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President's Forum

STRATEGY DEVELOPMENT—WHETHER FOR THE design of a future Navy or the focus of a business—implies making predictions about the future. The problem, of course, is that we've never been particularly good at predicting the future. The universe as we know it is an integrated system of systems, made up of many parts that dynamically interact with each other. The future behaviors of such systems are difficult or impossible to predict. So how do we cope with the security requirements of an unpredictable future?

Eric D. Beinhocker, writing for the Massachusetts Institute of Technology's *Sloan Management Review*,* suggests that we take our cue from nature—relying less on our ability to make accurate predictions and more on our ability to adapt to the situation that does occur. Beinhocker suggests that rather than having one strategy,

*Eric D. Beinhocker, "Robust Adaptive Strategies," *Sloan Management Review*, Spring 1999, pp. 95–106.

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optimized for a single predicted future, responsible management teams should go about “cultivating and managing populations of multiple strategies that evolve over time.” He notes that “a robust population of strategies will produce positive results under a wide variety of circumstances, even though it may not be optimal in some circumstances. . . . Such an adaptive population of strategies keeps an array of options over time, minimizing long-term and irreversible commitments.”

While Beinhocker is drawing an example from evolutionary biology to address strategies for successful business, the requirement for flexibility, robustness, and adaptability is nowhere more important than it is for the Navy. The Navy we build for tomorrow must be a balanced force capable of adapting to a wide range of uncertain futures. It must have a good balance of weapons and sensors, of quantity and quality, and speed and stealth. It must be able to adapt to the less likely scenarios while dominating the more likely ones. Also, it must not be too dependent on a single technology, platform, mission, or strategic environment.

Evolutionary biologists often use an imaginary grid called a “fitness landscape” to visualize patterns of evolution in nature. Fitness landscapes also provide useful models for thinking about the types of strategies that ensure survival in a complex and unpredictable future. In its most common incarnation, a fitness landscape is essentially a dynamic, three-dimensional grid. The points on the grid represent various gene combinations, and the height of each point represents the fitness of a specific genetic combination for survival.

Vice Admiral Cebrowski has 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 Operation 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.

The evolution of a species or of an organization can be thought of as a search for high points in fitness landscapes that are continually changing.*

Fitness landscapes can take a variety of shapes, from a single peak to a random topography with many peaks and valleys. The landscape is not fixed, as a mountain range appears to be, but is constantly in flux, in response to interactions with its inhabitants and with the external forces acting upon it. As the environment changes, the fitness of any particular inhabitant or strategy will also change. What works today may not work tomorrow.

Beinhocker suggests there are three elements vital for success on any fitness landscape: keep moving, conduct parallel searches, and mix long and short jumps across the landscape. The more you explore, the greater your chances of finding new peaks. Even if you are fortunate enough to be on a high peak, you can't afford complacency—at some point your dominant peak will collapse, as the environment changes or competitors' actions deform the landscape.

Detailed case studies of successful companies find that those that have remained successful for many years have created cultures of restlessness, discomfort with the status quo, and constant striving for improvement.** They innovate and evolve. They don't sit still. So it must be with the Navy.

Over the past summer, the Naval War College was tasked by the Secretary of the Navy to develop a set of recommendations for transforming our current and programmed Navy into the "Navy after next"—a fully networked force capable of dominating the sea and decisively influencing events ashore . . . anytime . . . anywhere. The need for transformation—driven by the changing geostrategic environment, advancing technological opportunities, cost trends, and guidance from the Joint Chiefs of Staff—is undeniable, but the strategy for transformation is just now beginning to receive the investment of intellectual capital it deserves.

Successful transformation has traditionally required radically different approaches to doing business. The attendant cultural and

* For a general discussion of fitness landscapes, see Stuart A. Kauffman, *At Home in the Universe: The Search for Laws of Self-organization and Complexity* (New York: Oxford Univ. Press, 1995).

** J. C. Collins and J. I. Porras, *Built to Last: Successful Habits of Visionary Companies* (New York: HarperCollins, 1994).

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structural changes to an organization are often dramatic, and quite painful. It is likely to be no different for the Navy. For instance, the requirements of transformation may ultimately challenge one or more of the Navy's traditional core competencies. Old priorities will have to give way to the new. There is likewise little doubt that we must develop new personnel policies, organizational approaches, doctrine and training, and acquisition structures and processes to adapt ourselves to the rule set of the information age. A certain amount of disruption will be inevitable. So, how do we begin?

Obviously, a transformation strategy must start with a mutually held goal—a clear vision of where we want to go and what we need to become. The vision of the future Navy, painted in broad strokes by the Chief of Naval Operations, describes the conceptual mountain that must be climbed. It does not specify the route to the top, but it does provide us with both a starting point and a focus for the transformation that must occur. It asserts that the Navy after next must be able to fight and dominate in the complex environment of the littoral against an enemy with steadily improving sensors and weapons. We know that our approach must be both network-centric and innovative. Finally, we know that we must be informed by the realities of the past and present, but not held hostage by them.

A guiding vision is a necessary precursor for transformation but not a sufficient impetus. To move forward, we must articulate and define the vision. We must create an institutional commitment to the keystone concept of network-centric warfare and establish a sense of excitement and urgency about the opportunity—and necessity—for change.

Our initial priority must be establishing the competitive space that the Navy is uniquely qualified to fill. In other words, how will the Navy define, or redefine, its core competencies in the future? In which technological and warfare areas should the Navy take the lead? In which should it follow? What should it ignore? Where should it reserve the right to play later? For example, should the Navy shift focus from strike against fixed targets to taking the lead in rapid strike against moving, mobile, and other time-critical targets? Should we lead or follow in the area of space-based sensors? Answers to these questions and others like them will frame the Navy after next and guide us as we prioritize our investment decisions.

A successful transformation strategy must focus on tangible gains. This requires disaggregating the vision into its essential elements and translating them into action items. These elements must be specific enough to fuel concept development and to support a rigorous program of experimentation, modeling, simulation, and gaming. Such a program is critical to sharpening our vision, identifying emergent warfare challenges, testing our concepts, and defining how we need to change today's operations to meet tomorrow's challenges. Parsing the vision into specific and measurable objectives will also provide us with an opportunity to gain the early victories necessary to sustaining momentum in our journey to the Navy after next.

Only a comprehensive, integrated, innovative, and holistic strategy is likely to result in the successful transformation of an organization. In a recent study that included both traditional research and a series of conferences with experts in transformation strategies, we developed a set of recommendations covering four areas—personnel, organization and administration, programs and acquisition, and the concept development and experimentation that drive doctrine and training. These four pillars form the structural components of a Navy transformation strategy. They build upon and support one another. Taken as a package, they can combine the power of innovative ideas with the strengths of both the Navy of today and the programmed Navy to forge the Navy after next.

Personnel. In the information era, workers have a different value from the days when skill was defined by the ability to operate a machine or perform a repetitive task. The number of unskilled workers has fallen to less than 20 percent of the nation's workforce. People are the heart and soul of any successful organization. If the Navy is to continue to prosper in the highly dynamic environment of the information age, we must be able to recognize, attract, nurture, and retain enough innovative individuals with the specialized skills necessary to dominate in this highly competitive arena. These will be the same people and skills that are in high demand in our increasingly information-dependent civil economic sector. To compete successfully for them we must ensure that our personnel management practices are consistent with the realities of the twenty-first century. For example, we should review and perhaps revise practices to encourage our most experienced people to stay and to provide them a vital,

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growth-oriented environment. Everyone should expect new practices to disrupt the old.

Organization and Administration. Proponents of information-age structures point out that by and large, organizations that have been able to leverage fully the power of information and of information technologies have dominated their competitive domains. But what do these organizations look like, and how relevant are those structures to the military? We understand that military organizations optimized for the information age may look much different than they do today, but at this juncture we don't really know what the optimal organizational arrangements should be. We do know, however, what qualities they must possess: they must be informed, agile, and adaptive. For the present we should look at every source, including the business world, for the best it has to offer and adapt it where applicable in the Navy.

Program and Acquisition. The most important consideration for the Navy's acquisition strategy in the next millennium is ensuring proper balance between sensors, communications, and weapons. In particular, we need to invest in the sensors and communications necessary to take full advantage of the weapons we have already procured. Additionally, if we are to exploit fully the speed at which new technology develops we must have a commensurate increase in the speed with which new systems, and the operational concepts necessary to exploit them, are introduced into the fleet for evaluation. We must find a way to encourage rapid prototyping.

One innovative way to proceed is a strategy known as "spiral acquisition." Spiral acquisition begins with a promising high-risk, high-payoff concept. Because the concept is on the fringes of the achievable, there is little likelihood that it will succeed entirely in the short term. Instead, contractors are asked to prepare estimates of what they think they can produce in one or two years, and the most promising proposal is funded. By the end of the contract period, the Navy will have acquired enough of the product for experimentation and use by the operational forces. The Navy then refines the concept, adapts it, or remains with the original, and once again opens the process for bids, using the latest product as a starting point. The process continues until the final objective is achieved or the program is

terminated. Such an approach would speed development, encourage rapid experimentation and adoption by the fleet, and preserve competition by keeping a number of contractors in the game.

Doctrine and Training. How the Navy trains and fights in the future will largely be determined by the kinds of precursor activities it participates in today. As noted above, the Navy's vision for the future has matured to the point that we need now to turn our attention to disaggregating that vision and translating it into measurable operational tasks so that we may begin the serious business of experimentation, simulation, and analysis. Only through these activities can we enrich the detail and scope of promising but untried concepts. It is impossible to overstate the importance or urgency of this effort. A group of Institute for Defense Analyses researchers highlighted the importance of experimentation, especially in peacetime, by summarizing thousands of pages of scholarly work on military innovation in one short paragraph:

History shows that in peace technology and doctrine develop somewhat separately. First battle experiences expose, at high cost, the lack of alignment. Experimentation should provide the first battle experience and ensure that doctrine is capable of fully exploiting available technology. Furthermore, first battle experiences expose fallacies in thinking and mismatches between available and needed capability. Experimentation must confront conventional wisdom. Lacking a specific threat we lack a unifying focus for doctrinal and technological development. Instead, we must plan for a wide array of threats. Experimentation should provide the breadth of experience needed to deal with the unexpected.*


A successful experimentation program will accept failure at a certain level. Despite every effort to design well-thought-out experiments to test equally well-considered concepts and hypotheses, a number of our experiments will fail, and many of our concepts and hypotheses will be proven unsound or untrue. That is as it should be in an experimentation program. That is how we learn. If everything we do succeeds, we're not pushing the edge of the envelope hard enough.

* D. Robert Worley, Dennis Gleeson, and John Kries, "What Does Military Experimentation Really Mean?" (briefing by Institute for Defense Analyses, 30 September 1999, from work sponsored by the Joint Staff [J-8]).

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The Evolution of the Revolution. I've spelled out in the broadest terms the necessary components of a transformation process that supports creative people, provides opportunities to excel, ensures resources for transformation, promotes changes in culture and structure, guarantees that the next generation of leadership is open to innovation, and institutionalizes the innovation process. Much work remains to be done on the details.

Some of the more pressing issues will be explored at the Naval War College in the spring 2000 intersessional conference on innovation in the Navy. Others will be hammered out in fleet battle experiments, war games, and a variety of decision-support events. A few solutions will offer themselves quickly, others will require extensive analysis. It is clear that real transformation will not be easy. Ultimately, advantage will be gained not by optimizing on the fringes of the known but by imperfectly seizing the unknown. In a fiscally constrained environment, to fund the new we will have to do away with the old. That will be painful for many of us. Centuries ago, Machiavelli wrote, "There is nothing more difficult to take in hand, more perilous to conduct, or more uncertain in success, than to take the lead in a new order of things. Because the innovator has for enemies all those who have done well under the old conditions, and lukewarm defenders in those who may do well under the new."* There is no doubt that many of the programs and organizations of the current and programmed navies have much of value to offer the Navy after next. Other dearly held models, no longer of value in the information age, must fade, like many cherished traditions before them, into the Navy of history.


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* Niccolò Machiavelli, *The Prince*, trans. W. K. Marriot (London: J. M. Dent & Sons, 1968), p. 29.