

2006

Arthur K. Cebrowski: A Retrospective

James Blaker

Follow this and additional works at: <https://digital-commons.usnwc.edu/nwc-review>

Recommended Citation

Blaker, James (2006) "Arthur K. Cebrowski: A Retrospective," *Naval War College Review*: Vol. 59 : No. 2 , Article 9.
Available at: <https://digital-commons.usnwc.edu/nwc-review/vol59/iss2/9>

This Article is brought to you for free and open access by the Journals at U.S. Naval War College Digital Commons. It has been accepted for inclusion in Naval War College Review by an authorized editor of U.S. Naval War College Digital Commons. For more information, please contact repository.inquiries@usnwc.edu.

ARTHUR K. CEBROWSKI

A Retrospective

James Blaker

Art Cebrowski put it this way: “We live between two great chapters of human history, in the messy interspaces between the industrial age we are leaving and the information age we are entering. This time, however, the transition is occurring much faster and it is far more global. Military affairs, military competition, and the stakes of military competition are in the balance.”

Vice Admiral Arthur K. Cebrowski (U.S. Navy, Ret.), former President of the Naval War College, former director of the Office of Force Transformation (in the Office of the Secretary of Defense), N-6 on the Navy Staff, J-6 on the Joint Staff, carrier battle group commander, aircraft carrier commander, and naval aviator, passed away on 12 November 2005. He joins the pantheon of American military innovators, along with George Patton, Hyman Rickover, and Billy Mitchell. He

was the prime intellectual architect of U.S. military transformation and network-centric warfare.

In 2001, shortly before the terrorists attacked the World Trade Center and the Pentagon, Cebrowski accepted Secretary of Defense Donald Rumsfeld’s request to join his office as Director, Office of Force Transformation. He served in that position for nearly four years, leaving because the cancer that was to defeat him several months later had now so wounded him that he was no longer, he believed, able to help transform the U.S. military. He saw this last position as a culmination and a fulcrum. It culminated his personal intellectual efforts over the four previous

James Blaker is currently a vice president at Science Applications International, Inc. He previously served in the Department of Defense as the Senior Advisor to the Vice Chairman, Joint Chiefs of Staff; Deputy Assistant Secretary of Defense (policy analysis); Deputy Undersecretary of the Air Force; and Personal Representative of the Secretary of Defense at the Mutual Balanced Force Reduction negotiations with the Soviet Union. Mr. Blaker, who served as a company-grade infantry officer in the U.S. Army, has also been vice president of the Hudson Institute and a department director at the Center for Naval Analyses. He collaborated with Vice Admiral Cebrowski on a book draft about U.S. military transformation until shortly before the latter’s death.

Naval War College Review, Spring 2006, Vol. 59, No. 2

decades to explain military force and to reconcile its destructive violence with morality. It was a fulcrum, he believed, from which he could help lever the U.S. military to greater effectiveness in the new age. “We would be wrong to let our current military dominance lull us into arrogance or lethargy,” he would say. “We should choose to transform what is today the world’s most powerful military. We should accelerate some of the changes that are emerging. We should push—more rapidly, strongly, and diligently than we have—the potential capabilities that technology opens into the way we organize, structure, train, and use the U.S. military. We should do this for the sake of our children, their children, and their children’s children. And we should do it because it is morally correct.”

CEBROWSKI’S CAREER

Cebrowski retired from the Navy in August 2001 as the Navy’s senior vice admiral, stepping down from the presidency of the Naval War College in Newport, Rhode Island. He had served in the Navy for almost thirty-seven years after receiving his commission through the Naval Reserve Officer Training Corps, or NROTC, upon graduating from Villanova University. The general course of his Navy career was set just prior to graduating, for in 1963 Admiral Hyman Rickover, father and then absolute ruler of the American nuclear submarine force, conducted his annual survey to find the NROTC members getting the highest marks in science and mathematics. Cebrowski’s name popped up. Rickover invited him to interview for the elite nuclear community he was putting together. “Rickover was just a name I’d read in *Time* magazine, I had no understanding of who he was at the time, and here he was asking me to come to Washington on a Saturday,” Cebrowski recalled. “So, I sent back a polite note saying thanks, but I was busy. This was, of course, before my commissioning and before I had any real experience with the intricacies of military protocol. To me at that time, admirals were some exalted, mythical beings who had nothing at all to do with ensigns. As far as I was concerned the pinnacle of the Navy was the captain who headed the NROTC detachment at Villanova.” Rickover was not amused by Midshipman Cebrowski’s polite regrets and called the captain to inquire, in his inimitable way, what was amiss in the captain’s detachment. “I remember the captain’s face when he asked in a voice louder than normal if I knew who the Admiral was and just what did I want to do in the Navy now that there was no way I could ever have a successful Navy career. Remembering the captain was an aviator, I replied [that] with all due respect to Admiral Rickover, or whatever his name was, I had always wanted to fly Navy jets, thus setting my Navy career for many of the next thirty years.”

He flew 154 combat missions during two tours in Vietnam in the 1960s, almost all of them over North Vietnam. “I focused on two things then: completing

the missions and getting back alive,” he would tell his wife. It was an early introduction to the military challenge of striking the correct balance between central control and individual discretion and to the dangers of focusing on military problems too narrowly. Reminiscing in 2004, he related an example of the challenge:

I remember an apocryphal story circulating through the fleet in the 1960s. Those were the early days of dodging SAMs [surface-to-air missiles], and some credited the missiles with extraordinary power, sometimes referring to them as a new kind of death ray. Navy intelligence had discovered a limitation to the missiles, however. They had difficulty locking onto aircraft flying below about eight hundred feet [of] altitude. The solution down the chain was clear: reduce the missile threat by flying low. For a while, the pilots did as directed, and the losses to the SAMs went down. But our overall loss rate went up sharply, not because the missiles got better but because the eight-hundred-foot operating altitude made it so much easier for the Vietnamese antiaircraft gunners. For us aviators, the short-lived quandary was how to balance the need to follow central direction with what we experienced at the tactical level. Ours was a pretty straightforward perspective. As long as the prospect of getting shot down was a function of both missiles and gunfire, we were going to do things that tried to reduce the probability of both. We were after a higher level of truth, if you will, even if it seemed more complicated.

Cebrowski came out of his Vietnam experiences with some combat axioms. “One was to beware the narrow view; try always to look beyond the immediate issue and see it as part of a larger problem. Always start with the assumption that your opponent is not dumb. And always value the perspectives of the individual warriors. No one learns as quickly as someone being shot at, and usually no one in senior headquarters is being shot at.” He believed strongly that the Navy applies these axioms pretty well. “It tells its people what to do and not how to do it. It’s the officers’ job to understand this and get those they lead to implement orders without denigrating or ignoring the insights of their subordinates who were carrying them out.” But he also believed an officer was obligated to keep his or her seniors from issuing unfortunate or uninformed orders. “If he fails in that, his next job is to see to it that they are not carried out in unfortunate or uninformed ways. This is a moral dimension that distinguishes the American military from others,” he said. “It places value on honesty and on maintaining the flow of information throughout the chain of command. That moral dimension is, as it should be, a driving factor in the new American way of war. And as I grew to understand during my career in the military, it applies to how we ought to think about and build military capabilities, too.”

In the 1970s and 1980s he moved upward through the naval aviator’s levels of command. Not all of it involved flying. “In the early 1970s, I got interested in

large-scale integrated circuits—computer chips. I saw the chips as technical marvels, because, unlike the older vacuum tubes, they didn't generate much heat. Vacuum tubes did. That made them fail. But you could never be very sure when they would. You could predict more accurately when the chips would fail. And you could increase their use without a proportional increase in their potential failure rates. That meant a reduction of technical risk. Lower technical risk meant you didn't have to have as many backups. At the individual aircraft level, for example, that meant more capability and improved reliability at less cost, risk, and weight."



Office of Force Transformation

He thought large-scale integrated circuits had strategic importance, that they could help deal with military complexity. "My experience had come from flying combat aircraft. While I did it well enough to stay alive, I never saw myself as one of those 'naturals' who seem to fly almost effortlessly. To me, it took a lot of effort to fly through air defenses, maneuvering quickly to present as unpredictable a target as possible, watch for the flak patterns and missiles, locate the target, getting the approach right, timing the bomb drop, and then getting out. It was a complex situation, and success depended on manipulating that complexity—making it as complex as I could to the defenders without missing the target. Transistors and the large-scale integrated circuits they built promised to shift some of the complexity to the aircraft and the weapons it carried. The military that could do that on a large scale, I thought, would have an edge. It could lead to a strategic advantage, an ability to shift the terrible burden of warfare complexity and the risks it carried away from you onto your opponent."

Yet it was clear that the transition from technical promise to strategic effect was anything but automatic. In the 1970s advances in military technology came largely from taxpayer-funded research and development. But Cebrowski realized that the military was not coming up with uses for large-scale integrated circuit technology—the civilian sector was. The promises that the technology brought were one thing; converting those promises to military effectiveness was another. Could it be that technology was only an initial step and that the military had within it structural, organizational, and cultural barriers to bringing technical promise to fruition? "Thirty years ago I began to think the answer was yes. But then it was an ill-formed answer, without much related thought about the question that answer framed: So, what are you going to do about it? I started to develop some answers to this difficult question over the next two decades."

One assignment involved research on how the F-14 could defend the fleet against waves of Soviet Tu-22 Backfire bombers, which the Navy then saw as a key threat. The analysis compared the theoretically best way of using the aircraft with what exercise data indicated could actually occur in an attack on a U.S. carrier battle group. The theory said a central air controller with perfect understanding of the defense scheme, excellent understanding of what was occurring in the airspace a hundred miles around the aircraft carrier, and perfect communications would *always* be able to mount the most effective defense. Equations demonstrated this, as did supporting simulations.

But exercise data indicated that sometimes a squadron of F-14s operating *without* a central air controller was more effective in intercepting and destroying attackers than what the algorithms said centralized control could provide. The data said several pilots, each with only part of the engagement picture, could do better than a single air controller could with a perfect, full picture. We wanted to see why this happened. It turned out to be my introduction to the potential power of self-synchronization.

We found that the information the pilots got from communicating with each other produced better results than following directions from a central control point. Even if none of them had as much information as a central controller, the pilots could build a rich, operational knowledge of what was going on. And they added nuances, depth, and correlations to the information they passed back and forth, in effect building a common appreciation that was, literally, greater than the sum of the bits of information each contributed.

Involved here, he concluded, were different ways of dealing with the complexity of armed conflict generally. One approach was the classic military solution—concentrate information in a central point so that greatest of all computers, the human mind, could make sense of it and direct the defenders accordingly. “The other was to do the processing in parallel, using the minds of all the defenders with less comprehensive information and letting them self-synchronize to cut through the complexity. I think that was the beginning of my views on the value of pushing information and decision authority down in the military, something I knew went against the traditional view of how militaries are supposed to work.”

In 1981, the Navy established the Strategic Studies Group at the Naval War College and sent a handful of carefully selected captains and commanders to it for a year of strategic thinking, discussion, and research. It selected “war fighters,” people whose careers had for the most part kept them in the fleet, away from the Washington, D.C., arena of budget fights, program management, and politics. These were officers who had done well enough in their first decade and a half of service to emerge as prospective flag officers. Cebrowski was the youngest

member of the first class. He joined another young commander, a submariner named Bill Owens, destined to lead the American “revolution in military affairs” as the vice chairman of the Joint Chiefs of Staff in the mid-1990s. As the lowest-ranking and youngest members of the select group, Cebrowski and Owens formed a friendship based on three shared perspectives: first, that change in military affairs was essential; second, that it was not going to come easily; and third, that therefore, the logic for changing had to be solid and its articulation relentless.

Following the year at Newport, Cebrowski returned to the fleet in a series of command positions. He commanded a carrier air wing, then a helicopter carrier, and then an aircraft carrier during Operation DESERT STORM. After promotion to rear admiral in 1992, he took over a carrier battle group.

Those assignments let me observe and fly the F/A-18. It was an epiphany of sorts. It was the first aircraft I piloted that really flew itself, letting you focus on your mission rather than trying to control the airplane. And the information that was available to the pilot in the cockpit was so much better. To me, the F-18 represented a shift from the physical to the information and the cognitive realms. The limit on what the pilot could do was no longer a matter of physical strength or reflexes. The real limit was the level of awareness and knowledge the pilot had of both the mission and of the environment in which he operated. That awareness turned on the information flowing from parts of the aircraft, what the pilot could see from the aircraft, and—this was the big change—from what other pilots or sensors could see far beyond. That was the revelation. It was no longer the airplane or its pilot that counted the most; it was what the pilot could do as part of a networked environment.

By the time he returned to the Pentagon in 1994, he had developed some general assumptions about military innovation. “I realized that military competition wasn’t about how fast one could align with reality but how fast one could leap over it and create a new reality. I spent the next ten years trying to figure out how to do that. I was never fully successful, because I couldn’t align my own intellectual compass fast enough. The world was changing too rapidly, and the changes were digging down into the foundations of society—into basic assumptions and what we had accepted as rules. Information technology was driving a lot of it. But I increasingly thought the kind of changes we all felt were diastrophic—that we were in the midst of a shift to a new age.”

It was his deep interest in the moral nexus with military power that distinguished Cebrowski and his thought. His focus stemmed from a set of personal beliefs in which his reading of Augustine, Aquinas, and the Jesuit John Courtney Murray were prominent. He was firmly in the American pragmatist tradition and had studied just-war theory—because, as he once explained, his profession had brought him in direct contact with the dilemma of how to use violence

morally. “How to draw the line between the moral and immoral use of military force is a constant companion to those in the military profession; we wrestle with it throughout our careers. Most of us are acutely attuned to the moral need to avoid bringing violence to bear on the innocent.”

Cebrowski was convinced that the American military stood on the threshold of an explosion of information, knowledge, and understanding of warfare, as well as, and most importantly, greater precision in waging it. “All that had great moral seductiveness,” he said. “It promised to make it easier to protect the innocent in using the great destructive power of the U.S. military.”

For most of the 1990s, Cebrowski was at the center of the military’s growing interest in the digital information era, increasingly trying to push the edge of that interest beyond conventional wisdom. In the mid-1990s, as Director of Command, Control, Communications, and Computers on the Joint Staff (J-6), he joined Owens, now the vice chairman, in contending that information technology challenged many of the precepts of American military thinking, suggesting that information could substitute for mass and pushing for radical force-structure changes. Most of Cebrowski’s military colleagues agreed that information technology was of growing significance. Many could also accept that information technology was changing military capabilities. DESERT STORM was still reverberating through the military in the mid-1990s; while the U.S. victory there had come from overwhelming force, senior military professionals appreciated the potential of the emerging technology and understood that changes in the military were always under way.

But that was about as far as most of the senior military in the mid-1990s would go. Information was certainly a good thing to have in a battle. However, any suggestion of a trade-off between military mass and information faced strong skepticism, even though “smart” bombs, dramatically improved ground navigation afforded by the Global Positioning System, networked warships, and other emerging technology suggested just such a trade-off. “Never saw and don’t believe bytes of information kill enemy soldiers,” Lieutenant General Paul Van Riper of the Marine Corps was fond of asserting: “Bytes of information can be very valuable in war, but it’s bullets that kill enemies.” Cebrowski and Owens were arguing, however, not only that rapid change was called for but that there was a moral imperative to make the leap to a different way of warfare. Most of the military leadership remained unconvinced. Some questioned whether “the revolutionaries” understood armed conflict or the lessons of history. If there was a moral imperative here, colleagues told Cebrowski, it was to oppose his views.

One of the best indications of the nature of the debate, and perhaps the high-water mark of the revolutionary argument, was a public 1997 description of future military operations issued by General John Shalikashvili, as chairman

of the Joint Chiefs of Staff. The document was entitled *Joint Vision 2010*. Billed as a “template for future U.S. military operations,” it had been eighteen months in gestation and when finally published was neatly bifurcated between competing views. The first half of the thirty-page document read like an enlistment advertisement, underlining the importance of tradition, the need for highly trained, dedicated, and disciplined personnel, and the lessons of the past. The last half, the part that Owens and Cebrowski had pushed, was very different. The operations envisioned for 2010 centered on a term that had become a buzzword, a rallying point of revolutionary sentiment—“dominant battlefield awareness.” Under that rubric, Owens and Cebrowski believed, new operational concepts would come into play. U.S. military operations would emphasize agility and speed, the ability to beat opponents to the punch at all levels of conflict. They would move from sequential to concurrent actions, a concept that not only contradicted contemporary planning assumptions but challenged the linear operational concepts that had conditioned training, doctrine, and equipment since the Civil War.

Much of Cebrowski’s and Owens’s argument wove through the final pages of *Joint Vision 2010*. Information superiority, not military mass, was the key to military success. Overwhelming force would be less useful or effective than decisive force applied quickly and precisely. Military structures, equipment design, training, and organization would have to change accordingly—and those changes needed to be complete by 2010, when the 1997 vision of the future was to be reality. “We actually believed it could be done by 2005,” Cebrowski later said. “But we knew that would be too controversial to get people behind our efforts to accelerate change.”

To many senior military officers, this was too bold a vision, far too disruptive. They were comfortable with the existing rate of change the military had relied upon since the end of World War II. Compared to what Owens and Cebrowski were proposing, this was a snail’s pace, tied to design-change processes and career patterns measured in generations and decades. On average, between 1948 and 1997 it took major naval surface combatants seventeen years to move from the drawing board to their first cruise. Navy planners anticipated that once in the fleet, a ship and the logistics systems and shore infrastructure needed to support it would remain in place for at least twenty-five years. It took the Air Force’s F-16 almost two decades to advance from concept to an operational sortie; the F-15, the B-1 and B-2 bombers, and the F-117 stealth fighter took sixteen, seventeen, fourteen, and fifteen years, respectively, to make the same journey. The initial design of the Abrams tanks that so dramatically outgunned and outmaneuvered Iraqi armored forces in 1991 had been approved in 1968. In the thirty years between 1967 and 1997, the Army introduced a total of four new

courses to its Infantry School at Fort Benning, Georgia; each of them needed between five and eight years to get through the design, test, and implementation process. Cebrowski began asking why this had to be the case.

The answers he got were appeals to history, assertions that “the revolutionaries” failed to understand the nature of warfare, that such challenges ignored the timeless wisdom of the nineteenth-century military commentator Carl von Clausewitz. In fact, the American revolution in military affairs led by Shalikashvili, Owens, Cebrowski, and a handful of other flag and general officers ran into a counterrevolution in 1998. Shalikashvili and Owens retired. The status quo ante returned as their successors reverted to earlier joint staff processes and discarded the modifications made to the Joint Requirements Oversight Council, which Owens had sought to mold into a revolutionary vanguard. *Joint Vision 2010* became *Joint Vision 2020*, still officially a guide to future operations but slipping the goal a decade beyond the horizon of plans, programs, and budgets. The disturbing phrase “revolution in military affairs”—with its connotations of radicalism, speed, and decentralized control—slipped from the lexicon, replaced by the more indeterminate and benign “transformation.”

Cebrowski remained in his staff position, with planning and programming responsibilities for Navy command and communications systems, until appointed as President of the Naval War College, with additional supervisory authority over the newly established Navy Warfare Development Command, also in Newport. Captain Terry Pudas, today the acting director of the Office of Force Transformation, served under Cebrowski during this assignment. “He wanted to be an intellectual leader at the War College,” Pudas recalls, “and to engage the intellectual power there in three great questions: What was the world of the twenty-first century going to be like? What should the Navy of the twenty-first century become to deal with that world? And how was twenty-first-century warfare going to differ from past and present conflict?”

In his first convocation speech Cebrowski challenged the faculty, staff, and students to innovate, to investigate alternate concepts, to be suspicious of conventional wisdom, and to look beyond history and outside the Navy so as both to understand and influence the future. At the College he was to advocate new and different kinds of naval ships, not only to stir debate but to investigate alternative operational concepts. His proposals for fast logistics ships with nontraditional hull forms elicited deeper understanding of the relationship of the cost of greater speed to the value of time in modern conflict. His “Streetfighter,” a new conceptual class of smaller, faster, stealthier vessels woven together by advanced communications networks, were an approach to the broader question of widely distributed operations—not just on the sea but on and above the earth’s surface. His proposed “corsairs”—small aircraft carriers carrying relatively few

aircraft—afforded insights into the benefits of more highly networked platforms in more widely distributed operations that might be gained from greatly extended breadth and speed of maneuver.

The assignment gave him the authority and time to work out the details of the theoretical construct he had pursued over the previous decade. “It was at the Naval War College, during my last active-duty assignment,” he would reminisce four years later, “that network-centric warfare [emerged as], with all apologies to Clausewitz and the legions of military historians, truly a new theory of war.”

When Secretary Rumsfeld asked Cebrowski to become the director of the Office of Force Transformation, he agreed. He arrived at the Pentagon two weeks after terrorists flew a Boeing 757 into the building’s south side. “As I walked through the military cordon around the Pentagon, past the destruction, and into the lingering odors of the fires and water damage,” he later recalled, “I knew—more than ever before—that the world had changed. And that the U.S. military had to transform. And that it had to do it much faster than it thought.”

Cebrowski was not sure why Rumsfeld had brought him in.

We had not worked together before, and while I vaguely remember his first tour as secretary of defense in the mid-1970s, it was from afar, geographically and in terms of rank. While I was generally aware he had been secretary of defense, I had been a lot more interested then in what much lower ranks in the chain of command at considerable distance from the senior leadership were telling me to do. I don’t remember ever meeting him face to face and doubt if he had any awareness of me prior to the late 1990s. So I was surprised when he called and asked me to come and talk with him. When we met, he went straight to the point. He had heard what I’d been doing for the last several years, he said, and asked how I could help him accelerate the transformation of the U.S. military.

But before I answered, Rumsfeld answered for me. I was to serve as a conceptual engine for the effort and help him sift from all the programs claiming to be “transformational” the ones that best fit the path he wanted to blaze into the new century. He was not particularly clear in that discussion as to what he meant by his path. But he talked of a need for big changes, undertaken quickly, and of the controversy he expected to stir. He spoke of his need for a “think and do tank” and [of] how I would work directly with him in formulating what should be done and then getting it started. I accepted immediately.

There had never been an office of force transformation before; Rumsfeld gave Cebrowski wide discretion in establishing its size, location, budget, and role. Cebrowski opted for a small office, brought in several civilians with whom he had worked previously, including the recently retired Terry Pudas, and asked each of the military services to provide representatives (mostly officers in the grade of captain or colonel). He selected facilities outside the Pentagon for his

main office but capitalized upon his authority to work directly with the secretary on transformation matters, authority that exempted the office from the Defense Department's regular policy and planning processes. The secretary invited him to attend meetings of the Senior Level Review Group, an assembly of the Pentagon's top civilian and military leaders. Rumsfeld launched this privy council with a series of meetings, usually on weekends, focused on defining transformation. He would ask attendees what they understood by the term and then lead a collective parsing of whatever definition had been offered.

"Rumsfeld didn't care what we came up with," Cebrowski recalled; "regardless of who offered a definition, he kept asking them to explain it. He was relentless about it. In meeting after meeting, he'd go back to the definition. And we argued over every single word. What Rumsfeld was doing was making three points. First, that whatever its definition, the senior leadership had to own it and they were not to delegate their ownership down into the various staffs. Second, transformation was a top priority, worthy of the personal time and energy of the leaders; and, third, that the secretary of defense was going to be relentless in its pursuit."

Cebrowski's access to the secretary on issues of force transformation was the source of his influence. Rumsfeld relied on Cebrowski, trusted him, and accepted his advice and views, using his insights and formulations in speeches and public discussions of transformation as well as in Pentagon and interagency policy and planning evolutions. Such stature was not ignored by the press or, more importantly, by the other participants in these processes. For his own part, Cebrowski was not shy about offering his thoughts on transformation to those who solicited them, including congressional committees, senior members of the military services, defense agencies, and major combatant commands. Nor was he bashful about speaking and writing. But he was surprised at the influence his views enjoyed.

I was surprised by how important the press and other media were to maintaining interest in transformation and how much they became allies in the effort. Senior defense officials—civilian or in uniform—are always interested in what the press is saying, and we all tried to use the press to make our arguments to each other and to the various hierarchies we headed. You send memos and hold meetings. But if you do that in parallel with press coverage and public commentary on the same substance, you get ideas into the audiences who will ultimately determine how far the ideas will go. I found there were some informal "rules" of the game, however. I worked for the most part ahead of policy, pointing out possibilities. That is appealing to the press in the same way it appeals to defense contractors. Both want to "scoop" their competition, and there is no better way than being able to predict the future. So, in effect, I had a story to tell, and the press wanted a story to tell. It was a

synergistic relationship that turned out to be surprisingly effective. That was because of the subject matter itself. Transformation is about the future and everyone is interested in the future. So, if you've got something sensible to say about what could be coming, and you can say it in interesting ways, almost everyone will listen.

CEBROWSKI'S LEGACY

Art Cebrowski's interests ranged across mathematics, information technology, history, sociology, and theology. They wove themselves throughout his thinking about military affairs and conditioned his instinct for innovation. He was an eclectic thinker; though he claimed to lack deep insights, he could make connections in ways that helped illuminate underlying processes and "the way things worked." He will, however, probably be most remembered for generating important concepts, two of which are network-centric warfare and the idea that military transformation is a process, not an end point.

Cebrowski argued that network-centric warfare is a theory of war—that it identifies new sources of power, shows why those sources generate new military structures and organization, and points to how the combination of new technology, organization, and structure leads to new military and political strategies. It speaks to the character of war, not to its nature, accepting that war by nature is a form of intense human competition that involves violence, profound risk, and mutual danger. Network-centric warfare recognizes that it is the nature of war to be nasty, brutish, and, however short it may be, highly complex.

The new sources of military power stem largely from information technology—from our growing capacity to gather, communicate, and process information rapidly into knowledge. These capabilities, Cebrowski postulated, generate new command and control possibilities, dramatically raising the efficiency and effectiveness of "flatter" military organizations. They suggest the abandonment of classic hierarchical patterns in favor of organizations that are much more decentralized in terms of who reports to whom. They allow "horizontal" structures (with respect to such functions as fire, maneuver, transportation, and logistics) that cut across the vertically structured military services. He argued that information can often substitute for mass in military operations, that dispersed units can, as long as they have access to robust and secure information networks, generate the kind of combat power that achieves overwhelming effects once associated solely with mass. This, he believed, changes geostrategic assumptions, including operational notions of time and distance. But the most profound military implications, in Cebrowski's view, were that attrition was no longer the ultimate military means of achieving political goals and that significant—indeed, superpower-scale—military strength was available to nearly any nation or group that wanted it.

Like other and earlier theories of war, Cebrowski argued, network-centric warfare has its “competitive space,” rule sets, and metrics. Where the competitive space of industrial war involved the capacity to produce heavy weapons and get them to where they could be most destructive, in network-centric warfare it is the capability to obtain and integrate information into military operations. The metrics used to gauge the relative power of militaries in the industrial age were generally measures of input, notably military mass, expressed in numbers of weapons, ton-miles per day, manpower, and orders of battle. Operational planning focused on how to achieve an edge in such measures on a battlefield, during a campaign, or in a war. In contrast, the metrics of network-centric warfare describe relative ability to create an information advantage and turn it into a military advantage. They involve *output* measures—rates of change, operational and tactical innovation, the speed with which one acts on information and couples events together, and political and moral outcomes. Where industrial warfare focused on the physical realm and the application of overwhelming force, killing all opponents or as many as it took to make any who remained surrender, the goal of network-centric warfare was to change the mind of the adversary quickly. It aimed to demonstrate to the opponent that he could never maintain the initiative, would always be beaten to the punch, outsmarted, outmaneuvered, and out-killed—to impose on him a conviction that resistance is futile. The central battlefield was not the physical but the cognitive domain. The aim of network-centric operations was to couple military action more closely to the mental processes and perceptions of war, to reduce superfluous destruction, shorten conflict, and minimize harm to the innocent.

Cebrowski’s insistence on understanding U.S. military transformation as a continuing process flowed from assumptions girding his interpretation of network-centric warfare, namely, that information technology was a new source of military power and was widely available. He contrasted the availability of information technology with the industrial resources that until recently had powered the strongest militaries and divided the world between great and lesser powers. To compete militarily in the industrial age, a competitor had to have tremendous financial and organizational power, for which reason military powers were almost exclusively nation-states. In the information age, a source of military power was emerging that did not demand financial or organizational assets anywhere near so large. The new technology of power was ubiquitous, flowing out of commercial enterprises, not government laboratories, and globally available. Moreover, the rate at which information technology could produce new and improved military capabilities had become very rapid.

That meant, he argued, that military competition was going to change fundamentally. It was going to be a true “World Series,” involving not only the great

powers but a growing plethora of “others”—not just other nations but nonnational, transnational, and subnational groups as well. Competitive positions would change much more quickly; those who started the race behind would not have to repeat the developmental steps of the leaders. Competitive success would depend increasingly on the ability to innovate and change. Transformation would never end in a particular force structure or set of military capabilities. Unless the United States recognized this, Cebrowski warned, it would lose its current military superiority long before it figured out what to do with its advantages. His solution was to institutionalize transformation.

So, the United States has to figure out how to best institutionalize continuing and probably accelerating transformation. The Defense Department ought to cultivate a general bias that change is not dangerous, wrong, or unnecessary, *per se*. That doesn't mean you accept any changes as transformational or necessarily good. The standard for judging transformation is threefold: does it increase military effectiveness, improve military efficiency, and reinforce moral principle in the use of military force?

Military effectiveness, in this context, is a function of generating more capability to achieve American political goals. It is unlikely that everyone will ever agree on the specifics of what that means. So one of the keys to institutionalizing transformation is to devise and refine decision processes that will *continually* assess the priority of our political goals and whether the military capabilities we seek, maintain, and develop are consistent with that priority. And when there is a discrepancy between our goals and capabilities, as is increasingly going to be the case, we will have to have the means of revising our capabilities much faster than has been the case. As our experience in Iraq in 2005 illustrates, it's not too hard to discern when gaps between our military's capabilities and the goals to which we commit the military exist. The hard part comes in being able to keep our notion of future military effectiveness attuned to the changes in the world.

Military efficiency deals with the ease and costs of performing military functions and tasks. Here, the goal is to innovate faster than potential opponents. This is because opponents will adapt to and seek to counter what makes our military efficient. It's particularly the case now, because our current military power is so overwhelming. Our military edge compels those who want to compete against us to try to exploit the way we *do not* conduct our military functions rather than confront us head on, on our terms, and trying—with low probability of success—to beat us in what we do best.

Military efficiency also involves achieving a decisive solution to an issue as fast and completely as possible once you've decided to commit military force. Militaries that do this are efficient. Those that do not are inefficient, because in prolonging military operations they are likely to expand and elevate the violence and, in the process, change the political stakes in the conflict. This is where efficiency, effectiveness, and morality overlap. If the issues driving a resort to armed conflict are not resolved

quickly, and because of this the political context of the conflict changes, then that is likely to reduce the ability to use military force effectively and morally. This is one of the reasons why an attrition strategy—destroying lives and property until the enemy gives up—is likely to be immoral. It's inherently sloppy and tends to kill the innocent along with everyone else. That creates blood debts that change the political context of the conflict and prolong the violence even longer.

In short, military effectiveness, efficiency, and morality together point to a force that can adapt to changes in the world, to the resulting changes in the political goals the United States adopts because of those changes, and to the opponents' adjustments to what the United States does. The net effect is a general standard for transformational constant change that continually makes U.S. military operations more effective, efficient, and moral.

Near the end of his life, Cebrowski increasingly turned to the question of how to institutionalize constant transformation. He believed the solution was a matter of identifying both the major barriers and the levers needed to overcome them. He narrowed the former to four: "failure fear," "size and uniformity," "the military-congressional-contractor triangle of stasis," and "the seduction of stasis authentication."

"Failure fear" reflected the conservatism of military institutions. They are cautious by nature because they recognize that the stakes of failure are very high. But it is easy to go from justified caution to a less beneficial conservatism that cautions against all change. It is the flip side of the view that change is inherently good, and it is just as dangerous, particularly during a transition from one age to another.

"Size and uniformity" often become a rationale against change, especially relatively rapid change. The size of the U.S. military makes change costly, particularly in view of the need for a high degree of uniformity in order to keep overall capability and readiness high. Size and the commitment to maintain uniformity also impart a momentum to change, in that once change takes hold there it is logical to complete it as rapidly as feasible to avoid a divided force. Accordingly, if the wrong change is initiated, the mistake can compound itself as the military pushes along an ill-fated course driven by the need to reestablish uniformity, coherence, and readiness. For the sake of readiness, preventing costly mistakes, and avoiding a dangerous momentum down the wrong path, the argument goes, it is better to avoid change until the need is entirely clear, recognized, and agreed by all parties involved.

The "military-congressional-contractor triangle of stasis" was Cebrowski's shorthand for the complex interactions that had grown since President Dwight Eisenhower's famous warning about the "military-industrial complex." Defense contractors, focused largely on military clients, tend to accept and echo their

military clients' views because it is good for business. But there are other business reasons why contractors were generally not inclined toward change. To those who produce tangible goods for the military, change usually means retooling, new production learning curves, and at least temporary sags in profit. Service providers, too, welcome the continuation of "business as usual," for which they have already hired and trained their employees. The congressional interest in continuity is less stable, but the geographical distribution of both the military and defense industry tends to bolster it.

Cebrowski saw "the seduction of stasis authentication" in the behavior of individuals who have the political authority to bring about transformation but often find it easier not to exercise it. The deference the military pays to senior civilian defense officials is seductive—particularly to the growing numbers of officials who have never served in the military. It is sometimes more convenient, usually less difficult, and almost always more enjoyable for them to act as important spokespersons for military figures, with more experience in, understanding of, and appreciation for the intricacies of national defense.

These, then, Cebrowski saw as the four greatest barriers to transformational change inside the Pentagon. He was convinced they would not vanish, perhaps not even in the context of a catastrophic attack on the United States. But he was convinced the United States could surmount them, and he offered "levers" for doing so.

One was the language and imagery of change. Changes in vocabularies, he opined, could interject a healthy counterpoise to stasis. It is important, he warned, not to make the shifts in vocabulary arbitrarily, because sloganeering generates cynicism rather than progress. The key is to choose the vocabulary of change carefully and to keep new terms consistent with the general thrusts of the changes and concepts one seeks to bring about. The shifts should be from the more general concepts toward the more specific, and as a rule of thumb, they ought to occur roughly every two years.

Another was using the military training and education system to "teach change." The training and education system in the Department of Defense offers something few, if any, other federal government departments can—extensive formal training and educational access to the thinking and behavior of most of its members. It is the single most important channel for embedding a process of change in the institution.

A third was to expand the concept of "spiral development." The term came into vogue in the Rumsfeld Defense Department as a way of speeding new weapons and systems through the research and development stage and into the hands of operating forces. Cebrowski saw it as a way of transforming the U.S. military

more broadly, because new technology in the hands of troops pays off in what they learn in using it. The process incorporates the assumption that continued and faster change has virtue. It can help build a mind-set that it is not merely acceptable to challenge continually the existing way of doing things, but natural and needed.

A fourth was what Cebrowski called “planting dragon’s teeth.” His metaphor picked up on not only the ancient Greek myth of Jason and the Golden Fleece but the Chinese notion of a dragon as an agent of change from whose teeth, planted in the earth, more dragons arise. “The point is,” he would say,

if you want to cultivate a conscious commitment to transformational change, you have to establish agents and charge them with making transformational change their primary mission. Changes in attitude, culture, and procedures that emerge from the bottom up are the most enduring. But they don’t emerge spontaneously and they don’t necessarily occur in response to admonitions from the top. It takes explanation, consistency, and effort by change agents—dragons, if you will—throughout the organization. And because dragons don’t live forever, because they often turn into sheep and merge with the spirit of stasis, or just vanish, we need to continually plant their teeth so that new change agents can take their place.

Finally, Cebrowski advocated more open access to information in and about what the Defense Department was doing—“letting the sun shine in.” Change agents can be important levers, particularly if they form networks and fill those networks with information and transactions. But that is not easy. “In national security matters it confronts concern with divulging secrets and threatens the extravagant security systems in which we have invested great wealth and energy. But much of this is outdated now that national security lies less in trying to restrict information and more in knowing what is occurring.”

Art Cebrowski remained a profound optimist. In one of our last discussions, amid discouragement that the Pentagon seemed to be using transformation rhetoric to cloak business as usual and that it was proving very hard to make significant changes, he remained confident. “Look,” he said, “the race will go to the swift, the smart, and the agile. Here, we Americans have an important edge, for the capacity to leave the past behind flows from our culture and political system. We venerate new frontiers and diversity, the expression of ideas, and the freedom to differ. We, as a people, are the swift, the smart, and the agile. As such, we are far more willing and able than any others to seize the opportunities of the new age.”