despite stringent financial constraints. This process was a major contributor to our victory in World War II. We urgently need to revive that process to help us prepare for future political-military-economic competitions.

The Cycle of Research is an iterative application of the principal tools the military uses to explore, understand, and prepare for future conflict. The elements of the cycle include systems and operations analysis, wargames, exercises, and assessment of real-world experience and history. Each element of the cycle grows out of and feeds into the next. The results of using the cycle effectively link new capabilities and concepts to trained forces and commanders ready to respond to a range of opportunities and threats and prepared to adapt to and exploit surprise. These are the elements that can create true revolutions in military affairs (RMA). Such RMAs can be successful only if new capabilities and technologies are applied in new ways by leaders who fully understand them, not by incremental improvements in current approaches. The best way fully to explore and test these new ideas—other than in actual warfare—is through explicit adoption and application of the Cycle of Research to drive the defense program.

Changing Environment, Austere Budgets

The times, they are a-changin'—radically and rapidly. Technological innovations such as cybernetics, miniaturization, additive manufacturing (3D printing), biotechnology, nanotechnology, advanced communications, advanced radars, autonomous attack systems, drones, commercial spacelift, and many others are changing the face of society and warfare. At the same time, events in the Middle East illustrate how significant changes can be enabled by technology but also driven by demographic and social changes. "The global security environment presents an increasingly complex set of challenges and opportunities to which all elements of U.S. national power must be applied."[1] Parallel to the change in the political environment is the alarming proliferation of advanced and deadly weapons. The overwhelming military-technical and economic advantages we once had over the rest of the world are diminishing. To stay ahead of, or even to keep up with our competitors, we will have to generate another RMA akin to that of the 1920s and '30s. And we will have to do this despite the fact that the U.S.

The Board of Strategy plots moves during a Naval War College wargaming session in the cabin of the USS *Wyoming* (BB-32). Such rigorous preparatory training during the interwar years "was a major contributor to our victory in World War II," notes the author. "We urgently need to revive that process."

economy is struggling and the government is making cuts in defense spending. Debates abound regarding the role and structure of the United States and its military now and in the future.

Many of today's global dynamics are similar to those that shook the world during the years between World War I and World War II. That period witnessed mass technological changes in communications that shaped daily perceptions, such as radio and talking pictures.Other technological advances with radical implications for society and the military included aviation, rocketry, and oil-fired ships. Upheavals in the Middle East stemmed from the breakup of the Ottoman Empire and the imposition of artificial state borders setting the stage for much of the tension and violence that we see today. Fascism, socialism, anarchism, communism, labor movements, and labor unrest swept the globe. Italy, Germany, and other countries sought to expand their borders or grab overseas colonies. New and powerful weapons proliferated despite treaties designed to curtail them. These weapons harnessed advances in air power, artillery, battleships, aircraft carriers, mechanized warfare, and electronics. Wary, if not weary, of war and plunged into the Great Depression, the United States questioned its own strength and role in the world and chose to withdraw from most international affairs and significantly reduce its military capacities.

Games With a Purpose

Despite those reductions, the U.S. military recognized its responsibility to prepare for war. Observing the enormous and troubling changes under way and hoping to shape events rather than merely react, the Navy and Army conducted a series of war games, analyses, and exercises to understand and to shape the future of warfare. The Naval War College, collaborating with the Navy's General Board, explored a wide range of challenges the future might hold. These were embodied in a collection of planning scenarios, positing that the Fleet would face various competitors and capabilities (including recent allies such as France and England); each was given its own color name—such as Plan Orange for the hypothetical war with Japan. At the Naval War College, officers playing on opposing teams, or as referees, conducted hundreds of war games employing both paper charts and miniature ships to understand the possible situations they might face down the road and to analyze the decisions both sides might have to confront.

The incidents and issues that arose during these war games were explored further in analyses (which today

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we would call operations research or operations analysis) conducted at the Naval War College and by the Navy's General Board. The results were then fed back into the war games, expanding and refining them as the Navy came to understand better the capabilities and new uses of tools such as aviation and submarines. Most importantly, the theoretical results of the games and analyses were implemented and tested during annual Fleet Battle Experiments/Problems. During these annual events, most of the Fleet was gathered to conduct live operations designed to address the issues and challenges contained in the various color plans and train to respond to and overcome them. During these maneuvers the Navy explored new concepts and capabilities, though it sometimes was forced to employ surrogates to simulate new capabilities such as massed carrier air power.[2]

By taking the time to examine thoroughly all of the myriad new technologies and capabilities through the war games, analyses, and Fleet exercises, the Navy developed a potential RMA, which was realized subsequently during World War II. Fast carrier task forces were unleashed for independent strike operations, rather than tied to scouting for the big-gun battleships. Critical logistics concepts such as at-sea replenishment and mobile dry docks were developed to enable operations despite the loss of overseas bases. Carrier air power, radars, radios, and later proximity fused anti-aircraft batteries were blended together to devastate Imperial Japan's air power. Similar cycles of theory and practice helped prepare the U.S. Marine Corps for amphibious operations in the Pacific.[3] Without this preparatory work, the Fleet would have had to start with no more than incremental improvements in existing and outdated approaches, matching concepts and capabilities of its adversaries rather than moving beyond them by leveraging new technology and new ways of thinking.

The U.S. Army War College, in collaboration with the Army's General Staff, conducted its own cycle of war games and analyses during that same preparatory period, leading to a series of field exercises. The most famous of these were the Louisiana Maneuvers of 1940 and 1941, which trained leaders and staff officers in handling masses of troops, including armor and aviation, critical to U.S. Army operations during the coming war.

The Army and Navy often collaborated in the development and analyses of scenarios through the auspices of the Joint Board and even through the conduct of combined Battle Experiments, especially in the Pacific. The war colleges exchanged officers who participated in
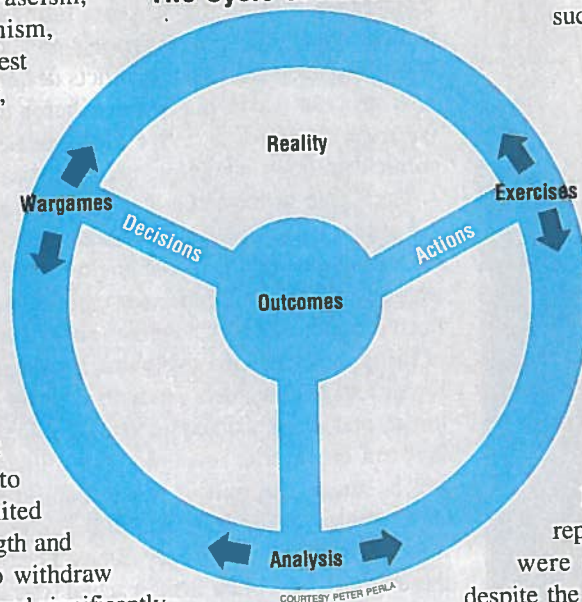
each other's war games and helped overcome institutional misunderstanding (if not all inter-service rivalry!). The State Department provided inputs and support to these efforts to help focus the services on both realistic and dangerous potential adversaries and situations.[4]

The Cycle of Research

The interwar years illustrated the power of combining war games, analyses, and exercises in a cycle of research to explore new concepts, innovations, and potential scenarios.

To use that cycle effectively, however, it is important to recognize wargaming, analysis, and exercises are not the same. Wargaming focuses primarily on human behavior, particularly human decision making. It provides an environment for the players to learn by making decisions and experiencing their implications. Umpires and observers learn from recognizing their own beliefs and how they are reflected (or not) during the game, as well as by watching the decision-making processes of the players. But wargaming is not an effective tool for producing quantitative measures. For that we turn to analysis.

Analysis, or operations research, is "a scientific method of providing [decision makers] with a quantitative basis for decisions." It employs various analytic (usually mathematical) models to approximate particular aspects of the physical processes of reality. Both war games and analysis must employ simplifications and abstractions of reality to function. The results stemming from these simplifications must be compared to actual combat or the closest approximation available through peacetime exercises.

Exercises focus on doing. They are primarily tools for training and usually designed with training goals uppermost in priority. They are often viewed as experiments that can provide reliable data about how things "really are" so that models used in analysis or games can be calibrated or made more realistic.[5] These two perspectives about military exercises can sometimes interfere with one another and so must also be treated as only part of the story.

To fully explore what the future will bring, an iterative cycle of war games, analyses, and exercises is required today, just as it was during the 1930s. Revolutions in military affairs require not just new capabilities but a change in the way those capabilities and others are employed. Incremental improvements in existing ways

of fighting do not create RMAs. To create a 21st-century RMA, the cycle of research provides an understanding of how events might unfold during a conflict of a type we have not experienced before. No one tool can do the same because they each suffer from their own biases, simplifications, and cognitive and epistemological shortcomings. When integrated judiciously, however, the cycle of research gives leaders at all levels critical facts, synthetic experience, and opportunities to rehearse a range of events in their minds and in the Fleet or the field. Just as important will be the ability of these leaders to adapt and to understand their own strengths and shortcomings when confronting new and uncertain situations.[6]

Wargaming and exercises are best when conducted between two competitive sides; experienced players will know how it feels to be surprised and what is required to adapt to an opponent's innovative approach. Good umpires will subject players to unforeseen events such as the loss of key leadership positions, unexpected weapon systems, and mistaken preconceptions. These and other "black swan" events can train leaders in how to absorb the shock of surprise, take immediate remedial actions, and respond with their own innovative initiatives. The analysis supports the validation of the concepts and their potential effects in the physical realm, while exercises assess their feasibility in the real world.[7]

In World War II the preparation of the U.S. Navy and Army paid impressive dividends. New technologies such as radars, sonar, aircraft carriers, and other capabilities had been fully explored. Their performance, interactions, and utility had been learned about in war games, analyses, and

1958: A war game is in progress at the Naval War College during the height of the Cold War, as commander and staff study the 15-foot screen in the newly installed Navy Electronic Warfare Simulator. "Assuming leadership in the global community," the United States, and its sea force in particular, "now had to meet commitments around the globe."

at-sea in exercises. The understanding gained by commanders made their employment more efficient and effective during the war. The implications of enemy actions and uses of new technologies had also been pondered in depth. Based on this competitive interaction, U.S. leaders gained important insights and greater understanding of the general courses of action available to both sides, particularly for the war in the Pacific. Leaders at all levels were prepared for conflict. Just as importantly, leaders were ready to absorb the shock of the unexpected and adapt to win the conflict.

What Happened?

Today's U.S. military no longer appears as effective in its application of the full power of the Cycle of Research. While each of the individual elements continues to be employed, the synergy of their integration has been diluted. Today there is no General Board for the Navy. The Naval War College conducts war games, but they are no longer tied closely to analyses conducted by the Navy Staff, nor do they seem to feed Fleet exercises on a regular basis.

Similarly, there is no longer a general staff for the Army. The Army War College conducts war games, but they are

College. This happy collaboration is likely the result of their collocation and the Marine Corps' usual lean organizational design.

The United States appears to have lost its winning application of the Cycle of Research through a mixture of operational tempo, growth, legal requirements, and pursuit of false efficiency. During World War II, the Fleet was executing the plans and reaping the benefits of all the prewar work that had been conducted. Following the war the United States drew down the Fleet but, assuming leadership in the global community, now had to meet commitments around the globe. This increased operational tempo prevented gathering most of the Fleet together for annual exercises. New technologies identified in World War II and during the Cold War required significant specialization within the three distinct communities of the Navy: submarines, surface, and aviation. "This was abetted and amplified by technology. Nuclear bombs, nuclear power, jet engines, radar and missiles all combined to make naval warfare intensely technical . . . ."[8] Meanwhile, in the pursuit of efficiency, the Naval War College was restricted to a more academic role and the General Board was disbanded.

Participants are a flurry of activity among the rows of computers on the war-game floor of Sims Hall at the Naval War College in 1987. Even in the "limited fashion" in which it had been perpetuated, the Cycle of Research "had great effect in helping to accelerate the demise of the Soviet Union."

A Winning Formula Dissipated

During the Cold War, the U.S. Navy did recreate the Cycle of Research in a limited fashion, which had great effect in helping to accelerate the demise of the Soviet Union. However, one of the Strategic Studies Groups, which acted like the old Navy General Board, was designed in a one-off manner and disbanded after its wargaming and analysis, and the members went to take command to execute the Fleet exercises to implement their collective vision.[9]

The Army revived the Cycle of Research from 1992 through 1995 during

no longer tied closely to analyses conducted by the Army Staff, nor do they feed Army maneuvers on a regular basis. The National Defense University, under the auspices of the Joint Staff, has been focused on joint professional military education. It has reduced its use of wargaming and does not feed exercises or joint-staff analysis on a regular basis. Wargaming and exercises have been separated from each other in completely different sections of the Joint Staff.

The closest modern example of the use of the Cycle of Research may be the Marine Corps Combat Development Center, whose Marine Corps Warfighting Laboratory seems to be working closely with the Marine Corps War

the Modern Louisiana Maneuvers with excellent results. Then–Army Chief of Staff General Gordon Sullivan sought to recreate the successful process of innovation that the historic Louisiana Maneuvers had achieved. He created a task force to coordinate the efforts of the Army War College, the Training and Doctrine Command, and other Army organizations in the identification of concepts to iterate through a process of wargaming, analyses, and exercises. Mindful of budgetary constraints, the Army employed distributed interactive simulation (also known as training simulators), validated by exercises at the National Training Center. This process produced important innovations such

as Owning the Night, Total Asset Visibility (advanced logistics), and Army Digitization to provide a common relevant battlefield picture as part of the Force XXI concept. This force was then highly successful in conventional operations in Iraq and unconventional operations during the early days in Afghanistan.[10]

More recently, the Army has been challenged to employ the Cycle of Research because of ongoing heavy warfighting demands. The Army has not been able to send forces to combined-arms training during the later years of the wars in Iraq and Afghanistan.[11] The Army War College, which was originally intended to train staff officers in the fine art of planning and coordinating operational orders, has been disconnected from exercises and limited to supporting the Army's annual Title X war games.

Unfortunately, the Joint Staff has not coordinated the Cycle of Research at the joint level as was originally intended in the draft national security reforms.[12] Goldwater-Nichols reforms took war planning away from the services and assigned it to the regional combatant commanders supported by the Joint Staff, which historically has not succeeded in the roles the Army's General Staff and Navy's General Boards played between the world wars. It has failed to continue to explore and develop in accordance with new capabilities. In fact, the inspiration for the latest Revolution in Military Affairs employed in the first Gulf War arose from outsiders looking at the United States' military.[13] Caught up in day-to-day operations, the Joint Staff has succeeded in important bureaucratic roles supporting regional combatant commanders in executing ongoing operations or daily preparation for potential operations, but at the cost of being able to properly analyze future security environments. Further, the elements of the Cycle of Research have been broken up into separate departments of the Joint Staff, each designed to pursue different objectives.[14]

Reviving the Cycle

The elements of the Cycle of Research are still available, and individually even more advanced in their techniques than ever, but we must reconnect them and employ them more consistently in mutually reinforcing ways. The war colleges need to connect more directly to the services and reinforce their use of wargaming to prepare students for future warfare. This will provide a low-cost opportunity for tomorrow's leaders to explore the future of warfighting, compete against potential adversaries, and learn how to overcome the inevitable surprises. The concepts developed and explored at the war colleges and other wargaming sites must be assessed through thorough analysis by the services and Joint Staff. These vetted concepts and challenges must be tested in Fleet exercises, Army maneuvers, and the annual exercises sponsored by the Chairman of the Joint Chiefs of Staff (JCS). Distributed interactive simulation (simulators) can enhance (but cannot replace) live-force combat exercises while saving resources. If the JCS annual exercises cannot be freed from support to the short-term war plans of the geographic combatant commanders, the

services must be free to devote their own exercises to a more long-term view.

The insights from exercises examining the future must then be fed back into the war games, and the whole process repeated on an annual basis. This will require carving out time from global commitments to support Fleet and Army field exercises as well as coordination and oversight from the services of all elements in the Cycle of Research.

Reviving that cycle can help restore our warfighting edge. This combination of techniques, employed consistently year after year, enabled the United States to prepare a range of plans to address multiple crises, develop new and innovative forces to respond to them, and prepare leaders to employ new capabilities and to be mentally equipped to respond to rapidly changing events and "black swans." It helped create a revolution in military affairs that arose not from incremental improvements in the standard approaches but in full exploration of and reordering of new and old capabilities. *Si vis pacem, para bellum*—If you would have peace, then prepare for war. To prevent the wars of the future, we must fully understand their nature and prepare for them. No technique can reliably predict the future, but we have seen this Cycle of Research—integrating war games, analyses, and exercises—prepare us for World War II. These tools have shaped our history—and they can shape our future and prepare us for it. ✵

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