The Future of the Army Profession

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Don M. Snider
project director

Lloyd J. Matthews
editor

with forewords by

Congressman Jim Marshall, Third District, Georgia

General (Retired) Frederick M. Franks, USA

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competitors?" rather than "Can the Army effectively win wars in its jurisdictions with its present state of knowledge and expertise?" Logically, we must ask and resolve the first question before taking up the second.

If recent operations in the Balkans, Afghanistan, and Iraq have demonstrated anything, it is that other agencies and organizations are competing for legitimacy within the Army's traditional jurisdictions, and that in some cases the Army does not have the best expert knowledge. Thus if the Army chooses to remain legitimate within these arenas (and it may not; it cannot be expert at all things!), it must both establish and defend the superiority of Army expertise for the evolving tasks within these jurisdictions. In this regard, Chapters 13 and 14 focus more on Army capabilities for major combat operations, while the research reported in Chapters 15 and 16 is focused more on the jurisdiction of stability operations under joint and combined commands.

Second, a very sobering theme from both Parts III and IV, glancing back to Chapter 3 in Part I, centers on the question of whether the Army is cleaving into organizations in which the professionals within them are perceived as either "thinkers" or "doers" and, if so, whether the professional future for each is equally bright. Since knowledge is the foundation of professions and the expansion and currency of that knowledge is fundamental to a profession's evolutionary viability, it is essential for all professions to value those members whose role is to create and develop expert knowledge as well as those who apply professional expertise. If the Army is to flourish as a profession, both types of Army professionals need to be equally esteemed, and to have equally bright futures. Unfortunately, our research casts doubt on whether this is the case today, and whether, without deep cultural change, is it likely to be so in the future.

Both of these themes—maintaining preeminent expert knowledge within desired jurisdictions and maintaining a cadre of professionals who produce that preeminent expert knowledge—reinforce the necessity for the profession's strategic leaders to capture and maintain the renewed professionalism evident in an Army redeploying to and from Iraq/Afghanistan, while at the same time raising the institution's esteem for and utilization of the intellectual base resident in the institutional side. Both are essential for the Army's future effectiveness, relevance, and vitality.

13 The Digital Battlefield: Transformation Efforts and The Army's Future Professional Jurisdictions

Elizabeth A. Stanley and G. F. Deimel

> The revolutions in information technologies (IT) and knowledge-based systems hold almost unimagined promise for the army that grasps them. IT will be a breakthrough in warfighting. . . . Discriminating sensors providing information on enemy and friendly forces will link to computers that display relevant information in real time in digestible bites. Using IT more than explosive weapons, forces will maneuver against and defeat their enemies more quickly and with less risk. Targeting the enemy's fighting forces and, more decisively, his command and control facilities will provide an unprecedented ability to defeat him.
>
> —Steve Mains[1]

Five years have passed since the Army first announced its intention to transform its force structure and composition to capitalize upon the ongoing Revolution in Military Affairs (RMA). Since that time, the plan remains to create a "Future Force" capable of full spectrum dominance—from major combat operations through stability operations, strategic deterrence, and homeland defense operations. Encompassing the entire Army, the Future Force will combine heavy force lethality, survivability, and sustainability with near-light force deployability. The Army plans to achieve these capabilities largely through dominant battlefield awareness.[2]

While recent events have focused a great deal of attention on interim developments in the transformation process—the fielding and employment of the first Stryker Brigade Combat Team, the announcement of force modularization efforts, and daily developments in the ongoing operations in Iraq and Afghanistan all dominate the mainstream media—the central and long-term goal of Army transformation remains progression toward the Future Force. And while it draws less attention, digital networking is an essential thread of continuity, if not the central element, in this process. It composes the core of the Future Force's Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) capability, promising to "link people and systems—vertically and horizontally . . . to increase situational understanding."[3] It will thus provide all participants in a theater a common operating picture while minimizing the fog of war and increasing lethality, survivability, and operating tempo within the digital force.[4]

In this chapter, we outline the Army's efforts to create a fully networked force in light of its evolving professional jurisdiction. The Army's methods for adopting new information technologies and the consequences of these efforts, intended and otherwise, speak to its future professional jurisdictions. *We argue that information technologies from the contemporary RMA are both an objective and subjective*

force for jurisdictional change and that some changes may possess unintended consequences for the profession of arms. While the Army has displayed the foresight to capitalize on technological opportunities to enhance its conventional war-fighting capability, it may not recognize or want to address the wider threats that such change could bring to its traditional core jurisdictions. Our exploration of some of these threats has significant implications for how the Army should renegotiate its jurisdictional claims—and thus redefine its professional expertise.

The chapter contains four sections and a conclusion. The first section reviews the theoretical considerations at the foundation of our analysis, defining the military "system of professions" and the RMA technologies affecting this system. The following three sections examine the implications of Army digitization in light of three concentric visions of the professional system: the inside of the Army profession itself, the wider professional system of traditional warfare, and the broad context formed by the national security arena.

RMA Technologies and Professional Jurisdictions

In his widely acclaimed study *The System of Professions: An Essay on the Division of Expert Labor* (1988), Andrew Abbott argues that an occupation's status as a profession and its standing within society are outcomes of social competition within a system of professions for control over expert knowledge as applied to particular jurisdictions. He describes professions as "exclusive occupational groups applying somewhat abstract knowledge to particular cases."[5] Professional life has three characteristics.[6] First, professions should be seen for what they do, not just how they are organized to do it. In other words, the essence of a profession is its work—its legitimated claim to apply expert knowledge to a particular set of tasks, which Abbott calls jurisdiction. Second, professions operate in an interdependent system—the "system of professions." Professions compete for the control of work, and the jurisdictional boundaries among them are constantly disputed. Professions occupy a jurisdiction by filling a vacancy or fighting for legitimate control of it through a variety of channels—the legal system, public arena, and workplace. As a result, a move by one profession inevitably affects others. Third, many variables affect the content and control of work, including technology, organizations, culture, etc. Perhaps the most important of these is technology.

From a jurisdictional perspective, technology is a double-edged sword. On the one hand, technological change can create new jurisdictional opportunities by (1) causing existing professional competitors to disappear; (2) creating new tasks; or (3) providing a new way to perform existing tasks. On the other hand, technological change can destroy jurisdictional opportunities by (1) introducing new professional competitors; (2) allowing existing competitors to take over existing tasks; or (3) driving existing tasks into obsolescence. Moreover, although technology can create new jurisdictional opportunities, rapid jurisdictional expansion is very difficult because there is a qualitative challenge to institutionalizing new work. As a result, even jurisdictional opportunities can lead to an invasion by outsiders seeking to claim legitimacy over those new tasks. The dramatic expansion in recent years of the number and role of civilian contractors in the maintenance support of digitally integrated Army units is perhaps the most prevalent example of this.

The Army's preferred professional jurisdiction is fighting and winning the nation's wars, but the technological innovations of the current RMA may change this jurisdiction.[7] Therefore, one must understand the principal concepts of the current RMA to fully grasp their capacity for introducing change within the system of professions.

The contemporary RMA is generally postulated as being the result of linking precision weaponry to knowledge in a manner that will radically enhance military capabilities in future warfare. The emerging picture of the future battlefield centers on an integrated system of battlefield assets—a reconnaissance-strike complex—that promises continuous, real-time, sensor-to-shooter links between all targets and all available weapons in the battle space. Technological innovations of the contemporary RMA fall into three categories: (1) intelligence, surveillance, and reconnaissance; (2) advanced command, control, communications, computers, and intelligence; and (3) precision strike weapons. Applications of these three technologies together form a "system of systems."[8] Through these new technologies, using conventional weaponry, the RMA's advocates promise rapid, decisive victory, very low casualties and collateral damage, and strategic results.

Scholars generally concur that RMA technologies provide three major improvements in operational capability: precision strikes, increased velocity, and information dominance. Precision strikes not only allow the military to conduct operations at a significant distance from the enemy—what Michael Mazarr calls "disengagement"[9]—but also have the potential to reduce the number of casualties and collateral damage associated with combat operations.[10] Second, increased velocity will create preemptive warfare "between cohesive, fast-moving friendly forces and unready, disrupted enemy forces."[11] RMA information technologies will increase velocity by enhancing leaders' battlespace awareness and command and control capabilities, thus eliminating irrelevant and counterproductive movement.

Third, and perhaps most importantly, information dominance promises to erode or destroy the enemy's means of collecting, processing, storing, and disseminating information.[12] The Army has defined information dominance as "the degree of information superiority that allows the possessor to use information systems and capabilities to achieve an operational advantage in a conflict or to control the situation in operations short of war, while denying those capabilities to the enemy."[13] Military theorists believe that information dominance is comprised of three effects. First, it will enhance situational awareness by providing accurate, complete, real-time information about friendly and enemy forces and the surrounding environment, thus answering those questions that have plagued soldiers in battle from time immemorial: "Where am I? Where are my buddies? Where is the enemy?"[14] Second, as a result of situational awareness, it will dissipate the fog of war so that all soldiers, at all levels, will share a common view of the battlespace at all times—the common operating picture.[15] Retired Adm. William Owens calls this common view "dominant battlespace knowledge," explaining that "this kind of knowledge

constitutes an insight into the future, for it enables us to understand how the enemy commander sees his own battlefield options, and therefore increases the accuracy of predicting what he will try to do."[16] Third, armed with this information, U.S. forces can operate within an enemy's decision and action cycles,[17] thus enmeshing the "adversary in a world of uncertainty, doubt, mistrust, confusion, disorder, fear, panic, chaos. . . . And/or fold [him] back inside himself so that he cannot cope with events/efforts as they unfold"[18]—achieving a state of operational existence currently termed "decision superiority."[19]

Of these three potential improvements at the operational level of warfare—precision strike, increased velocity, and information dominance—this chapter will concentrate on the third. Fundamentally, information dominance requires that a military organization have both the technology and the doctrine for managing and processing information to empower commanders with fused, real-time knowledge of the battlefield. This is the ultimate goal of Army efforts toward digital integration.

The Army has attempted to incorporate contemporary RMA technologies into its war-fighting capability since the 1970s. From Sigma Star in 1978 to today's Army Battle Command System, the Army has tried to minimize the fog of war and leverage new information technologies to improve the way it fights.[20] Initially, Army digital integration efforts primarily concentrated on heavy, or mechanized, forces. Starting in 1994, the Army launched a series of exercises—called Advanced Warfighting Experiments (AWE)—to evolve the digitization concept. The Army's strategy uses a bottom-up approach that experiments echelon by echelon with several experimental systems simultaneously. By early 1996, experimental equipment was fielded by the 1st Brigade, 4th Infantry Division (Mechanized) at Ft. Hood; that unit became the core of a brigade combat team designated the Experimental Force (EXFOR).[21] EXFOR experimented with 72 different initiatives—operational concepts and equipment prototypes—during its milestone, two-week AWE in March 1997 at the National Training Center, Ft. Irwin.[22] Following the EXFOR AWE, the Army conducted an AWE at Ft. Hood based on a division-level simulation in November 1997.[23]

Most of the equipment initiatives tested in these and subsequent AWEs are components of the Army Battle Command System (ABCS), which integrates the command and control systems found at each echelon—from dismounted soldier or individual weapons platform up to the ground force commander at the theater or joint task force level. In its present configuration, ABCS has three major levels. First, at the highest level, the Army Global Command and Control System (GCCS-A) operates at the division, corps, and theater levels, overlapping with the DoD's own GCCS. GCCS-A provides the communications underpinning for force tracking, host nation and civil affairs support, theater air defense, psychological operations, C2, logistics, and medical support. Created from existing Army-wide communications systems, GCCS-A was first fielded to Army units in Hawaii and South Korea in September 2000.[24]

Second, the upper level of the Tactical Internet (formerly known as the Army Tactical Command and Control System, or ATCCS) operates in the middle command echelons, from corps to brigade. This level is organized into five battlefield functional areas: maneuver, field artillery, intelligence and electronic warfare, combat service support, and air defense.[25] Third, the lower level of the Tactical Internet

uses the Force XXI Battle Command Brigade and Below (FBCB2) system to provide situational awareness and command and control to the lowest tactical echelons—from the brigade down to dismounted soldiers and individual weapons platforms. The FBCB2 system is comprised of (1) a computer that can display a variety of information, including a common picture of the battlefield overlaid with icons of friendly and enemy forces; (2) software that automatically integrates global positioning system (GPS) data, military intelligence data, combat identification data, and platform data (such as fuel and ammunition status); and (3) interfaces with communications systems.[26] Battlefield data are communicated to and from users of FBCB2 through the Tactical Internet, a radio network comprising a positional navigation and reporting capability[27] and a voice- and digital-converting radio.[28] For dismounted soldiers, these components were mounted into a man-portable system called Land Warrior.[29]

While much of the development to date has been Army-centric, the Army will operate digitally in a much more joint and global context in the decades to come. In recent years, DoD has made great efforts to provide joint controlling concepts to guide the development of the various services' transformation plans.[30] These joint concepts promise a global information grid that provides joint connectivity within a "horizontally and vertically integrated network" extending from the ground into space.[31] The Army's Future Force will operate within this grid providing "relevant and ready land power capability to the combatant commander and the joint team."[32] Presently the Future Combat System (FCS) is the "cornerstone" of technological development of the Future Force which will enable the Army to function in a networked context across the full spectrum of operations.[33] As planned, the FCS is suite of 18 manned and unmanned systems which are, by definition, digitally integrated through the Joint Tactical Radio System and the Warfighter Information Network-Tactical.[34]

In sum, the Army has been trying since 1994—in a very determined and structured way—to digitally integrate its heavy forces for major conventional combat. The Army has made less progress with lighter forces except for the new Stryker brigades which are addressed below. While the digitization process has not necessarily been a smooth one, these new technologies do promise "increased lethality, survivability, and operating tempo." Yet, as discussed earlier, new technologies—like those embodied in the Army's battlefield digitization effort—have the potential to change professional jurisdictions in a manner detrimental to the Army's interests. The remainder of the chapter explores such potentially undesirable effects which future technological adaptation may produce.

Implications of Digitization within the Army Profession Itself

The Army draws its mission mandate from the National Security Strategy, the National Defense Strategy, and the National Military Strategy. These documents (2004) define the national military objectives as (1) protecting the United State against external attacks and aggression; (2) preventing conflict and surprise attack;

and (3) prevailing against adversaries. As such, the "armed forces' foremost task is to fight and win wars."[35] Given this guidance, the Army currently envisions its professional jurisdiction as providing "[the] necessary forces and capabilities to the Combatant Commanders in support of the National Security and Defense Strategies." From this mission, the Army abstracts two "core competencies": (1) to train and equip soldiers and grow leaders; and (2) to provide relevant and ready land power capability to the combatant commanders as part of the joint team.[36] As digital integration efforts continue, the adaptation of new technologies will impact these competencies, with subsequent effects on the Army as a profession, both internally and in relation to other professions in the wider national security system.

There are five significant ways that digital integration may change the Army profession. First, the real-time sensor-to-shooter architecture may eliminate the need for some command echelons by "flattening" combat organizations. Second, the basis for learning and professional development appears to be changing as simulations become a more important—perhaps even the principal—means for training soldiers. Third, there is potential for degraded decision-making ability among tactical leaders. Fourth, digital integration could facilitate top-down command centralization—a concept currently anathema to a generation of leaders that professes to disdain overcontrol and micromanagement. And finally, information saturation could change the Army's organizational methods for decision-making and, consequently, its perspective on professional knowledge. We will address these five effects in turn.

Eliminating Echelons

Battlefield awareness resulting from digital integration will create synergies that facilitate a reduction in organizational structure. As in the business community, the real-time information link among various echelons and between sensors and shooters may make it possible to flatten the Army's hierarchy by eliminating some command echelons.[37] Moreover, because information technology enhances the ability to reallocate combined arms assets quickly and more flexibly, operations may no longer require all capabilities at every echelon. Simultaneously, the link between sensors and shooters may blur the traditional distinction between operations and intelligence.

Because of these synergies, most proponents of streamlining Army organizational structure—including Douglas Macgregor and John Brinkerhoff—have argued that the division is too large and cumbersome to fit the needs of the digital battlefield. Instead, in their view the Army should adopt a brigade-sized combat group as its basic combined arms organization, and scale back or eliminate the divisional echelon.[38] This trend is already present in the Army's modularization initiative as evinced by the movement to brigade-sized Units of Action (UAs) and a proposed joint floating headquarters at the higher tactical level dubbed the Unit of Employment (UEx).[39] While a full discussion of eliminating command echelons is beyond the scope of this chapter, it is important to note some risks associated with flattening the hierarchy. First, eliminating command echelons implies that the span of control for

senior leaders necessarily increases, thus reducing their ability to supervise their subordinates. Possessing the informational wherewithal to dispense with echelons does not in itself give the higher commanders the additional time and opportunity required to interact personally with additional subordinate commands. While technological development may streamline processes and facilitate interaction in some instances, leaders will be hard-pressed to find a substitute for individually tailored professional interactions with subordinates, particularly mentor relationships.

Simulations

In previous eras, learning and professional development were products of real-world experience. Today much learning and development now occurs though simulations. The Army conceives training with simulations as a toolbox with three different tools: (1) live simulation, in which soldiers use assigned equipment with some form of simulator for weapons systems; (2) virtual simulation, in which soldiers and crews in simulators replicating combat vehicles "fight" as if they were in the field; and (3) constructive simulation, in which large-scale computer simulations replicate units at or above the battalion level.[40] While the Army has undoubtedly gained a great deal of real-world experience in stability operations and counterinsurgency in Iraq and Afghanistan, circumstances will probably necessitate continued use of simulation exercises in preparation for major combat operations.

Simulations create a number of training efficiencies. First, and most obviously, they can be cheaper and safer than training in the field. Without burning fuel, firing live ammunition, or imposing wear and tear on equipment, crews and units can learn skills necessary to fit their actions into a broader combat context. Second, they create training synergies by allowing units to train together over a network or via remote conferencing. For example, during the AWE in November 1997, digital simulation tools allowed the 4th Infantry Division at Ft. Hood to compete against the Army's World Class Opposing Force at Ft. Leavenworth.[41] Third, simulations can be used for soldiers to complete online components of a professional development course before attending it and thus reduce the time they are away from home station. Finally, simulations can help soldiers prepare for fielding new equipment in a more efficient manner.

But virtual and constructive simulations can also have adverse professional consequences. First, prior to the rise of computerized simulation training, professional learning was largely a product of direct real-world experiences. Real-world experiences favored a professional development system that valued seniority; the more senior the soldier, the more experiences he or she had. Mentors were prized because they passed on tricks of the trade and provided institutional memory.[42] Learning through simulation can forfeit the advantages of seniority and experience, in a sense leveling the learning base among junior and senior officers.

Second, training with simulations ignores both Murphy's Law and the human dimension of decision-making. Senior exercise controllers can develop proficiency in the training unit by stopping and starting the simulation process at will, perhaps correcting some mistakes while allowing others to go unaddressed. Simulation

exercises can assume away vehicles breaking down or getting mired in the mud, support elements arriving late, personnel becoming disoriented and lost, and all the other manifestations of Clausewitzian friction. Moreover, during simulation, soldiers get more rest and suffer less stress than they do training in the field. Simulations also disregard subordinate input or low morale. As Robert Bateman argues, even with increased digital integration there are two constants on the battlefield that will not change: fear and leadership.[43] Yet simulations-based training very rarely takes these into account.

Finally, most Army simulations are still founded on attrition-warfare models. Attrition models are part of the "old" way of waging war, as will be discussed further below. Although simulations create training efficiencies, these efficiencies are meaningless if the training portrays a battlefield environment that no longer exists. For example, as Robert Leonhard argues, these simulations "cannot, in their current state, simulate perpetual unreadiness or vulnerability to dislocation,"[44] both key issues for future warfare.

Degraded Decision-Making Ability

Digital integration could ultimately result in degraded capacity for decision-making among tactical leaders. If digital networking functions as promised, soldiers may come to depend on the icons presented on their computer screens. Those icons may come to be taken as the "true" battlefield, and thus the lifeline by which leaders make decisions and soldiers fight. Yet the digital picture will never fully lift the fog of war. One informed observer argues that the "best truth" we can expect from the digital picture is "80/80/50"—80 percent accuracy for friendly forces, 80 percent accuracy for the environment, and 50 percent accuracy for the enemy.[45] The majority of leaders today have experience in analog, pre-digital units and thus can operate in a non-digital environment. This may not be the case in two decades, however. What would happen if future leaders assumed a perfect common operating picture when it was not or if they had to operate in its absence?

There are three ways that digitization could degrade tactical decision-making. First, and most obviously, over-reliance on the computer screen could degrade traditional warfare skills. Basic skills like navigating and calling for fire could atrophy as the digital equipment automates navigation and target acquisition processes.[46] In a more general statement of this argument, Donn Parker tells us that today's information technologies create "noledge," which is "information that we do not know and that we may never know by study or experience."[47] For example, "noledge" would include the fire control formulas that are used to compute artillery fire sequences. The end user enters the relevant positional data into the computer, but never sees—and possibly never even learns or remembers—the formulas used to plot trajectories or loads. This is fine until the "noledge" disappears or becomes unavailable as a result of human programming error, enemy hacking, or computer malfunction.

Second, the digital technology could create indecisive leaders who become overwhelmed by data they have not been trained to assimilate. On the one hand, soldiers could become so dependent upon their screens that they lose the ability to infer

information from real-world environmental clues. Soldiers will need to compare conflicting inputs from the electronic sensors that created the digital picture with inputs from their own eyes and ears. When conflicting data arrive, soldiers may be unable to work out the cognitive dissonance between the screen "reality" and the sensory reality around them. The greater the dissonance, the slower and less confident soldiers may be in distinguishing reality from misrepresentation. One company commander in the 3rd Infantry Division during Operation Iraqi Freedom explained that he primarily used his FBCB2 system to verify his position within the friendly picture but relied intrinsically on his eyes and ears for situational awareness with regard to his unit. The officer's background in this instance was not in digitally integrated formations, and his unit had received only a partial issue of FBCB2, lacking a complete suite of applications.[48] However, reconciling sensory reality with the digital picture may become more difficult as the Army's leaders are increasingly immersed in formations with expanding digital capability.

On the other hand, having a digital picture may obscure awareness of other key inputs to decision-making, especially inputs that cannot be measured with electronic sensors in the digital system. In certain situations, like stability operations, other inputs such as political and environmental conditions could be more important than the data provided by the screen. Lester Grau argues that the most effective software tools for stability operations in Iraq, Afghanistan, and others like them would be those used by police departments for handling gang-related crime.[49] Grau also emphasizes the centrality of human intelligence and the degree of footwork required for collecting data. Gathering such data will be time and manpower intensive, and coding it risks divesting it of critical intangible characteristics, which are impossible to quantify or portray graphically.

Finally, inherent to reliance on a digital common operating picture is the risk of losing it. Jamming and hacking could have disastrous consequences for tactical leaders who have come to rely on digital technology to fight. Yet as more units rely on such technology, the more likely it will become a target for enemy disruption.[50] Currently a Russian-made GPS jamming device with an effective range of 150 miles can be purchased for $35,000 a copy.[51] Or worse, what would happen if the enemy entered the network and manipulated the digital picture? Tim Rosenberg argues that the best technique is often not to steal or destroy information, but to corrupt it because people generally defer to computer-generated information over human observation.[52] Furthermore, two other factors previously discussed—cognitive dissonance and atrophied skills (such as navigation and calling for fire)—reinforce such adverse effects.

Without overstating the threat, computer viruses, equipment failures, faulty software, enemy intrusion, casual hackers, data theft, and overloaded communications circuits all raise the possibility of having degraded digital capabilities. While the advanced warfighting experiments have simulated some disruption of friendly networks, most jamming and hacking has been innocuous so as not to interfere with new equipment testing.[53] As the Army's digitization effort continues, enemy information warfare simulation should be stepped up, so that leaders can practice making decisions in a degraded information environment.[54]

Top-Down Command Centralization

The Army's nine tenets of battle command include initiative, agility, depth, integration, versatility, flexibility, judgment, intuition, and empathy[55]—values embodied in what German military thinkers called *Auftragstaktik*, or tactics based on mission orders. In this method of command, only the outline and minimum goals of an effort are established in advance; the rest is left to subordinate leaders. *Executing mission orders requires a mindset and value system that support independent thinking, decisive action, and risk-taking.* Many theorists claim that mission orders are the key to successful maneuver-based operations in the fog of war. In other words, as the fog of war thickens, commanders at the lower echelons are better positioned to make decisions.

The digital battlefield could potentially disrupt such highly valued decentralization. Digitization increases the risk of top-down command, or what Martin van Creveld calls "command by direction."[56] As Thomas Czerwinski points out, the Army's digitization effort does indeed embody the first of van Creveld's "iron rules" for improving command performance—increase information processing capabilities and thus strengthen the "central directing organ." Czerwinski's analysis suggests, however, that the interventionist capabilities of command by direction, as made possible by the Army's digitization effort, risk being self-defeating.[57] The question becomes one of efficiency (from command by direction) versus effectiveness (from decentralized command).

Digital technologies adopted by the Army can encourage top-down centralization in two ways. First, although in theory everyone has the same digital picture of the battlefield at the same time, lower echelons cannot see the whole battlefield as well as higher echelons. This has been the rather prosaic result of the size of the computer screens in tanks, Bradley fighting vehicles, and Land Warrior headgear sets. Computer screens in individual weapon platforms are much smaller than those in command vehicles and thus can show only a small portion of the battlefield at a time. Moreover, even if they wanted to scroll around and discern the bigger picture, soldiers in these platforms (and dismounted soldiers) have less time for interfacing with their digital screens than commanders and staff officers.[58] Consequently, higher echelon commanders have a better picture of the total digital battlefield than their subordinates and may choose to intervene to capitalize on the opportunities that such digital information provides. With increased digital integration, a perception may develop that the command post is the best place from which to command, thus tying the commander to his or her C2 vehicle. Jim Dunivan argues that Army leaders flirted with centralized command once before with the use of C2 helicopters during Vietnam. The "results were erosion of trust between subordinates and leaders, and a weakening of the chain of command" as well as "a tragic decline in junior officers' and noncommissioned officers' willingness to initiate action without orders."[59]

The second effect flows from the first: with a supposedly better picture of the battlefield, commanders risk micromanaging their subordinates, discouraging independent thought and initiative, while training them to follow detailed orders. Army Col. Rick Lynch, who commanded the EXFOR from 1997 to 1999, warns future leaders:

> In a setting where abundant amounts of information are available, leaders of the U.S. Army must be empowering and decentralized. As a commander of a digital brigade combat team, I had visibility on the location of each and every vehicle in the 1BCT. For example, I could focus on the actions of D32—the wingman tank of the 3rd platoon, Delta Company, 3-66 Armor. . . . But I chose not to do that. I set the filters on my digital equipment to show me company level icons. . . . However, there are individuals who, given the opportunity to micromanage their units, will do so. This will have a disastrous effect on subordinate leadership.[60]

The digital battlefield thus risks creating an overly-centralized organization, where the commander remains in his C2 vehicle watching the screen, merely moving his subordinates about the battlefield. The question then becomes: how does such an organization grow officers to direct the battle via the digital picture, if these same officers spend their whole junior careers responding to chess moves by the incumbent digital warrior chief?

There is a tension between the abstract knowledge of the higher echelon commander—embodied in the digital common operating picture—and the particular knowledge of the lower echelon commander. Professions have confronted this tension forever, and for good reason: professions need both types of knowledge—abstract and particular—for proper diagnoses and treatment. Top-down command centralization, enabled by digital integration, risks missing the proper professional balance. What seems most *efficient* from the perspective of fighting the battle may not be what is most *effective* from the perspective of those fighting the tactical engagements, nor from the perspective of building a profession.

Information Saturation

While over-centralization of battle command is one potential by-product of digital integration, a second and countervailing effect could be that of information saturation. As leaders come to rely on the common operating picture, their screens may display data, not processed information. A commander who bypasses the staff that was supposed to filter and analyze the data will now have to undertake the task himself. This effort actually increases the commander's cognitive workload, because he or she must perform both analytical and decision-making tasks.[61]

A system that produces mountains of unassimilated data could be as overwhelming as an enemy force. Maj. Geoff Norman, a participant in the Army's Project Warrior Program, served as an observer-controller during multiple digital exercises at the National Training Center. He relates that leaders of digitally networked units were very careful to avoid "data saturation"—a situation in which the leader, submerged in raw intelligence, struggles to synthesize it into useful knowledge.[62] In their training, they found that networked digital systems could easily overwhelm them with data yet failed to provide the necessary intelligence for decision-making. Such problems are evident in all units. During one division-level simulation exercise in 2002, a division commander told his personnel staff that an artillery strike on the artillery's headquarters area that occurs in the middle of a battle killing X number of personnel was not nearly as significant as the fact that the

strike had killed the majority of his experienced radar signal analysts—a critical group of soldiers often in short supply within the division. He needed them to analyze the data and provide him with critical knowledge.[63] On a digitally integrated battlefield, the variety and volume of information will increase exponentially, and such problems, left unresolved, may only grow worse.

Ultimately leaders within the Army may come to rely on "decision enablers." Indeed, the current literature points to technology-assisted decision-making. The transformation roadmap addresses "decision aides" as one enabler to help translate "information superiority" into "decision superiority."[64] Such aids might consist of software tools that facilitated information management by sorting and collating data to determine such things as event correlation and conduct predictive analysis. However, the use of such tools has two adverse ramifications. First, as discussed previously, not all data are appropriate for numerical or graphical expression; shochorning it into digital format thus risks stripping it of important intangible dimensions. To process such data digitally compounds a potential data-set bias that existed even before the operator coded it. Such a compounded bias could degrade decision-making and compromise effectiveness at the operational and tactical levels. Second, decision-making tools represent a more advanced degree of "noledge." While the inability to comprehend the ballistic solution for a tank or artillery projectile is one level of ignorance, lack of familiarity with limitations of software models and data management devices is a problem on an altogether different plane.

In sum, we find five possible ways digital integration may alter the Army profession— elimination of echelons, thereby flattening organizations; increased emphasis on skills harvested through simulations; atrophy of traditional warfare skills; increased centralization of command; and creation of a data-saturated environment. All of these developments pose potentially damaging side-effects on the profession of arms. More importantly, they will not act independently upon the profession but will work in synergy, reinforcing one another with non-linear effects. These forces will likely be present in varying degrees, producing uneven effects inside the command hierarchy. Furthermore, the Army has stated that its battle command systems are the bridge between the current force and the Future Force.[65] If digital integration is to be the thread of operational continuity across the next two decades, such effects may be experienced not as a radical cultural shift but as gradual changes over time. It may thus be difficult to identify the undesired professional by-products. Members of the profession should therefore maintain a heightened sensitivity to such change. Evaluations of systems, organizations, and doctrine should not only assess quantifiable objectives, but should seek to understand how those objectives are achieved and what ripple effects result.

Implications of Digitization within the Wider Professional System of Traditional Warfare

This section addresses change in the Army's professional jurisdiction within the system of professions that participate in traditional conflict—what is currently termed

major combat operations. There are three ways that digital integration could affect the wider system of traditional warfare. First, digital networking will add a new player to the professional system—civilian contractors. Second, the development of new joint operating concepts and transformational plans implies that digital integration is not exclusively an Army jurisdiction, but that the Army's developments are actually nested in a greater transformation taking place. At the same time, the Army may struggle to achieve interoperability both internally and across its spectrum of allies. Finally, the ongoing development of new operational concepts indicates that some traditional jurisdictional tasks are in danger of being poached while the Army struggles to meet professional obligations within others.

Reliance on Civilian Contractors

Even under the best conditions, information technology is sensitive and complex; difficulties increase enormously during tactical employment in a field environment. The equipment comprising the digital battlefield includes computers, radios, satellite terminals, switches, and software—all of it potentially faulty, weak, or insecure. This added complexity and fragility—requiring a special process of diagnosis and treatment—introduces a new kind of battlefield professional: the civilian contractor.

Information technology has created new jurisdictional tasks that the Army cannot itself fulfill, thus civilian contractors are becoming indispensable on the digital battlefield.[66] The digital Army relies on contractors to train and equip units and maintain systems. For example, building the Tactical Internet required integrating the efforts of 48 different contractor vendors. During the Task Force XXI AWE in March 1997, 1,200 contractors from these 48 vendors were in the field at the NTC with the EXFOR, providing advice, maintenance, and technical support.[67] Such support requirements are projected to increase as the number of digital systems fielded to Army units rises.

At least two issues warrant consideration within this trend of ever-greater civilian involvement. First, civilianizing military functions raises the issues of whether we will need civilians in times of crisis and whether we can guarantee reliable support .[68] For example, one company commander from the 3rd Infantry Division explained that his task force received a limited issue of FBCB2 under the Rapid Fielding Initiative prior to the invasion of Iraq. During major combat operations, the division had one contractor and a very limited ability to perform basic maintenance on the systems, amounting to little more than removing the hard drive to install operational graphics. He estimated that approximately 50 percent of the systems had ceased to function within the first two months of conflict.[69] While one must be careful not to draw too many conclusions from such a limited test, such indications certainly raise questions regarding the reliability of equipment and the maintenance system. The increasingly clouded issue of combatant/noncombatant distinction that is critical to the law of armed conflict becomes a second important issue rising from the first. Operating high-tech systems moves civilian contractors from traditional support functions to what are arguably hostile activities, increasing

the risk they will become characterized as "unlawful combatants" under international law.[70] To prevent such characterization, some authorities suggest establishing a new type of part-time military, lacking "much of the military regimen" in the way of dress and physical fitness standards.[71] Although an adjunct military structure might create the necessary legal framework to compel civilians to remain on the job during crisis, it would not fully replicate the professional ethics, unit cohesion, and training of the Army profession.

Digitization and Joint Interdependence

In a future conventional conflict, the Army will fight as part of a joint or coalition force. Operations Desert Storm, Enduring Freedom, and Iraqi Freedom bear witness to the truth of these propositions. Digital integration and increased joint interoperability open the Army to change in its jurisdictional tasks on the one hand, and strain its ability to provide collaborative C2 structures on the other. What are the ramifications of digital integration for the Army in the context of this increasingly interdependent system of professions?

First, the prospect of joint integration through a network of systems poses new possibilities not only for the Army, but for its sister services. Such thorough connectivity means services must develop common protocols, operating procedures, and technical standards. Currently, two systems, the Joint Tactical Radio System and Warfighter Internet-Tactical (WIN-T), form the command and control backbone of the Army's FCS, serving as the Army's tactical "plug" to the future Global Information Grid.[72] Thus the Army will be one service relying on a very complex global structure under civilian and/or joint management. Furthermore, interoperability among the armed services will require not just adhering to the same technical standards, it will require common doctrine and procedures in network management. By definition, common protocols and standards mean that network-centric combat is not a U.S. Army-exclusive jurisdiction. And while resulting synergies promise to increase military capability dramatically, the Army will not be the sole proprietor of the digital battlefield. If all services have claim to operations intertwined in the joint domain, does this not create a conduit for them to usurp what may traditionally be exclusively Army jurisdictions? For example, Army generals have served as the combatant commanders in all the conflicts previously cited; however, might a more integrated joint force be commanded by flag officers from its sister services who have different perspectives on the employment of the joint force?

Second, the execution of coalition operations could become much more difficult because communications must be standardized across the battlefield. Digitally integrated forces must be able to accommodate least-common-denominator communication systems—what the Army calls analog (non-digital) systems. Nora Bensahel points out that coalition partners' capabilities can run the gamut: from those that have incorporated information-based technology to others who fight on horseback, like the Northern Alliance forces in Afghanistan. Furthermore, political sensitivities sometimes require that coalition partners have an entire national

chain of command parallel to that of the joint/coalition force.[73] Her prediction is that Army transformation will only exacerbate this problem, resulting in increased requirements for liaison teams and complications that arise from sharing sensitive information. For example, the 2nd U.S. Infantry Division (currently an analog unit) serves as the headquarters for a combined force of American and Korean artillery units. Such a mission requires multiple cells of liaison teams within the division and artillery brigades' headquarters for coordinating operations with Korean artillery elements across an Army sector. The coalition forces attain this level of interoperability by leveraging a 50-year alliance between the two armies with extremely similar operational doctrines, and with augmentees from the Korean Army who live with American units permanently.[74] As Army capabilities expand and coalitions fracture and reform, will the U.S Army have both the trust and capacity to provide such specialized skills and technology to facilitate interoperability with ever-changing partners?

However, the question of digital and analog interoperability is much broader than merely communication among units. Because of the vast differences in command and control capabilities, digital and analog units cannot seamlessly integrate and respond to orders in an equivalent manner. A digital commander can see the battlefield and thus decides where and how to attack the enemy from a position of advantage before the enemy discovers his unit. In contrast, an analog unit must still go forth and find the enemy physically. This has profound importance for how the forces are employed in battle.

Furthermore, although the Army aggressively seeks a baseline level of digitization throughout the current force based upon the present Army Battle Command System,[75] there may be significant problems with the digital integration of reserve units. These units face training challenges that active units do not—they train at lower echelons, less frequently, and for shorter periods of time. These training disadvantages become a critical issue because digital skills are very perishable.[76] As a result, the National Guard and Army Reserve may not be effective in networked warfare.

Recognizing these differences, David Fautua has argued against assigning *any* digitization-dependent role to the Guard and Reserve. Because of the inherent speed that digitization creates, a digitized force will be designed to conduct "burst operations" as opposed to sustained campaigns.[77] Yet burst operations may not allow for mobilization, in which case the contribution of reserve forces would be less. Fautua argues that the Army Reserve and National Guard should develop competencies in "shaping" and peace operations missions, because these missions play to their strengths: small-unit cohesion, a comparative inclination toward expeditionary-type missions, and fewer manpower-intensive training requirements.[78] Current Army literature echoes this sentiment to some degree. The Transformation Roadmap calls for a restructuring and reshaping of assets between the active and reserve component, whereby the active force will "typically respond in the first 15 days of an operation," while reserves will "provide strategic depth to reinforce the warfight and support and stability operations (SASO), as well as lead our efforts to protect the homeland."[79]

Exploiting the Digital Advantage: Future Concepts

The Army has attempted to incorporate new technologies into operational concepts for nearly a decade. It has achieved a great deal of success with precision fires, but struggled to leverage information technologies to facilitate changes in maneuver warfare. This imbalance threatens the Army's relevance in major combat operations in general. The Army may thus find its jurisdiction over fire support usurped on the one hand and its jurisdictional claim to maneuver warfare unfulfilled on the other. This section will explore the ramifications of future concepts with regard to the system of traditional warfare.

The Army's initial experimentation with networked fire support achieved significant success. During the AWEs, digitized spot reports reached the fire support battalion in five minutes, as opposed to nine minutes under conventional communications means, and needed repeating only 4 percent of the time, whereas one-third of conventional messages needed repeating. The conclusion was that digitized spot reports save time and can rapidly synchronize direct and indirect fires:[80]

> As a result, both experiments revealed an enormous increase in the logistical demand for more ammunition. Suddenly able to perceive, track, and identify literally thousands of targets, Experimental Force commanders reclined in their natural tendency toward [maneuver] caution and long-range fires. Information Age warfare degenerated into a turkey shoot. . . . Army officials pushed beyond rational limitations on available ammunition and allowed Experimental Forces the freedom to blast the enemy into nonexistence at extreme ranges to their hearts' content. Realistic limitations on transportation, ammunition, and the ability to fire into inhabited areas were tacitly ignored. The simulated enemy enthusiastically and obediently cooperated with the cyber-carnage, stupidly charging into terrain that was easy to target, unit after unit, never learning and never adapting to fires like a real enemy would.[81]

As James Blackwell observes in the present anthology (see Chapter 14), the Army's RMA doctrine seems to be acquiescing in the notion that the best way to destroy the enemy is through long-range precision fires—fires throughout the depth of the battlefield. Thus, one of the key results of Army digitization has been to increase the power and role of long-range fires.

While still in its infancy, it seems that the Army has begun to leverage information technologies to facilitate maneuver as well. The reconnaissance, surveillance, targeting, and acquisition squadron (RSTA) within the Stryker Brigade Combat Team (SBCT) reflects a shift in organization structure with the intent to capitalize upon these new technologies. The reconnaissance squadron, traditionally a division-level asset, is now organic to the SBCT (which has the one squadron and three Stryker infantry battalions). At the same time, the squadron has been equipped with a robust suite of C4I systems to facilitate parallel planning with the brigade headquarters. Thus equipped the squadron is responsible for "reconnaissance pull—providing information (and possibly conducting shaping operations) on threat forces to allow the SBCT elements to maneuver out of contact and gain positional advantage."[82] The Army's current modularization initiative will eventually restructure brigade combat teams to give each of them a

reconnaissance squadron with two battalions, thus dedicating one third of the maneuver force to reconnaissance and surveillance by 2008. While current authorizations in these units are still provisional, it certainly appears that the Army is attempting to leverage C4ISR capabilities across the entire force to facilitate a new method of maneuver.

Within the system of professions, two issues arise. First, land power through fire-supported maneuver, not precision strike, is arguably the Army's core jurisdictional task. However, the Army has used its digital capability to expand its jurisdiction deeper into the battlefield, to take deep fire missions away from the Air Force and the Navy. Yet, it may prove more operationally efficient for those services to provide such long-range fires. Given the U.S. proclivity to use military force in the most restrained and surgical manner possible, the continued attractiveness of air power alone bodes poorly for the Army. Second, in an attempt to balance firepower with maneuver on the digital battlefield, the Army has created the RSTA squadron to capitalize on new technologies and facilitate "maneuver out of contact" in the short term.[83] In the long term, the Army is developing the Future Combat System with this specific doctrinal concept in mind. However, recent studies indicate that system development relies on several immature technologies that in turn depend upon an unproven C2 backbone.[84] Should the system not meet expectations, the Army may find its fire support capability irrelevant and its capacity for maneuver inadequate.

In sum, digital integration has given rise to a new professional within the military system of professions—the civilian contractor. At the same time it promises to integrate the Army into the joint community from "space to the mud." These two developments have opened to poaching Army professional tasks once within the Army's jurisdictions, and at the same time have placed greater emphasis on the Army's need to bridge the capabilities of the Future Force with reserve and coalition forces. Furthermore, the operational concepts currently at the heart of the Future Force's core jurisdiction, maneuver warfare, remain in their infancy with years of testing and development ahead.

Implications of Digitization within the Broadest Professional System of National Security

Thus far, we have examined the Army's digital transformation efforts through the Army's preferred lens. The Army's methods for digital integration express its perspective of its professional jurisdiction, and to date Army efforts have focused on the high end of the conflict spectrum, using technology to facilitate operational concepts that fall under the auspices of major combat operations (MCO).[85] Yet the professional system of national security encompasses much more than MCO; indeed both joint and Army documents advocate "full spectrum dominance." This section explores the Army's digital integration efforts within this wider professional system, arguing that the Army may ultimately leave itself inadequately prepared for future national security requirements.

The Wider Conflict Spectrum

The Army's digitization efforts are not a new way for the Army to do business, but rather a new way of doing existing business better. Its current concept of the future digital battlefield envisions improved ability to conduct fire-supported maneuver as the basis of its operational art. Indeed the Army's Transformation Roadmap acknowledges MCO as a primary driver in transformation, declaring the ability to conduct major combat operations the cornerstone of national power: "Major Combat Operations are the ultimate military coin of the realm for a global power." "The ability to conduct MCO," it continues, "underscores the credibility of the Joint Force across the full spectrum of operations, fundamentally influencing the success of other operations."[86] As the current struggle in Iraq indicates, however, successful conduct of MCO does not imply the successful execution of stability operations.[87]

Over the last decade, nontraditional adversaries and asymmetric forms of conflict challenge assumptions underpinning the DoD and Army visions of the future battlefield. For example, the National Intelligence Council forecasts that, through 2015, the most common threats to stability around the world will be internal conflicts, transnational terrorism, and weapons of mass destruction.[88] The 11 September 2001 terrorist attacks on the Pentagon and World Trade Center, which gave birth to the current mantra—Global War on Terrorism—lend weight to this prediction. Potential future adversaries will acknowledge U.S. military superiority in major combat operations and simply avoid such conflict, seeking instead to exploit vulnerabilities elsewhere:

> This perception among present and potential adversaries will continue to generate the pursuit of asymmetric capabilities against U.S. forces and interests abroad as well as the territory of the United States. U.S. opponents—state and such non-state actors as drug lords, terrorists, and foreign insurgents—will not want to engage the U.S. military on its terms. They will choose instead political and military strategies designed to dissuade the United States from using force, or, if the United States does use force, to exhaust American will, circumvent or minimize U.S. strengths, and exploit perceived U.S. weaknesses. Asymmetric challenges can arise across the spectrum of conflict that will confront U.S. forces in a theater of operations or on U.S. soil.[89]

Furthermore, dominance of precision fires may force enemy combatants into complex terrain such as we have observed in the mountains of Afghanistan and neighborhoods of Baghdad, Najaf, and Fallujah in Iraq. Such a strategy increases the inherent risk of higher casualties and collateral damage, degrades U.S. military advantages, and creates an intensive ground force manpower requirement.[90] Recent experiences in Iraq validate this argument. Capt. Dave Hibner explained that on the march to Baghdad, two massed armor formations attempted to confront his task force, but the Joint Strategic Targeting and Reconnaissance System (JSTARS) identified them within 30 minutes of initial movement and every single vehicle was destroyed by air support: "We forced them [Iraqi combatants] into the cities because they realized any other way of trying to fight us was futile." He further observed that "what really hurt the Iraqis was poor but organized defenses because it made

identification [i.e. distinguishing enemy from noncombatant] and destruction of the enemy easier."[91] By compelling American forces to operate in a physically and politically restricted environment, adversaries can limit U.S. technological advantages. Lt. Col. Jim Rainey described a 15-day urban battle in the town of Najaf fighting "through a 100,000 [inhabitant] urban area, 2 1/2 kilometers by 3 kilometers, against a pretty committed enemy" to surround an enemy strongpoint.[92] Given that half the world's population today lives in urban areas—and by 2025 that figure is expected to reach 85 percent—future scenarios similar to these are hardly unlikely.[93]

While transformation efforts have attempted to address the full spectrum of operations to some degree, the application of digital technology to stability operations remains questionable. For example, Land Warrior, the prototype system designed to integrate the individual soldier into the tactical internet, weighed more than 90 pounds, in addition to the food, ammunition, and other gear that a dismounted infantryman carries.[94] One could never reasonably employ such a system in combat; as Daniel Bolger says: "Imagine carrying another guy on your back forever and you get the idea. You cannot fight like that no matter how much physical training you do."[95] The goal for the next model is a "fightable" weight of 50 pounds, still a significant load for a dismounted soldier to bear in a tactical engagement. Furthermore project outcomes remain questionable as development costs rise, footnoted by one review panel as a generally "neglected variable."[96] Another factor to consider is that digitally integrating dismounted soldiers may have counterproductive effects. For example, sniper weapons have been developed to focus on the frequencies transmitted by the Land Warrior system, potentially making the sniper's job easier—the sniper would not have to see a body but merely shoot at the source of an electromagnetic transmission at a particular frequency.[97]

However, more significant than the integration of digital hardware and software is the assumption that the Army's digital battle command system will be equally suitable across the entire spectrum of operations. As the Army Transformation Roadmap states, "battle command capabilities required for MCO [major combat operations] are applicable to SO [stability operations], and, as with MCO, battle command is the transformational underpinning for success in future stability operations." At the same time, the Army acknowledges that "the C2, communications, and ISR challenges of SO may be more complex than those encountered in MCO, requiring unique mixes of sensor and communications suites, HUMINT, CI, and special attention to information fusion enablers for urban environments."[98] The problem with such a system is not just questionable software capabilities but also unreliable system inputs. To illustrate, Maj. Odie Sheffield related his experience hiring translators for his unit in Baghdad. The unit parked a truck with a loudspeaker in the downtown area and broadcasted in English the message, "If you understand this, come see me." One Iraqi eventually responded and returned with over 50 English speakers the next day.[99] In the future, information garnered through such individuals would pass from an observer/informant through the translator—perhaps of questionable credibility—to a U.S. Soldier who either passes it along or enters it into the digital data stream. The ability of any device to capture intangible facets of various pieces of intelligence and correct human error

would be astounding. Furthermore processing such a "data byte" with others compounds such problems, reinforcing the issues of data-set bias and advanced levels of "noledge."

The Army's digital integration efforts appear to focus on missions at the high end of the conflict spectrum, and their applicability to operations other than major combat operations seems questionable. In this approach, the Army may be expressing its preferred view of its professional jurisdiction—conventional warfare in open terrain. Yet if the Army does not focus on military operations in other parts of the conflict spectrum, it may find itself irrelevant in one sense and incapable in the other. Recent events indicate that policy-makers inside DoD may be very concerned about the direction of the department's transformation; the Secretary of Defense is currently reviewing concept proposals that place less emphasis on platforms and more on personnel and intelligence.[100]

The Media Threat to Information Dominance

As discussed previously, the Future Force's promised capability enhancements depend largely on information superiority. However, challenges to joint and Army information superiority will take forms other than enemy actions and counteractions. The news media are exploiting information technology as well, and the consequent developments in reporting practices could affect security. In the last decade, civilian technologies have made a substantial qualitative advance, and the military's ability to secure the information environment during conflict has eroded significantly.

Like the U.S. military, the news media drew lessons from the first Gulf War. During the Operations Desert Shield/Desert Storm, journalists had to take their stories to Allied Forward Transmission Units (FTUs), which had satellite links with London and Washington. In the opinion of many journalists, military dispatchers delayed physical transport of stories to the FTUs and reviewed all stories before they were released for transmission.[101] After the war, journalists vowed never again to be prisoner to such military "censorship" and have capitalized on technology to become as independent from the military as possible.

A decade ago, mobile uplinks required a flatbed truck and came with a crew of five journalists. Today, a two-person journalist team can go to war with a digital camera, a wideband cellular phone to uplink to a satellite, and a laptop computer to coordinate the transmission. The equipment fits into two cases and weighs about 100 pounds. "Live from the battlefield" will no longer be primitive or cumbersome—it will be routine.[102] For example, a Thrane & Thrane satellite phone, which can be set up anywhere in 30 seconds and retails for about $3,000, allows "voice and data transmission from any place on the planet outside the Polar zones."[103] Advent Communications offers an International Mobile Satellite (INMARSAT) system that is small enough to be handled by one person.[104] Indeed, Lara Logan, a reporter for a British morning news program on assignment in Afghanistan, used a similar INMARSAT system to broadcast live from the frontlines in Afghanistan.[105] And Aerobureau of McLean, Virginia, can already deploy a self-sustaining flying newsroom. The aircraft is equipped not only with multiple video, audio, and data communications links, but also gyro-stabilized cameras, side- and forward-looking radars, and its own pair of camera-equipped remotely piloted vehicles.[106]

With the rise of such technology, reporters can move anywhere in the world and provide live coverage with a minimal support footprint, transmitting digital video footage at their discretion. In one report, Lara Logan sent a video transmission of U.S. carpet bombing prior to the Pentagon's admission of such activity. In another, she describes listening to Taliban transmissions on a Northern Alliance radio system.[107] Real-time public revelations of such transmissions could potentially compromise various aspects of military operations. Stephen Jukes describes a similar instance:

> Ismael Khan, a Northern Alliance commander in Afghanistan, was weighing his military options in a fight with the Taliban outside the city of Herat when his satellite phone rang. The voice on the other end was that of Reuters reporter Andrew Marshall, who, within minutes, had relayed around the world news that the city was under siege.[108]

And, while most news media cannot own a high-resolution satellite themselves, they can purchase satellite products on the open market, thus presenting a threat of a different dimension. Imagery from these satellites is not prohibitively expensive. For example, SpaceImaging, Inc. offers "news pix" for about $500 each, and it will re-task satellite coverage for about $3,000.[109] Most new commercial companies have focused their efforts on supplying relatively high-resolution imagery (objects five meters across or even less) of visible and infrared data.[110] Since five-meter resolution is enough to identify buildings and large weapons accurately, these satellites create a profoundly intrusive capability for prying news organizations and other paying customers—including potential adversaries.[111] Moreover, advanced software, along with a cadre of expert ex-military consultants, will enable them to fuse the raw inputs into usable, real-time or near real-time reportage. In other words, the news media will become the "poor man's intelligence service."

The most recent military response to potentially damaging battlefield reportage has been the embedding of reporters with units prior to and during operations in Afghanistan and Iraq. While many senior military officials viewed this program as a success, the results evoked much discussion in media circles. In order to rely less on military support, journalists have increasingly come to advocate a more professional approach to combat reporting, to include acquiring a more thorough knowledge of the battlefield on the part of correspondents. Peter Copeland states that "the press should do a better job of training people for the next conflict and reduce its dependency on the military."[112] Mark Mazzetti argues that reporters need improved "situational awareness" to better analyze developments within military campaigns. While not intrinsically harmful, developing such analytical acumen enhances prospects for the reporter to become an inadvertent intelligence source. At the same time, many reporters also advocate the presence of "unilaterals" or "freelancers" on the battlefield. [113] These are independent reporters who often go where the sanctioned journalists of the new media conglomerates cannot. There is some speculation that large media organizations actually encourage freelancing by creating a

market for footage requiring risks that their own reporters are not allowed to take.[114] Regardless, the market for an increasing number of highly skilled, well-equipped freelance journalists appears to exist, potentially threatening military information dominance.

In short, the Army's goal of seeking information dominance on the future battlefield is profoundly unrealistic. The proliferation of inexpensive compact global communications equipment, affordable satellite imagery products, and professionally savvy combat journalists translate into increasingly mobile, independent, penetrating reporters who can report from every corner of the battlefield. Charles Dunlap rightly states that modern militaries must "focus on developing doctrine and strategies for operating in an environment of information transparency or information parity."[115] At a minimum, the Army needs to recognize that there will be nontraditional professions competing for information on the future battlefield, and it must be ready to operate in an environment lacking the information dominance it has heretofore assumed it would have.

Strategic Information Warfare

Finally, the term "information warfare" (IW) is increasingly used to encompass a broader set of information-age warfare concepts. These emerging concepts are directly tied to the prospect that the ongoing evolution of cyberspace—the global information infrastructure—will create new opportunities and vulnerabilities. In this sense, information warfare is much broader than electronic warfare or anti-C2 network warfare. Instead, in future conflicts, battlefield C4I vulnerabilities may be less lucrative targets than vulnerabilities within national infrastructure.[116] The essential U.S infrastructures—those "whose incapacity or destruction would have a debilitating impact on our defense or economic security"—include systems like the public telephone network, securities and commodities exchanges, water-supply systems, utility networks, air transportation, highways, and the Internet.[117]

Today, strategic IW remains largely theoretical. However, the 11 September 2001 attacks on the World Trade Center and the Pentagon, which temporarily crippled air travel and financial markets, could be characterized as anti-infrastructure warfare. Furthermore, the electrical grid blackout in September 2003 that left the northeastern United States without power simply illustrates the effects an IW "cyberstrike" might hope to achieve. If such concepts reach fruition, state and non-state actors with the capacity will probably attempt them because of their potentially high level of effectiveness married with low risks and entry costs. When it becomes possible to wage war with a handful of computers, a new group of organizations will compete for this professional jurisdiction—military services, government agencies, security divisions of transnational corporations, and private security firms. The Army must stay abreast of these emerging forms of warfare—and of the competitors that such warfare will bring into the professional system of national security.

In summary, the Army's choice to employ digital networks to achieve conventional ends tacitly expresses its perspective of its expert knowledge and professional jurisdiction. These efforts have focused on the high end of the conflict spectrum—major combat operations. Yet the professional system of national security encompasses much more than conventional warfare. Evolving asymmetric threats and operations in Iraq and Afghanistan suggest that conventional warfare, while the "cornerstone" of military credibility, may not be the most prevalent operational demand. Moreover, concept developers and senior military leaders should question assumptions regarding information dominance. The findings in this section indicate that the Army may be unprepared for the future, and by consciously or unconsciously ignoring nontraditional operations, the Army risks being caught unaware and disregarded.

Conclusion

How the Army has chosen to adopt new information technologies says much about its future professional jurisdiction. As the forgoing analysis has shown, information technologies from the contemporary RMA are both a subjective and an objective force for jurisdictional change. This chapter has examined the implications of Army digitization in light of three concentric visions of the professional system—within the Army profession itself, within the wider professional system of traditional warfare, and within the widest professional system of national security. The analysis has suggested that although the Army has been capitalizing on technological opportunities to enhance its conventional war-fighting capability, it seems unwilling or unable to address the wider threats that such technological change could bring to its traditional jurisdiction.

Digital integration has the potential to generate a number of undesirable trends within the profession itself. Each of these impulses may be felt in varying degrees at different echelons within the command hierarchy. While adopting a pessimistic view of change would be detrimental to the long-term health of the profession, a healthy skepticism of the information technology "miracle" and its alleged benefits for the profession is advisable. Furthermore a reliance on battle command capabilities (products of digitally networked systems) as the bridge between the current force and Future Force will make it difficult to identify gradual, undesirable shifts in professional competence and culture that occur unevenly across the profession over a significant period. Thus in development and experimentation Army leaders must be sensitive to the potential outcomes and ask questions that address not only ends—victory and peace—but the means by which they were achieved. In a sense they must rethink the definition of failure.

In the professional system of traditional warfare, the introduction and expansion of digital networks into the joint realm has exposed the Army to jurisdictional poaching by contractors and sister services. Furthermore, two of the Army's core conceptual methods for capitalizing on digital networks—precision fires and maneuver out of contact—may be unbundled, leaving the Army less able to compete in its traditional jurisdiction of major combat operations. Networked precision fires are subject to jurisdictional usurpation, as joint assets may increasingly deliver them throughout the battlefield. And maneuver out of contact remains in its infancy with no clear indications for long-term success.

Furthermore, at the national security level, the assumption of information dominance that underlies DoD joint operating concepts remains questionable, especially in regard to ground forces that may have the most to lose in the realm of information competition. Additionally, the increase of nontraditional threats and potential for future conflict in complex terrain indicate that the Army's focus on major combat operations may leave it less prepared to meet national security requirements for urban operations that demand less conventional and more nonstandard capabilities.

This chapter does not argue that transformation is to be resisted; on the contrary, transformation is like the rising sun—it's going to happen and can both blister and pleasure. Whether its influences are malign or benign will be largely determined by the recipient. Thus, there are good reasons for the Army to pause and evaluate its current position in relation to other services, its current operations, and future projections. Of course, uncertainty will abound; it is impossible to identify and extrapolate the effects of every influence in the process. Not only the direction, but the pace of transformation is in question. Perhaps it is best, then, to heed the advice of Michael O'Hanlon when discussing the 2001 Quadrennial Defense Review:

> RMA proponents are certainly right to believe that a successful military must always be changing. But the post-World War II U.S. military has already taken that adage to heart. The status quo in defense circles does not mean standing still. It means taking a balanced approach to modernization that has served the country remarkably well for decades. Indeed, it brought about the very technologies displayed in *Desert Storm* that have given rise to the belief that an RMA may be under way. It is not clear that we need to accelerate the pace of innovation now.[118]

Notes

1. Steve J. Mains, "Adapting Doctrine to Knowledge-Based Warfare," *Military Review* 77 (March-April 1997), available from http://www-cgsc.army.mil/milrev/english.marapr97/mains.html; Internet; accessed 6 March 2001.
2. Briefing by Chris Lamb, Acting Deputy Assistant Secretary of Defense for Requirements, Plans, and Counterproliferation Policy, 14 December 2000 at Georgetown University.
3. Gen. Peter J. Schoomaker, *2003 United States Army Transformation Roadmap*, chap. 1, p. 7, available at http://www.army.mil/2003TransformationRoadmap/; Internet; accessed 27 September 2004.
4. Donald H. Rumsfeld, *Joint Operations Concepts, November 2003*, 15, available at http://www.dtic.mil/jointvision/secdef_approved_jopsc.doc; Internet; accessed 27 September 2004. DoD currently believes that future battle command systems built around new information technologies will help to minimize the fog of war. Clausewitz explained this conceptual fog: "War is the realm of uncertainty; three quarters of the factors on which action in war are based are wrapped in a fog of greater or lesser uncertainty." See Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1976), 101. The Army has experimented heavily with information technology-enabled tactical battle command systems since 1994. The hypothesis the Army tested during its digital experiments was as follows: "If information age battle command capabilities and connectivity exist across all battle operating systems and functions, then enhancements in lethality, survivability, and tempo will be achieved." See Ron Gregory, "Army XXI: Issues Associated with Development of Doctrine and TTP [Tactics, Techniques, and Procedures] for the Digitized Force," available at http://www-tradoc.army.mil/jadd/adxxi2/sld001.html; Internet; accessed 20 October 2000.
5. Andrew Abbott, *The System of Professions: An Essay on the Division of Expert Labor* (Chicago, IL: University of Chicago Press, 1988), 8.
6. Abbott, chaps. 2-4.
7. For a good introduction to the contemporary RMA debate, see Andrew Krepinevich, "From Cavalry to Computer," *The National Interest*, no. 37 (Fall 1994): 30-43; and Eliot A. Cohen, "The Revolution in Military Affairs," *Foreign Affairs* 75 (March-April 1996): 20-36.
8. William A. Owens, *Lifting the Fog of War* (New York: Farrar, Strauss, Cirouk, 2000), 118. See also Owens, "The Emerging US System-of-Systems," Institute for National Strategic Studies, *Strategic Forum*, no. 63 (February 1996); and Joseph Nye, Jr., and William A. Owens, "America's Information Edge," *Foreign Affairs* 75 (March/April 1996).
9. Michael Mazarr, *The Revolution in Military Affairs: A Framework for Defense Planning* (Carlisle Barracks, PA: U.S. Army War College, Strategic Studies Institute, 10 June 1994), 16-21.
10. Steven Metz and James Kievit, *Strategy and the Revolution in Military Affairs: From Theory to Policy* (Carlisle Barracks, PA: U.S. Army War College, Strategic Studies Institute, 10 June 1994), 5.
11. Robert R. Leonhard, "A Culture of Velocity," in *Digital War: A View from the Front Lines*, ed. Robert L. Bateman (San Francisco, CA: Presidio Press, 1999), 146.
12. Alvin and Heidi Toffler, *War and Anti-War: Survival at the Dawn of the 21st Century* (Boston, MA: Little, Brown and Company, 1993), 65-79.
13. "The 2001 Trained and Ready Division," draft document, 13, available at http://www-cgsc.army.mil/dao/fa30/New%20Information/DIGITAL%20TRAINING.html; Internet; accessed 16 March 2001.
14. "Digitization 101," available at http://www.armyexperiment.net/aepublic/digit_101/digi.html; Internet; accessed 16 March 2001. TRADOC Pamphlet 525-5 (Fort Monroe, VA: Headquarters U.S. Army Training and Doctrine Command, 1 August 1994) defines situational awareness as "the ability to have accurate and real-time information of friendly, enemy, neutral, and noncombatant locations; a common, relevant picture of the battlefield scaled to specific level of interest and special needs."
15. "Force XXI Operations," TRADOC Pamphlet 525-5, chap. 3.
16. Owens, *Lifting the Fog of War*, 117-18.
17. This is based on the widely-quoted concept of Air Force Col. John Boyd's observation-orientation-decision-action (OODA) loop. The Army specifically addresses this concept in its discussion of information and decision superiority (chap. 1) and operating within the enemy's decision cycle at every level (chap. 2) in *2003 United States Army Transformation Roadmap*. These capabilities are directly credited to the networked characteristics of the future force.
18. Edward Mann, "Desert Storm: The First Information War?" *Airpower Journal* (Winter 1994): 6-7.
19. Current operational concepts, both joint and Army, outline decision superiority as an essential element of future combat, and define it as a product of information superiority. While definitions of information superiority vary between agencies, the concepts are generally consistent with that offered in this chapter. Furthermore, all texts consider information superiority a direct benefit of digitally networked systems. For more discussion of information superiority and decision dominance, see *Joint Operations Concepts* (November 2003), 16, and *2003 United States Army Transformation Roadmap*, chaps. 1 and 2.
20. For a more detailed history of Army attempts to automate C2 systems, see Elizabeth A. Stanley, *Evolutionary Technology in the Current Revolution in Military Affairs: The Army Tactical Command and Control System* (Carlisle Barracks, PA: U.S. Army War College, Strategic Studies Institute, 25 March 1998).

21. Mark Hanna, "Task Force XXI: The Army's Digital Experiment," *Strategic Studies*, no. 119 (July 1997).
22. Mark Thompson, "Wired for War," *Time*, 31 March 1997, 72-73.
23. Elke Hutto, "Reaping the Battlefield Digitization Harvest," *International Defense Review Special Report*, Quarterly Report No. 2 (1 June 1998): 3.
24. Frank Tiboni, "Global Command System Speeds Planning," *Defense News*, 25 September 2000, 4.
25. Each battlefield functional area has a different automated system in ATCCS. They include the Maneuver Control System (MCS), the Advanced Field Artillery Tactical Data System (AFATDS), the All-Source Analysis System (ASAS), the Combat Service Support Control System (CSSCS), and the Air and Missile Defense Work Station (AMDWS, formerly known as FADC2I). For more information about ATCCS, see Stanley, *Evolutionary Technology*, or "The ABCS Primer," available at http://www.armyexperiment.net/aepublic/abcs/default.html; Internet; accessed 24 January 2001.
26. On weapons that already have an embedded computer, like the M1A1 Abrams tank and the Bradley infantry fighting vehicle, FBCB2 software is added to the existing computer system. For more information on FBCB2 see "Battlefield Automation: Acquisition Issues Facing the Army Battle Command, Brigade and Below Program," Report No. NSIAD-98-140 (Washington, DC: U.S. Government Accounting Office, 30 June 1998).
27. Today, this capability is embodied in the Enhanced Position Location and Reporting System (EPLRS), which constantly transmits an update of the soldier's or weapon platform's current location.
28. Most systems still have a Single Channel Ground and Airborne Radio System (SINCGARS) radio, although there has also been experimentation with newer radios capable of moving the large amounts of data that digital forces require. These other systems include the Near-term Digital Radio (NDTR), the Joint Combat Information Terminal (JCIT), and the Joint Tactical Radio System (JTRS). See Steve T. Wall, "Multifunctional Communication on the Battlefield," *Army Logistician* (July-August 2000), available at http://www.amlc.army.mil/alog/JulAug00/MS507.html; Internet; accessed 24 January 2001; David C. Isby, "US Army Considers Alternatives to JTRS," *Jane's Defence Upgrades* 3, no. 3 (9 January 1999): 3; "Improved Radio Eases Digitization Traffic," *International Defense Digest* 31, no. 10 (1 October 1998): 5; and Bruce D. Nordwall, "Software Radios Give Army Helo C2 Systems," *Aviation Week and Space Technology* 151, no. 11 (13 September 1999): 85.
29. Barbara Jezior, "The Land Warrior," in *AY97 Compendium Army After Next Project*, ed. Douglas V. Johnson, II (Carlisle Barracks, PA: U.S. Army War College, Strategic Studies Institute, 6 April 1998); "Army's Restructured Land Warrior Program Needs More Oversight," Report No. NSIAD-00-28 (Washington, DC: U.S. Government Accounting Office, 15 December 1999).
30. In the past decade the body of literature on DoD transformation has matured from a collection of theories and disparate concepts to a more formalized plan providing top-down guidance for Joint Operational Concept (JOC) development, integration, experimentation, and evaluation. For a more thorough understanding of the collection of JOCs under development, see the Future Concepts library website at http://www.dtic.mil/jointvision/index.html; Internet, accessed 27 September 2004.
31. For a discussion of the Global Information Grid's capabilities see Gen. Richard. B Meyers, *National Military Strategy of the United States of America, 2004: A Strategy for Today; A Vision for Tomorrow*, 22; at http://www.oft.osd.mil/library/library_files/document_377_National%20Military%20Strategy%2013%20May%2004.pdf; Internet, accessed 27 September 2004; and Gen. Peter J. Schoomaker, *2003 United States Army Transformation Roadmap*, chaps. 2, 3, and 8.
32. Gen. Peter J. Schoomaker, *2003 United States Army Transformation Roadmap*,chap. 1, p. 1.
33. Ibid., p. xiv.

34. "The Army's Future Combat System's Features, Risks, and Alternatives: Testimony before the Subcommittee on Tactical Air and Land Forces, Committee on Armed Services, House of representatives," GOA 04-635T Defense Acquisitions (Washington, DC: U.S. Government Accounting Office, 1 April 2004).
35. Gen. Richard B. Meyers, *National Military Strategy of the United States of America, 2004: A Strategy for Today; A Vision for Tomorrow*.
36. Gen. Peter J. Schoomaker, *The Way Ahead: Our Army at War . . . Relevant & Ready Moving from the Current Force to the Future Force . . . Now!*, at http://www.army.mil/references/; Internet, accessed 7 October 2004.
37. Michael Evans, "Fabrizio's Choice: Organizational Change and the Revolution in Military Affairs Debate," *National Security Studies Quarterly* 7, no. 1 (Winter 2001): 15; Francis Fukuyama and Abram N. Shulsky, "Military Organization in the Information Age: Lessons from the World of Business," in *Strategic Appraisal: The Changing Rules of Informational Warfare*, eds. Zalmay M. Khalilzad and John P. White (Santa Monica, CA: RAND, 1999), 327-60.
38. Douglas A. Macgregor, *Breaking the Phalanx: A New Design for Landpower in the 21st Century* (Westport, CT: Praeger, 1997); John R. Brinkerhoff, "The Brigade-Based New Army," *Parameters* 27 (Autumn 1997): 60-72. See also David Fastabend, "An Appraisal of 'The Brigade-Based New Army,'" *Parameters* 27 (Autumn 1997): 73-81. For a history of the Army divisional structure, see Richard W. Kedzior, *Evolution and Endurance: The US Army Division in the Twentieth Century* (Santa Monica, CA: RAND, 2000).
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40. National Simulation Center, *Training with Simulations* (Fort Leavenworth, KS: Combined Arms Center, November 1996), 34-35.
41. Leonhard, 135.
42. Paul T. Harig, "The Digital General: Reflections on Leadership in the Post-Information Age," *Parameters* 26 (Autumn 1996): 133-40.
43. Bateman, "Introduction," in *Digital War*, 2.
44. Leonhard, 150.
45. Daniel P. Bolger, "The Electric Pawn: Prospects for Light Forces on the Digital Battlefield," in *Digital War*, 118.
46. Ralf Zimmerman makes a similar point in his column, "In a technology-filled battlefield, let's not forget the basics of combat," *Army Times*, 7 May 2001, 62.
47. Donn B. Parker, *Fighting Computer Crime: A New Framework for Protecting Information* (New York: J. Wiley, 1998).
48. Interview with Capt. Carter Price, Commander of C Company, 2-69 Armor, 30 September 2004.
49. Lester W. Grau, "Something Old, Something New: Guerillas, Terrorists, and Intelligence Analysis," *Military Review* (July-August 2004): 42-49.
50. Robert H. Scales, Jr., "Adaptive Enemies: Achieving Victory by Avoiding Defeat," *Joint Forces Quarterly* no. 23 (Autumn/Winter 99-00): 7-14.
51. T. Trent Gegax, "Wired for Battle," *Newsweek*, 3 March 2003.
52. Interview with Tim Rosenberg, CEO of Whitewolf Security Consulting Co. and instructor on information warfare at George Washington University, 1 October 2004.
53. For example, when the Land Information Warfare Activity (LIWA) provided hackers for the DAWE, the hackers would leave "calling cards" reading "You've been hacked" so that operators would know when they had been invaded. These were used to avoid running the risk of interfer-

ing with the ongoing AWE. Hackers did not try to manipulate the friendly systems or use the information they obtained through the hacking to help the enemy forces. See Hutto, 3.

54. GAO made a similar point in its recent study, "Battlefield Automation: Opportunities to Improve the Army's Information Protection Effort," Letter Report No. NSIAD-99-166 (Washington, DC: U.S. Government Accounting Office, August 11, 1999).
55. Department of the Army, *Battle Command, Draft 2.1* (Fort Leavenworth, KS: Battle Command Battle Lab, April 1994).
56. Martin van Creveld, *Command in War* (Cambridge, MA: Harvard University Press, 1985).
57. Thomas J. Czerwinski, "Command and Control at the Crossroads," *Parameters* 26 (Autumn 1996): 121-32.
58. Hanna, 3.
59. Jim Dunivan, "Surrendering the Initiative? C2 on the Digitized Battlefield," *Military Review* (September-October 2003): 2-10.
60. Rick Lynch, "Commanding a Digital Brigade Combat Team," Special Edition, No. 01-21 (Fort Leavenworth, KS: Center for Army Lessons Learned, TRADOC, December 2001), 5.
61. Lawrence G. Shattuck, "A Proposal for Designing Cognitive Aids for Commanders for the 21st Century," in *Future Leadership, Old Issues, New Methods*, ed. Douglas V. Johnson, II (Carlisle Barracks, PA: U.S. Army War College, Strategic Studies Institute, June 2000), 104.
62. Interview with Maj. Geoff Norman, 23 September 2004.
63. The coauthor served on a division staff in a non-digital unit from August 2002 to July 2003. The cited exchange occurred during an exercise in August 2002.
64. Gen. Peter J. Schoomaker, *2003 United States Army Transformation Roadmap*, chap. 3, p. 5.
65. Ibid., chap. 2, p. 1.
66. Katherine McIntire Peters, "Civilians at War," *Government Executive*, July 1996, 23; David Silverberg, "Crossing Computing's Cultural Chasm," *Armed Forces Journal International*, February 1997, 38-39; Bryan Bender, "Defense Contractors Quickly Becoming Surrogate Warriors," *Defense Daily*, 28 March 1997, 490.
67. Hanna, 4.
68. Charles J. Dunlap, "Organizational Change and the New Technologies of War," available at http://www.usafa.af.mil/jscope/JSCOPE98/Dunlap98.html; Internet; accessed 30 March 2001.
69. Interview with Capt. Carter Price, Commander of C Company, 2-69 Armor, 30 September 2004. Captain Price explained that the task force received about 12 systems under the RFI with a limited appliqué suite of digital tools. This method of fielding has been referred to as the "Leader Distribution" option and will be the backbone of the future fielding initiative for standardizing command and control systems in the current force, termed the "Good Enough" strategy. The objective of the Good Enough strategy is to create a baseline battle command capability that will serve as the bridge between current and future forces. See Gen. Peter J. Schoomaker, *2003 United States Army Transformation Roadmap*, chap. 8, p. 7
70. An unlawful combatant is an individual who is not authorized to take a direct part in hostilities but does. The term is frequently used also to refer to otherwise privileged combatants or noncombatants in the armed forces who use their protected status as a shield to engage in hostilities. Unlawful combatants are a proper object of attack while engaging as combatants, and if captured they may be tried and punished. See Dunlap, "Organizational Change."
71. Stephen Bryer, "New Era of Warfare Demands Technology Reserve Force," *Defense News*, 17-23 March 1997, 27; Brig. Gen. Bruce M. Lawlor, ARNG, "Information Corps," *Armed Forces Journal International*, January 1998, 26-28.
72. "U.S. Army Selects General Dynamics-Lockheed Martin Team for Combined WIN-T Approach," General Dynamics Corporation News Release, 11 March 2004, available at http://www.generaldynamics.com/news/press_releases/2004/NewsReleaseTuesday,%20September%2014,2004-2.htm; Internet, accessed 27 September 2004.

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74. The coauthor had the opportunity to plan and participate in several exercises with the 2nd Infantry Division and its ROK counterparts while serving in various positions as a member of the division staff. During this time, several senior officers commented on the unique relationship shared by the two armies (down to sharing the same operational graphic symbols) that made such interoperability conceivable.
75. See discussion in endnote 72.
76. For more information about the challenges of digital training for National Guard units, see Mike Pryor, "Digitization, Simulations, and the Future of the Army National Guard," in *Digital War*, 81-112.
77. Steven Metz, "Which Army After Next? The Strategic Implications of Alternative Futures," *Parameters* 27 (Autumn 1997): 15-26.
78. David T. Fautua, "Transforming the Reserve Components," *Military Review* 80 (September/October 2000): 57-67.
79. Gen. Peter J. Schoomaker, *2003 United States Army Transformation Roadmap*, chap. 1, p. 11-12.
80. John A. Antal, "The End of Maneuver," in *Digital War*, 161.
81. Leonhard, 137.
82. Michael C. Kasales and Matthew E. Gray, "Leveraging Technology: The Stryker Brigade Combat Team," *Armor Magazine* (January-February, 2003): 7-13.
83. The concept of "maneuver out of contact" and the formations developed to facilitate such maneuver remain largely untested. See "Army Transformation: Implications for the Future," *Statement of Colonel Douglas Macgregor, PhD, USA (ret.), Testifying before the House Armed Services Committee on July 15, 2004 in 2118 of the Rayburn Office Building*, at http://www.house.gov/hasc/openingstatementsandpressreleases/108thcongress/04-07-15Macgregor.pdf; Internet, accessed 16 October 2004.
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85. The Army states that major combat operations include "all actions associated with immediate preconflict shaping, force projection, campaign execution, and conflict termination, including transitions to and from stability operations." Gen. Peter J. Schoomaker, *2003 United States Army Transformation Roadmap*, chapt. 3, p. 1.
86. Ibid.
87. The Army outlines its general objectives during stability operations as "restoring or establishing order, providing humanitarian assistance, establishing new governance, restoring essential services, and assisting in economic reconstruction." These operations include a range of missions: "peace enforcement, peacekeeping, counter-insurgency, and foreign internal defense." Gen. Peter J. Schoomaker, *2003 United States Army Transformation Roadmap*, chap. 4, p. 1.
88. National Intelligence Council, *Global Trends 2015*, available at http://www.cia.gov/cia/publications/globaltrends2015/index.html; Internet; accessed 26 March 2001.
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