
**THE AMERICAN MILITARY ENTERPRISE IN THE
INFORMATION AGE**

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**INTRODUCTION: THE SOCIAL AND MILITARY
PERSPECTIVES**

The social and military effects of the ongoing information revolution occupy the thoughts of modern thinkers. From a social standpoint, the true believers hold that the current revolution in computing, telecommunications, and information technologies will profoundly remake our society, our democracy, and our daily lives. From a military perspective, visionaries within the U.S. military see in the new technologies of the information revolution the means to radically increase military effectiveness, reduce casualties, and save money. The purpose of this chapter is to develop an understanding of how these two perspectives, usually considered apart, impinge upon one another.

A nation's military is a reflection and a servant of the society from which it is drawn. If that society undergoes a change as profound as the information revolution, its security requirements will change as well. As a result of these changes, what society asks and expects the military to do to defend the nation, the military's "enterprise," will almost certainly change. If so, the most important consequence of the information revolution for the American military will not be the application of new information technologies to its existing missions, as the military perspective often implies. Rather, the most important effect will be the need for the military to adapt itself to performing new and different missions. The key, then, to understanding how we should apply new information technologies in the military is to unite

the social and military perspectives into an understanding of how the American military enterprise will evolve.

THE ROOTS OF REVOLUTION

No technological development since the release of nuclear energy has so preoccupied the American military as the currently cresting revolution in computing, telecommunications, and information technologies¹; no part of that revolution has been the subject of more speculation by the military than the idea of information warfare. Those preoccupations are evident in the professional journals of the American military and in the emergent doctrines, organization, and funding of the American armed forces. The fallout from these preoccupations is neither complete nor obvious—because many of the issues remain unresolved and involve large stakes within the American military institutions.

Some see the information revolution as but one component of an ongoing (or forthcoming) revolution in military affairs, in which the information technologies, when combined with new concepts for military operations and their command and control, will usher in a revolution in warfare comparable to that which occurred with blitzkrieg and aircraft carriers in World War II.² Some of these expectations are captured in *Joint Vision 2010*, which sees the information technologies as enabling “full-spectrum dominance” of military operations and “dominant battlespace awareness.” (DoD, 1996a.) Critics see such expectations of transparent battlefields as technological chimeras—futile hopes to eliminate the Clausewitzian friction of war.³

Few would dispute the importance of the new information technologies for militaries and warfare, but beyond that point, the

¹Hereinafter called the *information revolution*, recognizing that computers, telecommunications, and the explosive expansion of information access and utilization are inextricably intertwined.

²See, for example, Builder (1995), pp. 38 and 39.

³Perhaps the best treatment of this subject is found in Watts (1996). Dunlap (1997) cites information superiority or dominance in future conflicts as one of his four myths. One flag officer recently quipped that if he were thrust into the boxing ring with Mike Tyson, information dominance would hardly prevent him from being soundly beaten.

schools of thought divide and fan out on just how important and how pervasive these technologies will become. At the conservative end are those who see the application of the information technologies limited to marginal improvements in existing military operations—in communications, navigation, intelligence, logistics, etc.—as already evident with the introduction of Global Positioning System receivers, laptop computers, and wideband global communications nets. At a somewhat more ambitious level is the so-called “digitization of the battlefield,” in which maps and sensors are registered together in a common framework for all who would venture there.⁴

Toward the more expansive end are those who see the “information sphere” becoming the battlefield of the future—where the main battle will not be fought over territory using physical force, but over the minds of the combatants and their access to information. It is this school of thought that now precipitates turbulence within the American military, as it clamors for the attention of leaders who must decide on resource allocations and organizational changes. At the outer fringes of this school of thought, one can hear calls for an independent “information corps” similar to those (still heard) for an independent “space corps,” echoing much earlier (and ultimately successful) calls for an independent air corps in the first half of the 20th century. And it is here that one finds the jarring concept of the “information warrior,” a new and different breed of military person, like the pioneering aviator before, who boldly lays claim to the future of warfare.

The mainstream American military finds itself torn between (a) gaining for itself the fruits of the information revolution when applied to its traditional concepts of military roles and missions and (b) finding itself riding the back of a tiger that might threaten to overturn those traditional concepts and replace them with a new kind of war and warrior. The balancing act is how to embrace the information technologies without being institutionally undone by them.⁵

⁴This perspective is captured in the Army’s Force XXI concepts and experiments.

⁵For example, the most effective exploitation of information is achieved through networklike organizations, while the most effective command and control is achieved through the hierarchical organizations so long associated with the military. Marrying the two forms risks one undoing the other, for hierarchical and network organizations

Whether the choice is real or not may be less pertinent than the fact that there are factions within the American military that are willing to make the choice seem real to those in and out of uniform who must decide how the military should be organized and funded. That such opposing views might surface within the military and be broadcast is certainly not without precedent, but the information revolution has just as certainly made the debate more visible and widely spread.

So, one important fallout of the information revolution is the looming prospect of information warfare—warfare waged with information as a *primary* weapon or target.⁶ Although information warfare as a component of war is not new (as in deception and electronic warfare), the possibility that it might become the *dominant* dimension in future war is new. That possibility looms now because of the growing dependence on information infrastructures for the most modern means of warfare—such as the use of precision weapons—and for the economic functioning of a modern society and state.

Even those in the American military who believe information warfare is the wave of the future find themselves pulled between complementary interests and concerns:

1. The interests are the potential military advantages of *exploiting* information as a weapon against the entire range of enemy targets—from the minds of the enemy’s leadership to the performance of their weapons.
2. The concerns are the potential *vulnerabilities* of the sophisticated U.S. civil and military infrastructures—communications, commercial, logistical, and command—to hostile actions using information as a weapon.

tend to be mutually corrosive—the former cutting network links for greater control, the latter bypassing hierarchical levels in the search for more information.

⁶Information warfare is formally defined as

Actions taken to achieve information superiority by affecting adversary information, information-based processes, information systems, and computer-based networks while defending one’s own information, information-based processes, information systems and computer-based networks. (DoD, 1996b.)

That information might be a *primary* weapon or target is evident from Army Field Manual 100-6 (TRADOC, 1996), which declares that “The objective of IW [information warfare] is to attain a significant information advantage that enables the total force to quickly dominate and control the adversary.”

The interests are generally contemplated under the heading of *offensive* information warfare, while the concerns are associated with *defensive* information warfare. The interests and concerns are, of course, intertwined: Means devised for offensive purposes might be turned against us, and exposition of our vulnerabilities—if neither corrected nor correctable—might invite the very attacks we hope to avoid. Indeed, there is a line of argument that says information warfare is something that the most developed societies in particular should eschew—that its relative advantages will accrue mostly to the weak and underdeveloped adversary.⁷ An opposing argument is that the most developed societies can bring their enormous information resources—from global infrastructures and technological superiority in depth—to bear against an enemy with surprising new effects and reduced risks.

These arguments will not be resolved soon. They will reverberate over the next several decades as the information revolution crests and then subsides in the first half of the 21st century.⁸ But to anticipate how these arguments and others might be resolved, they will be illuminated here in four different lights:

1. the historical patterns in 20th-century technological revolutions, particularly as they have affected the American society and interacted with American military cultures
2. the current information revolution—which may break with the historical patterns—because it is fundamentally transforming the relationships between the American society and its institutions, including its military
3. the adaptations—past and prospective—of other American institutions to the information revolution, with the American family, business, government, and education as examples of how the information revolution can or will wreak changes—changes that might foretell what will happen to the American military

⁷The reasons being that the capital investments required to wage offensive information warfare within the existing global networks are modest and that the required technology is developing faster in the commercial sector than in the military because of differences in acquisition cycles. (See Dunlap, 1997.)

⁸For more perspectives on the information revolution as a passing wave, see Builder (1990).

4. the historically changing enterprise or focus of American military activities, as a way of anticipating changes even as the institutional roles and missions remain constant.

HISTORICAL PATTERNS

The contemporary American military response to information warfare—rooted as it is in the information revolution—is not without precedent. In the 20th century, at least three and perhaps four technological revolutions swept through the American military: the mechanization of warfare by means of the internal combustion engine, the release of almost unlimited nuclear energy, the opening of access to space as a new vantage point, and now the information revolution. In each of the first three instances, the American military was transformed in its thinking and eventually in its physical makeup. The fallout from these three revolutions included the ideas of strategic air warfare, nuclear warfare, and even space warfare. We should not be surprised today, therefore, to find a part of the American military captivated by the idea of information warfare.

However, as the idea of information warfare is now embraced by its advocates, it is worth reflecting on the evolution of these transforming ideas as they were incorporated into the American military. First, they took a long time to move into the mainstream of military thought. Although World War II was a mechanized war, horsemanship remained a required skill at West Point two years after the dropping of atomic bombs on Japan. In many segments of the American military, airpower is still seen today as it was in the 1920s—primarily as support for the surface forces, not as an independent national instrument of power.⁹ Space operators in the military are still struggling, like the aviators before them, to find their place in the mainstreams of American military institutions.

Second, the ideas were oversold as expectations, at least in the short term. In the mechanization of warfare, strategic bombardment theories were finally vindicated by the advent of the atomic bomb more than by the bombers themselves. Within four decades, many of the theories of nuclear warfare were made irrelevant by the unimagi-

⁹See, for example, Correll (1997), in an editorial in *Air Force Magazine*.

able destructiveness of the very arsenals they promoted. And after four decades, space, like prominent high features on the surface of the earth, still remains mostly a place of vantage for navigation, communication, and observation infrastructures instead of an arena for earth-centered conflicts. Space warfare may yet materialize, but it seems more likely to be a 21st-century rather than a 20th-century phenomenon.

All that suggests that the idea of information warfare will take a longer time to mature than its most ardent proponents expect and, in the near term, will probably deliver less than it promises. But there is also something unique about the information revolution compared to the previous technological revolutions in the 20th century, with differences that could break the observable patterns of the past. Unlike the prior technical revolutions in this century, the information revolution is dramatically altering the power relationships between the state and society, not just in America or even the developed world, but throughout the globe. And it is from the state that the military draws its mandate.¹⁰

While the revolution wrought by the internal combustion engine gave Americans wheels and wings, the relative power of the state to the individual only increased as society looked to the state for the needed roads and airways. Nuclear power and space were, for the most part, state-managed monopolies that did not involve relinquishment of state power to individuals. But the information revolution has unleashed forces—both political and economic—that have significantly eroded the relative power of the state with respect to individuals and all sorts of new nonstate actors. Sovereign powers that states took for granted even two decades ago—such as control over their borders, markets, currency, information, and population movements—have been significantly weakened. (Wriston, 1992.) This is not to say that the state is about to disappear—only that the powers of individuals relative to states, because of their access to information, are presently in ascendancy. Jessica Mathews has put it thusly:

¹⁰That mandate is only 350 years old. The Treaty of Westphalia, in 1648, established that militaries would henceforth be instruments of the state and not mercenary bands or freebooters.

The most powerful engine of change in the relative decline of states and the rise of nonstate actors is the computer and telecommunications revolution, whose deep political and social consequences have been almost completely ignored. Widely accessible and affordable technology has broken governments' monopoly on the collection and management of large amounts of information and deprived governments of the deference they enjoyed because of it. (Mathews, 1997, p. 51.)

Even the ability of the state to wield military power with the freedom that its elites might prefer has been greatly circumscribed by the information revolution—a fact the American military has come to appreciate throughout the last half of the 20th century when it talks about (a) “the CNN effect,” through which military operations are increasingly exposed to news-media examination, (b) the political imperative to hold casualties to a minimum to retain public support,¹¹ and (c) planning in the face of political constraints on the use of force.¹² These were not significant considerations in the first half of the 20th century, before the information revolution.

CULTURAL FACTORS

To complicate matters, the American military's responses to new technological revolutions may not be typical of militaries more generally. There is a cultural component of the American military that bears watching, for it may create asymmetries with the militaries of other nations that will be revealed fully only through conflict. Many have observed that Americans have a penchant for quick technical fixes for their problems and have historically been more attracted than most to proposals for bloodless technological solutions for waging war. Between the two world wars, Americans embraced airpower and strategic bombardment with greater alacrity than any other nation except Great Britain, largely on the promise of reducing

¹¹As when the humanitarian mission in Somalia escalated to partisan involvement in determining political leaderships and began incurring casualties.

¹²Although these constraints were painfully evident to the American military during the Korean and Vietnam conflicts, in which self-imposed sanctuaries thwarted strategic actions, they also emerged during the Gulf War in response to the destruction of the Al Firdos bunker and the devastation of Iraqi forces fleeing Kuwait City at the end of the war.

the casualties associated with stalemated trench warfare.¹³ After World War II, no other nation committed itself so quickly or completely to nuclear weapons for its security. Despite a late start in the space race with the Soviet Union, the United States was determined not to be second, even though it tacitly accepted numerical inferiority in many other aspects of military force.

So, there is a dilemma here as well for the American military. On the one hand, there are obvious risks that the American fascination with technical fixes could lead to the selling of a commitment to (and reliance on) information warfare as a less costly, easier way to deal with future national security problems. That is the lesson of our earlier commitments to strategic bombardment and nuclear deterrence for security in the middle of the 20th century. Neither could adequately deliver for the real situations that ultimately arose in the 1940s and 1950s. On the other hand, the natural conservative tendencies of the mainstream of the American military make it reluctant to embrace new technologies at the expense of maintaining adequate stocks of traditional forces. That is the lesson that restive military aviators in the 1920s and space operators in the 1990s learned.

The leaderships of the uniformed American military services find themselves (1) not wanting to disaffect their information and space cadres because of the importance of these fields to present and future military operations and (2) not willing to devote scarce resources or to grant cherished authority that their information and space proponents claim they need, while (3) enduring concerns that these factions—like the aviators before them—may seek independence from their parent services with the help of congressional or Department of Defense sympathizers. The result is a delicate dance between the mainstream military leaderships and their information and space cadres—each knowing that they now need the support of the other, neither wanting to alienate the other, each waiting for the future to reveal that it lies in their favor. In that sense, both sides are relying on political and technological developments outside their direct control to render a favorable verdict.

¹³In the event, however, the mechanization of land warfare made stalemates rare; instead of a repeat of the bloody attrition in the trenches, the war for control of the air turned into bloody attrition at 20,000 feet over Europe. On this point, see Meilinger (1997).

WHAT IS THE ENTERPRISE?

The term *enterprise* is used here in the business sense of the *primary purposeful activity* of an organization. That is a deliberately different idea from the objective, mission, role, or purpose of an institution. *Enterprise* tells us about the activities that preoccupy an organization. For example, many business organizations will claim a constant objective or purpose, such as making a profit for their owners, but their enterprise may change—as in the case of IBM, whose enterprise changed from making office machines (mainly typewriters) to making computers as a result of the information revolution. The American military has had a constant mission of defending the nation's interests, but its enterprise has changed several times, even within the 20th century—from constabulary activities at the far-flung outposts of America's new empire, to mounting expeditionary forces for fighting two world and three regional wars, to ensuring the nation's very survival during the Cold War. The notion of enterprise is used here not to apply business concepts to the military but to highlight possible changes in the primary purposeful activity of the American military as it moves into the 21st century—with a recognition that the military enterprise has not been a constant and may change in the future.

Much of the current focus of the American military on information warfare—offensive or defensive—is on applying the burgeoning information technologies as new tools for what it sees as its traditional mission of fighting and winning the nation's wars. More precisely, as stated in *Joint Vision 2010*, the mission is “to deter conflict—but, should deterrence fail, to fight and win our nation's wars.” However, it is increasingly common to hear those in uniform say that the *primary* mission of the American armed forces is and should be to fight and win the nation's wars, particularly as encroaching demands for humanitarian and peacekeeping tasks fall upon those forces. GEN John J. Sheehan, Commander in Chief of the Atlantic Command, recently voiced his skepticism about that common interpretation:

Any service member, asked to define the mission of the U.S. military, will most likely reply, “to fight and win our nation's wars.” But is that really our mission? If so, who decided, and when? Where is it written? (Sheehan, 1997.)

This contemporary emphasis on “fighting and winning the nation’s wars” seems to have emerged in the wake of the war in Vietnam, for the very idea of fighting or winning the nation’s wars, as the *raison d’être* of American military forces, would have been an anathema during the height of the Cold War, when the nation’s strategy was deterrence and the primary purpose of our military forces was to *avoid* war. Indeed, the cornerstone of nuclear deterrence strategy was laid by Bernard Brodie in his early observation that

Thus far the chief purpose of our military establishment has been to win wars. From now on its chief purpose must be to avert them. It can have no other useful purpose. (Brodie, 1973, fn. 2, p. 377.)

An additional impetus for recentering the American military mission on “fighting and winning the nation’s wars” arises from the growing demands in the wake of the Cold War to use the military for operations short of war—as in the humanitarian operations in Somalia and Rwanda and the peacekeeping operations in Haiti and Bosnia. These seemingly open-ended demands, when exacerbated by budget constraints,¹⁴ are perceived as a threat to resources for traditional forces to fight conventional wars:

The revised defense strategy puts unprecedented emphasis on Smaller-scale Contingencies and Military Operations Other Than War. That diverts attention and resources from the main requirement, which is to fight and win the nation’s wars. It also tends to lessen the priority on Air Force combat airpower, since other services are seen as more relevant to peacekeeping and constabulary functions. (Correll, 1997.)

Not addressed by this lament is whether airpower could be fashioned to be much more relevant than in the past for peacekeeping and

¹⁴It is more common to hear the current budget constraints referred to as budget reductions. But the current budgets for the American military are larger, in real or inflation-adjusted dollars, than those at the height of the Cold War. In 1955, when the United States was urgently preparing for what appeared to many to be imminent thermonuclear war with the Soviet Union, the national defense budget was \$242.8 billion in 1995 dollars. In 1995, the number was \$271.6 billion. These numbers are taken from the historical tables in U.S. Congress (1995), p. 21. The recent reductions in military budgets are with reference to the so-called “Reagan buildup” of the defense budget, which peaked a little more than a decade ago.

constabulary functions (Builder and Karasik, 1995) and whether peacekeeping and constabulary functions (1) have been the more traditional peacetime roles for the American military throughout most of American history and (2) could become the predominant role for the American military for the first several decades of the 21st century.

Implicit in the contemporary focus on “fighting and winning the nation’s wars” is that the mission of the military, however defined, will remain more or less what it has been in the 20th century—at least before and after the Cold War—and the only thing that will change is the way the military goes about this traditional mission. That is to say, the military mission is still fighting and winning the nation’s wars, but those wars will now be fought with some new tools and in new ways. Information warfare is one of those new ways, and the information technologies will provide many of the new tools.

The problem with that formulation is that the information technologies are driving much more fundamental changes elsewhere—transforming societies and their institutions, creating new and destroying old enterprises. The American society that created and supported the American military in the 20th century has already been transformed by demography and technology—the two most fundamental drivers of change in the world today. The aspirations, expectations, and values of the American society now emerging are not the same ones that gave birth only a generation ago to the American military of today.

The current military posture—a relatively large, standing, ready military force in peacetime—is still running on the powerful legacies of the Reagan buildup and its vindication in the Gulf War. The creation of that posture almost two decades ago involved a combination of threat, political will, and public support that is no longer evident or easily re-created. Because the political will and public support to *change* the current posture will require initiative and hard choices, deliberate posture change may not manifest itself until the American society is forced to choose between social and defense programs—a choice that seems to be postponed for now by a remarkably healthy national economy. However, that should not mask the possibility that the military posture is riding on its momentum along a path of least political resistance more than it is buoyed by intrinsic public support. Thus, for the American military posture to remain substan-

tially unaltered despite great changes in the society that supports and tasks it is an assumption of heroic proportions.

Is it possible that the American society has been so transformed in the last quarter of the 21st century—during the lifetime of a single military career? The number of observers who say that it has been transformed by technology and demography is growing rapidly—the collective testimonies of Peter Drucker, Samuel Huntington, Arthur Schlesinger, Walter Wriston, and George Kennan in the September-October 1997 issue of *Foreign Affairs* should be sufficient to raise if not prove the possibility. Could it be that the enterprise or business of the American military will change as well? Even here, the observers who think the military enterprise has changed are growing in numbers and stature. Jessica Mathews, writing in *Foreign Affairs* earlier in 1997, argued that traditional interstate conflict is on a downward course, even as intrastate conflicts are on the rise:

War will not disappear, but . . . the security threat to states from other states is on a downward course. Nontraditional threats, however, are rising—terrorism, organized crime, drug trafficking, ethnic conflict, and the combination of rapid population growth, environmental decline, and poverty that breeds economic stagnation, political instability, and, sometimes, state collapse. The nearly 100 armed conflicts since the end of the Cold War have virtually all been intrastate affairs. (Mathews, 1997.)

Israeli military historian Martin van Creveld argues that traditional interstate wars and the kinds of armed forces required to fight them will slowly disappear, in part because of the proliferation of nuclear weapons—itsself one of the many consequences of the information revolution:

Slowly, unevenly but inexorably nuclear proliferation is causing interstate war and the kind of armed forces by which it is waged to disappear. The future belongs to wars fought by, and against, organizations that are not states. Indeed in most parts of the world this form of war has already taken over. . . . Unless some yet to be designed system enables states to reliably defend themselves against nuclear weapons . . . the writing for large-scale, interstate war, as well as the armed forces by which it is waged, is on the wall. (Van Creveld, 1996.)

To be sure, there are many who argue that war is in the very nature of humans¹⁵ and is not about to disappear—even though the modern nation-state as the wager of traditional warfare is only 350 years old. The confusion arises because war, for most in the American military, has come to mean interstate warfare between regular military forces. The possibility that the 20th century may have seen the apex of the powers of the nation-state (and its frequent resort to interstate warfare) is disturbing in its implications for the future enterprise of regular military forces. The argument that information warfare is the wave of the future only adds to those concerns.

Whether the enterprise of the American military is changing or what the new enterprise might be is addressed below. At this point, it is enough to suggest that it *could* be changing—from what thoughtful observers are saying—and that it *may* be something different from, or more than, providing for deterrence or fighting and winning the nation's wars.¹⁶ And if the enterprise of the American military *might* be changing, applying the information technologies to the old enterprise could be a diversion from, rather than an adaptation to, the future.

ADAPTING TO THE INFORMATION REVOLUTION

In large measure, the outlines of the first half of the 21st century are already quite evident with respect to the two greatest drivers of change:

1. **Demography:** The patterns of population growth and migration are widely appreciated. The number of people of retirement age in 2050 is known today with considerable confidence; it is a matter of counting the number of teenagers today and adjusting for mortality and migration trends.
2. **Information Technologies:** The computational and telecommunications capabilities for 2025 can be projected with confidence, for they are closely tracking the stable trend lines they have been

¹⁵This view is addressed and challenged by Keegan (1993).

¹⁶As an existence proof, the future enterprise of the American military might be what it has been throughout most of its 220-year history in peacetime, save the 40-year Cold War—keeping the arts and sciences of warfare alive with meager funds while carrying out constabulary duties as assigned.

on for more than two decades¹⁷ and are forecast to follow for at least two more decades with foreseeable developments in laboratories today.

So, the things that are most changing our world as the information revolution crests either have already occurred or have clearly signaled their trajectories for decades to come.

What is less apparent in our future is how our institutions—particularly our government institutions—will adapt to these changes. Nongovernmental institutions have already demonstrated their ability to adapt to the new world that demography and information technologies are creating before our eyes. The American family, as an institution, changed dramatically in the 1950s and 1960s. We may not like those changes, but individuals have a way of adapting quickly when they find themselves in a changed world. They quickly surmise that if they do not change, they will not be able to compete, survive, or flourish. Moreover, inertia does not impede individual change to the degree that it does in groups governed by collective or institutional behavior.

Businesses, as institutions, mostly changed or adapted in the 1970s and 1980s. They had to change or be killed by their bottom lines. The business school literature has been rife with theories about how businesses must redefine, reengineer, reinvent, reorganize, or rethink themselves in the new world with its global markets for finance, production, and goods. At the same time, old businesses have collapsed or been transformed, and completely new commercial giants have emerged in businesses that did not exist two decades ago (e.g., Microsoft). Those that have stumbled or fallen, after half a century or more of success, include such familiar names as IBM, Xerox, Sears, DEC, DuPont, and Pan Am. (See Hamel and Prahalad, 1994, p. 6.) Finding the right niche (enterprise) in the market is often more important than being effective or efficient in a shrinking enterprise or the wrong niche. Being effective or efficient takes on importance after the right enterprise has been discovered and engaged.

Even medicine—at least the business side of medicine—has been transformed. How medicine is practiced today through health

¹⁷See, for example, Moravec (1988). Also see Petersen (1994).

maintenance organizations looks completely different from what it did only 10 or 20 years ago. Again, not all of these societal changes are welcomed, but that is the long history of revolutions, and institutions must either adapt or become less relevant to the new world that is now evolving before our eyes. The fall of many traditional business giants is testimony to these imperatives.

Elected government is showing signs of change. It must because it runs up against the ballot box every two, four, or six years. However, internal government fiefdoms, such as the Central Intelligence Agency, the Internal Revenue Service, or the Department of Energy, are more insulated from the ballot box and can afford, therefore, to be slower to change or to wait until change is forced upon them. Eventually, as creatures of elected government, they will be forced to change also, for their constituencies against change are seldom larger than their own employees and supporting contractors. But two government-supported institutional enclaves enjoy large public constituencies and seem likely to resist change: the American educational and military institutions.

The mission of education may be to educate students, but the traditional enterprise (activity) of educational institutions has been to certify the organization and discipline of students in various subjects and at various levels. That enterprise served both agrarian and industrial economies in its demands for people who could be depended upon to plan, organize, produce, and distribute—or in the case of the military, to fight. The relevance of that traditional enterprise in the new information economies is being challenged from two directions: At one end, information elites demand creativity and intelligence more than organization and discipline¹⁸—where certificates count for less than portfolios or demonstrations of abilities. At the other end, a demographically changed public poses increasing demands for government-supported custody of its youth—where young people need to be usefully or safely occupied or entertained while maturing. Traditional educational institutions, with their focus on conferring certificates, are likely to ignore these encroachments as fringe problems until the center has become less relevant. This would follow the path of the Catholic Church in the wake of the

¹⁸See, for example, Reinhardt (1997).

Renaissance and an earlier information revolution instigated by the printing press.

Just how education and the military will (or will not) adapt to change is likely to be an important determinant of American political history in the first half of the 21st century. These two institutions are the ones to watch, because they are the most isolated from bottom lines or ballot boxes and because their constituencies against change are large, affluent, and vocal. Both pose the possibilities of institutions that will elect to become less relevant rather than change.

APPLYING NEW TECHNOLOGIES TO OLD ENTERPRISES

The American military may assume that its enterprise (primary purposeful activity) remains unchanged, despite the ravaging effects of the information revolution on the powers of the nation-state and the transformation of entire societies, economies, and enterprises everywhere. If so, the principal effect of the information technologies on the military will be limited to their application in the existing enterprise.

However, the effects of applying the information technologies as new tools in old enterprises has almost everywhere proved disappointing—in business, governance, and education—because the dramatic changes wrought by the information technologies are to be found elsewhere in the societal changes that are producing new values, expectations, aspirations, and enterprises. When businesses automated their old accounting or inventory processes (often within their old enterprises), they found themselves disappointed with the cost savings. Computers introduced into the classroom have had little visible or measurable effect on the traditional enterprise of education.¹⁹ Managers everywhere see the movement of greater amounts of information through computer networks but only modest improvements in productivity. In traditional businesses, the lament is: Where are the savings promised by computers?

By applying the information technologies to its old enterprises—whether that be digitizing the battlefield or preparing to engage in interstate information warfare—the American military could be

¹⁹This tendency is lamented by Oppenheimer (1997).

diverted from the more important and difficult task of anticipating and reshaping itself to undertake new and different enterprises.²⁰ It is not the American military that will *determine* its future tasking and hence its new enterprises; that will be done by a new and different society in a new and different world. The challenge for the American military is to *anticipate* what those new enterprises may be before it is confronted with the tasking. How well the American military anticipates its next enterprise will determine whether it has adapted, maladapted, or made itself irrelevant in the cresting information revolution. Digitizing the battlefield may make soldiers more effective or efficient on battlefields as they were understood in the 20th century, but it may add less than expected to the tasks that lie ahead for the American military in the 21st century.

The ability to wage interstate information warfare—offensive or defensive—may or may not be salient to the new world (and enterprise) that is now emerging for the American military. Offensive information warfare as it is currently conceived may be salient only if being prepared to wage interstate warfare remains the principal enterprise for the American military in the 21st century. Offensive information warfare directed against an entire society or community may be the province of the military, but that may be rarer than information attacks upon individuals or small groups where the advantage of the military over individuals is less evident. In offensive information warfare, the differences in capabilities between the military and an individual may be much less than they are in the applications of physical force.²¹

Defensive information warfare may turn out to be the distributed burden of society every bit as much as its military—where all who use the fruits of the information revolution, civilian or military, must look after their own protection.²² Where there are state-sponsored

²⁰A point RAND colleague Nancy Moore made to the author from her studies of the business and management literature.

²¹Applying large amounts of physical force has tended to be a state-run monopoly, but even that now seems to be slipping away. In the application of information as a weapon, the state may not long enjoy a monopoly, even if it once did with state-controlled radio and television transmitters and printing presses.

²²This was presaged by the rising burden upon civil societies to look to themselves for protection from criminal violence. That burden can no longer be carried almost

information attacks upon U.S. infrastructures, it is to be expected that the responses might come from the military, but not necessarily in like kind. Just as state-sponsored terrorism has brought about responses with military strikes, so too state-sponsored information attacks might bring about responses in the form of physical force. Where information attacks come from individuals or nonstate actors, it is not at all clear that the American military would be involved unless its own infrastructures were the target.

So, the involvement of the American military in information warfare beyond what it has been in the 20th century—in signals intelligence, electronic warfare, jamming, spoofing, etc.—is not at all obvious until and unless the enterprise of the military in the 21st century is more thoughtfully discovered and agreed upon.²³ In the meantime, it might be better to have a 20th-century military preparing itself to engage in possible 21st-century enterprises than it is to have a 21st-century military preparing itself to engage in important but infrequent 20th-century enterprises.

THE FUTURE ENTERPRISE OF THE MILITARY

To anticipate what the future enterprise of the American military may be in the early 21st century, it may be helpful to look at its past enterprises during the 20th century. This century has seen the American military preoccupied with at least six different enterprises at different times, sometimes reverting to an earlier enterprise. At any given time, several of these six enterprises were usually detectable, but only one at a time, dominated the American military as its *primary purposeful activity*. The six enterprises are as follows:

entirely by the state, as it was before the information revolution and demography transformed societies and diffused the power of violence into the hands of individuals.

²³There is a tendency for managers to be impatient with the question of enterprise, so they can get on with the more comfortable questions of effectiveness and efficiency in known enterprises. Peter Schwartz provides a case study of the management of Royal Dutch Shell, in which strategic planners succeeded in getting the managers to slow down and focus on the question of enterprise. The happy result was that Royal Dutch Shell went through the oil crisis much better than its competitors because it was prepared to change its enterprise from oil production to oil brokering. See Schwartz (1991).

1. **Providing constabulary capabilities.** For the first 15 years of the 20th century, the new empire of the United States—from the Caribbean to the Western Pacific—saddled the American military mostly with constabulary duties: putting down rebellions (Philippines), chasing bandits (Mexico), and providing military governance (Dominican Republic). Constabulary duties reappeared as highly visible activities in the 1920s (Veterans' riots, Dominican Republic) and in the 1990s (Los Angeles, Haiti, Bosnia), but they did not once again become the *primary purposeful activity* of the American military that they had been at the beginning of the century.
2. **Mounting an expeditionary force.** The two world wars and the Korean, Vietnam, and Gulf wars preoccupied the American military for only 17 years of the 20th century. Although those periods are remembered most for the fighting of the forces, the preponderance of the military activities were centered on *mounting* the expeditionary forces, not the briefer periods of sometimes intense fighting.²⁴ Now, in the aftermath of the Cold War—through the Base Force, the Bottom-Up Review, the Commission on Roles and Missions, and the Quadrennial Defense Review—most of the American military would make preparing to mount two expeditionary forces for fighting two major regional contingencies its primary purposeful activity.
3. **Keeping the military arts and sciences alive.** The desperate challenge of keeping the knowledge base and cadres for a *functional* military was the dominant preoccupation of the American military during the 18-year interlude between the two world wars. Any rereading of that historical period provides vivid accounts of the struggle to find enough funds to develop modern weapons sufficient even to practice new doctrines and tactics.²⁵ Old newsreel footage of field exercises showing trucks marked as “tanks” in lieu of sufficient tanks is a sad testimony to the times.

²⁴As an extreme example, the Gulf War involved more than six months of deploying substantial forces into the Gulf, while the actual fighting lasted only six weeks or four days, depending upon whether one refers to the air or the ground war. The logistical efforts in supporting our other wars were also prodigious by any measure except the loss of lives.

²⁵See, for example, Van Tol (1997).

4. **Providing a deterrent.** For at least 20 years, the American military was dominated by the activities associated with building and deploying its nuclear deterrent forces after the beginning of the Cold War. This continues to be an important activity even today, but it ceased to be the *primary purposeful activity* of the American military after the Vietnam War began in earnest. It was displaced by a series of other enterprises, right down to the present.
5. **Providing a forward defense.** After the Vietnam War, the American military turned its attention back toward the Cold War, but this time the primary purposeful activity was providing a forward defense in Central Europe rather than relying on a nuclear deterrent—which seemed to have dead-ended in a stalemate. The United States had provided a forward defense on the Korean Peninsula since the 1950s, but it was not the primary focus of the American military. However, all of the American military, including the Navy and Air Force, turned its attention to defending forward in Europe as its principal activity for the 15 years from the end of the Vietnam War to the end of the Cold War.
6. **Providing a global presence.** After the end of the Cold War, forward defense melted into a forward presence. The Navy embraced this activity because it was quite close to naval activities under other names; more importantly, this activity supported the force structures for the Navy's most cherished units, the carrier battle groups. The Air Force tentatively tried to adopt this "cash cow" in arguing that air and space forces could provide a "virtual" global presence, because of their speed or omnipresence, but hedged its bet with the development of an "Air Expeditionary Force." The Army, with the politically mandated drawdown of European forces and without sufficient independent means for mobility and a global presence, focused its enterprise on mounting an expeditionary force.

These six enterprises constitute the past, but they do not exhaust the possibilities for the future. At least two other purposeful enterprises have lurked (but never dominated the American military) during the 20th century:

1. **Defending the homeland.** Homeland defense, as an issue and an activity, was evident several times in the 20th century—in the first

half of the century, when the Navy considered itself as the first line of defense and when coastal artillery was in vogue,²⁶ and again in the second half, when air and missile defenses (including the Strategic Defense Initiative) became salient issues.

2. **Maintaining a mobilization base.** Today, maintaining the mobilization base mostly means keeping the weapon industry alive and healthy. But for the first half of the 20th century, it also meant keeping the training infrastructures and manpower reservoirs. These issues have sometimes been of acute concern, but they have seldom risen to dominate the American military's purposeful activities.

What of the future? As the 20th century closes, it is clear that the enterprise of the American military—its primary purposeful activity—is being prepared to mount an expeditionary force. That the United States has had to do so five times in this century is enough to make that enterprise plausible, and its force-structure demands obviously make it attractive to the military as a peacetime enterprise. But this is largely a self-selected enterprise—one that the nation has never before supported in peacetime for any lengthy period.²⁷ Competing societal demands for budget resources remain unresolved—although they may be deferred by a healthy economy as we approach the end of the century. The real question is whether that enterprise—attractive though it may be—will be sustained by the American society into the 21st century. If it can be, the applications of the information technologies to the present enterprise may indeed be a pertinent challenge for the American military as the information revolution crests.

Some, including this writer, have argued that the enterprise will change because of the information revolution's transformation of societies and economies and, hence, the nature of conflict—the sub-

²⁶For a brief period, the Army Air Corps tried to justify the development of its first long-range bombers for coastal defense. (See Builder, 1993, p. 76.)

²⁷After the two world wars, the American military was rapidly demobilized. President Eisenhower demobilized more forcibly after the Korean War in favor of providing a deterrent. The demobilization after the Vietnam War and during the Carter administration was reversed by the so-called Reagan buildup, the final Cold War initiative of the 1980s. Whether the American military will once again be demobilized after the Cold War is the other shoe, not yet dropped.

sidence of nation-state warfare with regular forces and the rise of nonstate and intrastate conflicts brought about by the globalization of information and commerce. If so, the enterprise might shift toward providing constabulary capabilities for a more disorderly world or, alternatively, toward defending the homeland from terrorists, criminals, and rogues, either outside or within our borders.

Another possibility, raised by those looking to a revolution in military affairs instigated in large part by the information revolution, is a return to circumstances similar to the interlude between the two world wars, “largely peaceful decades but also periods of change and debate in military technology and strategy.”²⁸ If so, the enterprise might be characterized, as it could be in the 1920s and 1930s, by keeping the military arts and sciences alive or even maintaining a mobilization base in the face of rapidly changing technology and concepts of operation.

Of the eight enterprises considered here, the cresting information revolution would not seem to portend a return to the enterprises of providing a deterrent or forward defense as a primary purposeful activity. Both have their saliency in the collisions of powerful, autonomous nation-states, circumstances that may have reached their apex in the 20th century and the Cold War and that are now ebbing under the onslaughts of the information revolution. States can be deterred because they have something to lose, but many non-state actors have little to lose and may, therefore, be very difficult to deter. Forward defense seems likely only if the survival of the nation-state is ultimately at stake—a prospect that seems unlikely in the absence of another Cold War. Providing a global presence could become the enterprise of the American military in the 21st century if the United States pursues the role of global policeman, but that role, too, is likely to be eroded rather than enhanced by the effects of the information revolution.

The more important point to be made here is not which enterprise will dominate the American military in the 21st century—something that will remain arguable even after the fact—but whether the extraordinary effects of the ongoing and cresting information revo-

²⁸This is a view attributed to Andrew Marshall, Director of Net Assessment. (See Gigot, 1997.)

lution are likely to change the current enterprise of the American military. If the answer is yes, the change in enterprise almost certainly will be the most important consequence of the information revolution for the American military, not the application of the information technologies to its existing enterprise.

In sum, the most important effects of the current information revolution for the American military will probably not be new tools for fighting traditional kinds of wars—the old enterprise or business—but serving a changed society that has new and different expectations, assignments, and support for its military. The challenge the information revolution poses for the American military is not so much *applying the new technology as anticipating the new enterprises* that might arise as it is tasked by a society transformed by the information revolution in a politically and economically transformed world.

BIBLIOGRAPHY

Brodie, Bernard, ed., *The Absolute Weapon*, New York: Harcourt Brace, 1946.

Brodie, Bernard, *War and Politics*, The Macmillan Company, New York, 1973.

Builder, Carl H., *Patterns in American Intellectual Frontiers*, Santa Monica, Calif.: RAND, N-2917-A, August 1990.

_____, *The Icarus Syndrome*, New Brunswick: Transaction Publishers, 1993.

_____, “Looking in All the Wrong Places?” *Armed Forces Journal International*, May 1995.

Builder, Carl H., and Theodore Karasik, *Organizing, Training and Equipping the Air Force for Crises and Lesser Conflicts*, Santa Monica, Calif.: RAND, MR-626-AF, 1995.

Correll, John T., “The Headwinds of Tradition,” editorial, *AIR FORCE Magazine*, Vol. 80, No. 10, October 1997, p. 3.

DoD—see U.S. Department of Defense.

- Dunlap, Charles J., Jr., "21st-Century Land Warfare: Four Dangerous Myths," *Parameters*, Autumn 1997, pp. 27–37.
- Gigot, Paul A., "Cohen Decides Pentagon Needs Fewer Good Men," *Wall Street Journal*, November 14, 1997, p. 18.
- Hamel, Gary, and C. K. Prahalad, *Competing for the Future*, Boston: Harvard Business School Press, 1994.
- Keegan, John, *A History of Warfare*, New York: Alfred A. Knopf, 1993.
- Mathews, Jessica, "Power Shift," *Foreign Affairs*, January–February 1997, pp. 50–66.
- Meilinger, Phillip S., "The Next Air Campaign," *AIR & SPACE/Smithsonian*, Vol. 12, No. 4, October–November 1997, pp. 46, 47.
- Moravec, Hans, *Mind Children: The Future of Robot and Human Intelligence*, Cambridge, Mass.: Harvard University Press, 1988.
- Oppenheimer, Todd, "The Computer Delusion," *The Atlantic Monthly*, Vol. 280, No. 1, July 1997, pp. 45–62.
- Petersen, John L., *The Road to 2015: Profiles of the Future*, Corte Madera, Calif.: Waite Group Press, 1994.
- Reinhardt, Andy, "What Matters Is How Smart You Are," *Business Week*, Special Double Issue on Silicon Valley, August 25, 1997, pp. 68–72.
- Schwartz, Peter, *The Art of the Long View*, New York: Doubleday Currency, 1991.
- Sheehan, John J., "Building the Right Military for the 21st Century," *Strategic Review*, Vol. 25, No. 3, Summer 1997, pp. 5–13.
- TRADOC—see U.S. Army Training and Doctrine Command.
- U.S. Army Training and Doctrine Command, *Information Operations*, Field Manual 100-6, August 1996.
- U.S. Congress, *The Budget of the United States Government for Fiscal Year 1996*, as reported in *The National Review*, December 25, 1995.

U.S. Department of Defense, Joint Chiefs of Staff, *Joint Vision 2010*, Washington, D.C., 1996a.

U.S. Department of Defense, Office of the Chairman of the Joint Chiefs of Staff, *Joint Information Warfare Policy*, Washington, D.C., Chairman of the Joint Chiefs of Staff Instruction 3210.01, January 2, 1996b.

Van Creveld, Martin, "Air Power 2025," in *New Era Security*, RAAF Air Power Studies Centre, June 1996.

Van Tol, Jan M., "Military Innovation and Carrier Aviation: The Relevant History," *Joint Force Quarterly*, No. 16, Summer 1997, pp. 77–87.

Watts, Barry D., *Clausewitzian Friction and Future War*, Washington, D.C.: Institute for National Security Studies, National Defense University, 1996.

Wriston, Walter B., *The Twilight of Sovereignty*, New York: Scribner's, 1992.