



Vice Admiral Cebrowski commanded Fighter Squadron 41 and Carrier Air Wing 8, both embarked in USS Nimitz (CVN 68). He later commanded the assault ship USS Guam (LPH 9) and, during Operations DESERT SHIELD and DESERT STORM, the aircraft carrier USS Midway (CV 41). Following promotion to flag rank he became Commander, Carrier Group 6 and Commander, USS America Battle Group. In addition to combat deployments to Vietnam and the Persian Gulf, he has deployed in support of United Nations operations in Iraq, Somalia, and Bosnia. He has served with the U.S. Air Force; the staff of Commander in Chief, Atlantic Fleet; the staff of the Chief of Naval Operations, on four occasions; with the Joint Staff (as J6); and as Director, Navy Space, Information Warfare, and Command and Control (N6). Vice Admiral Cebrowski became the forty-seventh President of the Naval War College in July 1998.

PRESIDENT'S FORUM

The Navy has made considerable progress in transformation: it is increasingly network-centric; its offensive firepower is more dispersed and more accurate; and its power can be projected much farther inland. But these advances represent past decisions. Transformation is the continuing process of crafting a new future, one that will find expression in new "tangibles," used in new ways.

“CHALLENGE THE ASSUMPTIONS!” That is the oft-repeated exhortation of the Chief of Naval Operations, Admiral Vern Clark, to his admirals. From the perspective of a war college or a research laboratory, both under the aegis of academic and intellectual freedom, the task sounds easy. It is far more difficult in execution—yet it is a requirement for organizations under stress.

Before exploring the process and consequences of challenging assumptions, one should ask “Why?” What is the imperative? If the Chief of Naval Operations were comfortable with the current assumptions, if he were confident that they could produce what is required for the emerging national security environment, and if the budget environment were both predictable and adequate, there would be no compelling need to challenge the assumptions of an organization with a long history of sustained superior performance. But none of this is true. The evidence that the Navy cannot continue on its present course and still secure the interest of the nation over the long term is overwhelming. Analysts predict a procurement “train wreck,” not just for the Navy but for all the services. The growth of operating costs has been both large and unpredicted*—and personnel costs are likely to grow even if the economy should slow. It is little wonder that the Chief of Naval Operations asks his admirals to challenge the assumptions.

* For example, in the case of aircraft repair parts: 19.8 percent growth in fiscal 1998, 12.4 percent in 1999, 11.7 percent in 2000, and 14.6 percent so far in 2001.

TRANSFORMATIONAL CHANGE

In deciding which assumptions to challenge, one finds two broad categories. The least interesting assumptions involve neither significant contention nor significant money (consequently, that group almost always is selected for review). The second category represents both contention and money. Clearly, it is this second group in which we should be interested. Within it we find a further division into assumptions that can yield new ways of gaining efficiencies at the margin, and those that involve transformational change. The rest of this discussion will focus on the latter category.

Three common examples of assumptions at the highest level are:

- The national security environment will remain essentially unchanged through 2010 or even longer.
- The defense budget will be flat or increase only modestly through that period.
- The trend toward a networked joint force will continue or quicken.

We need to be exceptionally careful in our assumptions, for if they are not true our strategy will fail. The first and second assumptions should be challenged. The problem with the first is that it defies both history and current observations. The problem with the second is that if the budget falls, the Navy will become prohibitively expensive; and if the budget notably rises, we will miss opportunities, due to our insufficient attention to research and development, concept innovation, training, and acquisition capabilities. Put another way, the second assumption may cause us to “think poor,” and it stems from the first. Because the third assumption is fully under our control, it can be made to come true.

For a helpful way to think about assumptions, consider the relationship between science and technology. Science explores man’s relationship with the rest of creation. Technology, on the other hand, relates human actions to objectives. In the processes of science and technology, two things happen: observations are explained, and “things” are invented. The outcome is that the new explanations and the new things interact, creating new realities. This point gives insight into the process of challenging assumptions. A new concept flows from a new understanding of relationships, and it yields rules pointing to the creation of new tangible things. Attempting continued creation of things in response to older and increasingly discredited explanations of observations results in disharmony and waste, the stress and inefficiency of living a contradiction. Even when the creation of such things yields marginal improvements in performance, the improvements are only in relation to discredited theories and not the new realities. Since man can never fully observe or explain all of creation, this process is

continuous. It is only really noticed when truly large assumptions are challenged, as when Copernicus articulated a new relationship between man's habitat and the rest of the universe.

A modern-day example emerges from information science, best observed in the prevailing marketplace: large numbers of people with high degrees of shared awareness, responding to shifts in basic rule sets in ways not yet fully understood, constitute the modern market. The result is activity that takes us to a future where human behavior is less deterministic and more emergent, less focused on the physical and more on the cognitive, and where value is derived more from relationships than from things. For the military, the question is whether we can turn away from methods and processes that rely on building rigid paths to a predetermined future, and turn instead toward a view that is less deterministic and less focused on the physical.

This new understanding of mankind's relationship with information points us to technology choices. As we move from the industrial age to the information age, the intangibles of war will increasingly dominate outcomes. We are witnessing the "demassification" of the tools of war, with concomitant increases in speed; further, precision will be measured increasingly by reliability and predictability in coupling military operations to political objectives. The trend toward "demassification" is already apparent in the ascendance of precision strike, an information-age concept that relies on knowledgeable targeting and accurate weapons guidance rather than the mere counting of aircraft sorties and bomb tonnages dropped—industrial-age metrics. Also, the rapid targeting used both in DESERT STORM and over Serbia and Kosovo reduced the required mass. Since sources of power are increasingly associated with information, agility, and communications, categories of systems and procedures can be identified for reduction or outright elimination—those that depend on mass, reduce speed, or inhibit shared awareness.

With these examples as guides, we can explore the three avenues of transformational change available to military forces, the Navy in particular. These involve the questions of how to operate the Navy, how to size the Navy, and how to shape the Navy.

Is it possible to change how the Navy operates—or more broadly, how the Navy is used—without changing its size or shape? The principal feature of U.S. naval operations is the sustained projection of American sovereignty, frequently referred to as "forward presence." About this we need to ask, would we want to do less of it in order to save money to be spent elsewhere? Research by Professors Donald C. F. Daniel and Bradd Hayes at the Naval War College points to the importance of forward presence, while acknowledging the difficulty of expressing its value by a meaningful quantified metric. In other words, we know that to do

less is almost certainly bad, possibly disproportionately so—but it is difficult to say by exactly how much. Research by the College’s Professor Tom Barnett on economic and energy development in Asia implies a similar conclusion. Also, the joint combatant commanders clearly want more rather than less naval forward presence. But even if all of these views were wrong, a reduction in forward operations of the fleet would not yield meaningful savings unless portions of the forces themselves were eliminated.

One question, then, is whether presence levels can be maintained or increased with a smaller force level by changing the way the Navy operates. Indeed, there are proofs that the answer is yes—naval forces homeported in Japan, and the Blue/Gold crews of nuclear ballistic-missile submarines, for instance—but since presence forces are also warfighting forces, it is not clear that a smaller force would be prudent. There are ample indications that it would not be. Over the 192 crises of the past thirty years studied by the Center for Naval Analyses, naval forces on their normal deployments dealt with the vast majority. The most notable exception was Operation DESERT STORM, in which additional U.S. naval forces surged from their home ports.

The Navy’s mode of operation, its size, and its shape are interdependent. At the very least, an increase in one draws funds from the others, probably with unintended consequences. The result is that a change in one assumption that we might challenge has effects that cascade into other areas.

For instance, a navy does not hold its shape as its size is decreased: navies do not “scale” well in a downward direction. One need only look at the current U.S. fleet, in which there are virtually no small ships. The dominating cost-benefit rule has been to maximize combat power per dollar in a force of specific size. The result has been upward pressure on unit size and capability, downward pressure on the number of ships, and a general deserting of low-end missions. The result is that the fewer remaining ships have difficulty meeting forward-presence requirements. As low-end training opportunities are lost or underutilized, crews become overspecialized, aggravating the phenomenon that on multimission ships more mission capability is put at risk. The result is that the fleet tends toward tactical instability, by which I mean vulnerability of a force to an adversary that is disproportionately smaller in size and cost, and less sophisticated. A large, costly, multimission U.S. warship that neglects training in one or more warfare areas, such as antisubmarine warfare, may be defeated by a small, inexpensive, single-purpose foe, such as a conventional submarine.

The key assumption we really should challenge is that in a time of rising costs and flat budgets, the Navy must operate less, or reduce its size, or forsake capabilities appropriate for the information age—or all of the above. We should be asking instead, “Can we maintain or even increase forward presence, hold or

increase current size, *and* shape fleet capabilities for the information age, all within the expected budget?" My hypothesis is that by "shaping the force," making the appropriate choices in information-age technology, organization, doctrine, and business processes, the size, the operating levels, and the capabilities of the U.S. Navy all can *increase*.

The boldness of this hypothesis is acknowledged, but there are illustrations that indicate its merit in significant cases. One could replace some of our current and projected amphibious ships with an expansion of the U.S. Army's Theater Logistics Vehicle, employing a variant of the Royal Australian Navy's *Jervis Bay*. This force would substitute speed for mass while delivering more Marines to the objective, at high speed and low cost. Combat power delivered per unit of overhead could be reduced by an order of magnitude. Of course, this would necessitate a change in our concept of amphibious and logistics operations. A similar type of ship could be used for advance-force and special operations. Global 2000 and a limited-objective experiment with Amphibious Squadron 5 have pointed to the promise of this approach. A second example is found in a Naval Postgraduate School concept called SEA LANCE, in which the numbers of ships are sharply increased, their weapon load increases, and the crew size decreases—all within existing costs.

There are other examples. They all challenge doctrine, organization, and technologies that have been undergoing evolution and enhancement since World War II or before. Clearly it is time to look at the new ideas objectively and make the hard choices. But what are the rules by which these choices are to be made?

NETWORK-CENTRIC OPERATIONS

Over the past two years the Navy Warfare Development Command, with the aid of the Naval War College War Gaming Department, has examined and refined a Capstone Concept for the future Navy. The Capstone Concept articulates the U.S. Navy's transformation path to network-centric operations. It applies the defining tenets of joint and naval warfare to network-centric warfighting and establishes a vision of the new capabilities we must achieve. It underscores, in all its aspects, the increasing importance of information as a source of power. Information protection, knowledge management, and networked sensor employment are vitally important to future warfighters. The Navy must be able to fight for and win the information and knowledge advantage early in any crisis or conflict.

Centered on warfighting capabilities and human and organizational behavior, and enabled by evolving technology, network-centric operations can be broadly described as the process of deriving maximum military effect through the rapid and robust networking of diverse, well informed, and geographically dispersed forces. Network-centric operations primarily focus on the operational and tactical

levels of warfare, but they have significant impact across the spectrum of military operations, from diplomatic support and humanitarian assistance to strategic warfare. Network-centric operations represent an emerging theory of war that will harness the power of technological advances to dominate operational tempo and achieve warfighting aims at all levels of military operations. Four major supporting concepts—“pillars”—underpin this new theory.

To gain the information and knowledge advantage, the future joint force will fight first for knowledge superiority, building our own awareness while degrading the enemy's. Commanders have always valued a decisive information advantage over an adversary. “Surprise,” one of the great principles of war, is one generalized example; the breaking of the Japanese code before the battle at Midway is a more specific application. But the power of information in the emerging character of war has elevated the concept of “information superiority” to primacy. Awareness will be gained through multitiered expeditionary sensor grids incorporating autonomous vehicles, robotics, and microtechnology; through officers educated in the history, politics, economics, and cultures of potential adversaries; and through “red cell” networks of regional experts responding directly to operational commanders.

Assured access results from the Navy's ability to destroy or neutralize “area denial” systems, sophisticated and overlapping threats designed to keep U.S. power-projection forces from reaching positions from which they can be effective. The Navy must be able rapidly to establish control of the battlespace—on, over, and below the sea; over the land; and in space and cyberspace—to the degree needed to accomplish any mission, at any level of conflict. The emphasis here is on coping with the changing shape and technical character of the “no-man's-land.”

Effects-based operations shift primary reliance from attrition to a warfighting philosophy that relates physical effects more directly to desired political outcomes. This venerable principle will be manifested by naval forces using combinations of speed and maneuver to influence and degrade an adversary's decision processes. Toward this end, knowledge superiority enables a new era of effects-based operations that can capitalize on early war-termination opportunities that would otherwise be lost. An adversary of modest means requires a prodigious will to undertake the fight. We should expect our forces to shift accordingly from means to will.

The forward sea-based units of the Navy–Marine Corps team are our nation's most efficient, responsive, and sustainable “enabling” forces. Naval forces will continue to exploit the advantages of operating from an essentially borderless domain. Two converging trends are making sea-basing important in joint operations. First, land forces are relying more heavily on sea-based forces for increased agility, support, and survivability. Second, Navy sensors, strike assets,

access capabilities, and command capacities can be projected farther inland. Forward-deployed naval forces can shape the battlespace—by establishing a tiered sensor network; by putting their scalable, interoperable command and control networks at the disposal of joint and coalition forces; and by taking early offensive and defensive actions.

The tenets and pillars of network-centric operations are essential to fielding a Navy–Marine Corps team capable of performing the wide range of future missions necessary to maintain U.S. maritime supremacy. But the Capstone Concept is exactly that, a concept. It is more like science than technology, in that it indicates a critical change in our relationship with our environment. It points to specific requirements—the sensors, networks, weapons, platforms, and most of all, the people who will populate new generations of forces and execute the emerging doctrine. While the intangibles increasingly dominate outcomes, new tools are required to effect the transition to the new theory of war; as a 1998 RAND Corporation study concludes, a transformation requires not only challenges to the way competencies are pursued but also changes in the “tangibles.” The Navy has made considerable progress in transformation: it is increasingly network-centric; its offensive firepower is more dispersed and more accurate; and its power can be projected much farther inland. But these advances represent past decisions. Transformation is the continuing process of crafting a new future, one that will find expression in new “tangibles,” used in new ways.

If, rather than accepting limiting assumptions, we insist that we can maintain or even increase forward presence, hold or increase force size, and shape fleet capabilities for the information age, many of today’s assumptions will have to be discarded. We have only begun to take up the charge of the Chief of Naval Operations to “Challenge the assumptions!”



ARTHUR K. CEBROWSKI

*Vice Admiral, U.S. Navy
President, Naval War College*