



Technology's Double-Edged Sword: The Case of US Army Battlefield Digitization

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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.¹

The contemporary Revolution in Military Affairs (RMA) promises quantum leaps in the war-fighting capabilities of the United States armed forces. Given such high potential rewards, each service has made a concerted attempt to harness these new technologies. The Army is no exception – its efforts are collectively known as the Army Transformation.² A key component of Army transformation efforts is battlefield digitization – the process of automating all Army command and control systems. Digitization promises to use modern information technology to create a common view of the battlefield for all forces at all command levels.³ By minimizing the “fog of war”,⁴ the technology should lead to increased lethality, survivability and operating tempo for a digital force.⁵

The Army has been trying since the 1970s to incorporate at least some of the contemporary RMA technologies into its war-fighting capability. Beginning with Sigma Star in 1978 and continuing through various programs to today's Army Battle Command System,⁶ the Army has tried to leverage new information technologies to improve the way it fights. The Army's first digitized force was the Experimental Force (EXFOR) – 1st Brigade, 4th Infantry Division (Mechanized) at Ft Hood.⁷ In March 1997, EXFOR experimented with 72 different initiatives – operational concepts and equipment prototypes – during its milestone, two-week Advanced Warfighting Experiment at the National Training Center (NTC), Ft Irwin.⁸ Since then, its entire parent

division, 4th ID, has been digitized and conducted its digitization capstone exercise at the NTC in April 2001.⁹

As this brief history suggests, US Army digitization efforts have concentrated on heavy, mechanized forces. Light and medium weight forces have generally not been as involved with Army digitization efforts, although some Army units did participate in a September 2000 joint exercise, in which some digital equipment was tested in an urban environment.¹⁰ The Army's future digitization schedule reflects the heavy unit emphasis: the 1st Cavalry Division will be digitized by the end of FY03 and III Corps by the end of FY04. After that, the Army intends to digitize its remaining heavy divisions by 2012.¹¹

This paper will examine Army battlefield digitization efforts in the light of its evolving professional jurisdiction. How the Army has chosen to adopt new information technologies says much about its future professional jurisdiction. Successful digitization will be a double-edged sword for US Army professionalism, by creating both new jurisdictional opportunities and competition. On balance, the sword's edge of competition is probably sharper than that of opportunity. Although the Army has capitalized 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. After an overview of "professional jurisdiction", the rest of the paper will examine both edges of the sword and what their relative balance implies for the future of the US Army profession.

TECHNOLOGY'S DOUBLE-EDGED SWORD AND PROFESSIONAL JURISDICTIONS

In *The System of Professions: An Essay on the Division of Expert Labor*, Andrew Abbott argues that an occupation's identification 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. Accordingly, he defines professions as "exclusive occupational groups applying somewhat abstract knowledge to particular cases."¹² In other words, the essence of a profession is its work – its legitimated claim to apply expert knowledge to a particular set of tasks. This legitimated claim to control some type of work exclusively is a profession's jurisdiction. Because professions operate in an interdependent system – the "system of professions" – they 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. Moreover, many variables affect the content and control of work, including technology, organizations, culture and natural fact. This paper will concentrate on 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 of outsiders seeking to claim legitimacy over those new tasks.

As Abbott's theory suggests, the Army's current professional jurisdiction will be changed by the technological innovations embodied in the contemporary RMA.¹³ The contemporary RMA is generally postulated as the result of linking precision weaponry to knowledge to radically enhance capabilities for 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 force weapons.¹⁴

Through these new technologies, the RMA promises rapid, decisive victory, very low casualties and collateral damage, and strategic results using conventional weaponry.

Scholars generally concur that at the operational level of warfare, RMA technologies provide three major improvements in capability: precision strikes, increased velocity, and information dominance. First, precision strikes will not only allow the military to conduct operations at a significant distance from the enemy – what Michael Mazarr calls “disengagement”¹⁵ – but they also will reduce the number of casualties and collateral damage associated with combat operations.¹⁶ Second, increased velocity will create pre-emptive warfare “between cohesive, fast-moving friendly forces and unready, disrupted enemy forces” by allowing battlefield leaders to use their enhanced knowledge to eliminate irrelevant and counterproductive movement.¹⁷

Third, and perhaps most importantly, information dominance promises to erode or destroy the enemy's means of collecting, processing, storing and disseminating information.¹⁸ Military theorists believe that information dominance¹⁹ 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. In other words, it will answer the three questions that have plagued soldiers in battle for ever: “Where am I? Where are my buddies? Where is the enemy?”²⁰ 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 (“dominant battlespace knowledge”).²¹ Third, armed with this information, US forces can operate within an enemy’s decision and action cycles,²² enabling them “to understand how the enemy commander sees his own battlefield options, and therefore [increase] the accuracy of predicting what he will try to do”.²³

Fundamentally, information dominance requires that a military organization have both the technology and the doctrine for handling and processing information and empowering commanders with fused, real-time knowledge of the battlefield. Because this is what the Army’s battlefield digitization effort is attempting to achieve, this paper will focus on information dominance and its dual implications for jurisdictional opportunity and competition.

THE SWORD’S EDGE OF OPPORTUNITY

The US Army profession draws its mandate from the National Security Strategy and the National Military Strategy. These documents define the national military objectives as “to promote peace and stability and, when necessary, to defeat adversaries”. Given these objectives, the purpose of the armed forces is:

1. “fighting and winning our nation’s wars” and
2. “protecting US national interests”.²⁴

Given this guidance, the Army currently envisions its professional jurisdiction as “finding peaceful solutions to the frictions between nation states, addressing the problems of human suffering, and when required, fighting and winning our Nation’s wars – our nonnegotiable contract with the American people”.²⁵ However, as battlefield digitization continues, adopting new technologies may cause the Army profession to change, both internally and in relation to other professions in the wider “national security” arena.

Digitization has the potential to create three jurisdictional opportunities for the Army. First, the real-time “sensor-to-shooter” architecture associated with digitization may eliminate the need for some command echelons and increase top-down command centralization. Second, this architecture may also allow the Army to expand its jurisdiction deeper into the battlespace through precision strikes. Third, digitization may realign jurisdictions between the Army’s active and reserve components, perhaps with the active component becoming the Army’s digital force and the reserves shouldering humanitarian and peacekeeping missions. As the following discussion will suggest, however, many of these opportunities have some unintended consequences or obstacles to their success.

Eliminating echelons and increasing centralization

Digitization and its resulting dominant battlefield awareness create a number of potential synergies that could have implications for the Army’s organizational

structure. As in the business community, the real-time information link among various echelons and between sensors and shooters makes it possible to “flatten” the Army’s hierarchy by eliminating some command echelons.²⁶ Moreover, because information technology enhances the ability to reallocate combined arms assets quickly and more flexibly, it may no longer be necessary to have all capabilities at every echelon. Finally, the link between sensors and shooters may eliminate the traditional distinction between “operations” and “intelligence”.

Because of these synergies, most proponents of streamlining Army organizational structure argue that the division is too large and cumbersome to fit the needs of the digital battlefield. Instead, the Army should adopt a brigade-sized combat group as its basic combined arms organization, and scale back or eliminate the divisional echelon.²⁷ A full discussion of eliminating command echelons is beyond the scope of this paper. However, from the perspective of professionalism, it is important to note two risks associated with flattening the hierarchy. First, eliminating some command echelons implies that the span of control for senior leaders necessarily increases, decreasing their ability to supervise their subordinates’ activities or identify problem areas. Second, flattening the organization could have negative effects for “growing” future leaders, as the number of opportunities to command with ever-increasing responsibility is reduced.

Paradoxically, although digitization makes a flatter organization more feasible – because the need for hierarchical mediation to clear the “fog of war” is reduced – it also increases the risk of top-down command centralization, what Martin van Creveld calls “command by direction”.²⁸ As Thomas Czerwinski points out, the Army’s digitization effort embodies the first of van Creveld’s “iron rules” for improving command performance – increase information processing capabilities and thus increase the “central directing organ”. Czerwinski’s analysis suggests that the interventionist command capabilities of command by direction, as embodied by the Army’s digitization effort, risk being self-defeating.²⁹ Czerwinski is right. In fact, the question is one of efficiency versus effectiveness.

The digital technologies being adopted by the Army can cause 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 can. This is the rather prosaic result of the size of the computer screens in tanks, Bradleys and Land Warrior headgear sets. Computer screens in individual weapons platforms are much smaller than in command vehicles and thus can only show 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.³⁰ As a result, higher echelon commanders have a better picture of the digital battlefield than their subordinates and may choose to interfere to take advantage of the initiative that such digital information provides. In short, on the digital battlefield, the best place to see the battle may be from within the command post vehicle, next to all the “bubba-vision” screens.³¹ The net result is that the commander who wants to have access to the best information will be tied to his or her command and control (C2) vehicle.

The second effect flows from the first: with their better picture of the battlefield,

commanders risk micro-managing their subordinates. This, in turn, discourages lower-level leaders from thinking independently and taking initiatives and instead trains them to be good at following orders. For example, Robert Bateman paints a scenario of maneuver at the company level and notes that the higher commander is in a better position to run the battle:

Their commander knew as much about each of them as they themselves knew, and knew it at the same time or even before they did. While moving they had little time to look down, manipulate their computer interfaces, and access the same information sequentially that their commander could see simultaneously. Most importantly, they rarely got the chance to make independent decisions regarding the employment of their own units.³²

Like the Air Force, where the central figure is the pilot and everyone else is the supporting cast, the digital battlefield risks creating an officer-centralized organization, where the commander sits in his C2 vehicle and moves his subordinate puppets around the battlefield. The question then becomes: how does such an organization grow officers to direct the battle via “bubba-vision”, if these same officers spend their whole careers obeying orders from the incumbent “bubba-vision” warrior chief?

There is a tension between the abstract knowledge of the higher echelon commander – embodied in the “bubba-vision” – and the particular knowledge of the local commander. Professions have been confronting this tension for ever, and for good reason: professions need both kinds of knowledge – abstract and particular – for proper diagnoses and treatment. The top-down command centralization promised by the digital battlefield risks missing the proper professional balance. What is most *efficient* from the perspective of winning the battle may not be what is most *effective* from the perspective of building a profession.

Exploiting the digital advantage: precision strikes

Given successful digitization, what will the Army do with its information advantage in conventional warfare? If its Advanced Warfighting Experiments (AWEs) serve as a guide, the Army will choose to convert that information into targeting data to feed to its artillery and other precision strike weapons. During the AWEs, digitized spot reports reached the battalion in five minutes, as opposed to nine minutes under conventional communication means. Moreover, digitized messages needed repeating only 4 per cent 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.³³

As a result, both experiments revealed an enormous increase in the logistical demand for more ammunition. As Robert Leonard notes,

Suddenly able to perceive, track, and identify literally thousands of targets, Experimental Force commanders reclined in their natural tendency toward 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.³⁴

Warfare is about killing the enemy with battlefield fires faster than he kills you. The Army's developing RMA doctrine seems to insist that the best way to do this is through long-range destructive fires – fires throughout the depth of the battlefield. If the new information technologies point toward “an increase in the depth, breath and height of the battlefield”, then they also allow for “armies with high technology [to] place an increasing emphasis on simultaneous strikes throughout the battlespace”.³⁵ In short, one of the key results of Army digitization has been to increase the power of long-range fires.

From the perspective of professional jurisdiction, there are two major points here. First, the effectiveness of precision strikes is contingent on information dominance. We cannot expect firepower to destroy enemy capabilities with pinpoint accuracy if we do not know the exact location of enemy and friendly forces. Is information dominance feasible, as digitization proponents insist? This question will be discussed further below.

Second, even if information dominance is possible, precision strikes are not necessarily the Army's exclusive jurisdictional task. On the one hand, the Army is using its digital capability to expand its jurisdiction deeper into the battlefield, to take deep fire missions away from the Air Force and the Navy. On the other hand, it may still be more efficient for these kinds of long-range fires to be delivered by those services. Given the United States' proclivity to use military force in the most sterile manner possible, the continued attractiveness of precision strike by air power alone is bad news for the Army. But the Army is arguably making it worse for itself, by choosing to use its digital advantage to feed target data to the artillery. This choice may be self-defeating, because land power through maneuver, not precision strike, is arguably the Army's core jurisdictional task. At the very least, the Army should be aiming for a balance between fire and maneuver. As John Antal warns,

The ability to win bloodless victories through firepower alone is a siren's call – an idea with the best intentions that has historically produced bad results. War is a complex event, and combat solutions are rarely purely technological. The ascendancy of fires and the dominance of precision strikes in US Army doctrine are a dangerous case in point.³⁶

Contrary to the wishes of many, the close fight may never disappear from future battlefields.

Realigning jurisdictions: a digital active army and expeditionary reserves

The Army's current digitization plans call for its ten active divisions to be digitized by 2012, but plans for digitizing Reserve and Guard components are uncertain. This is

important, because impending integrations of National Guard light infantry companies in active duty brigades, the formation of two integrated divisions, and the continued existence of separate enhanced brigades underscore the relevance of reserve component combat arms units.³⁷ At the very least, digital forces must be able to accommodate least common denominator communication systems – what the Army calls “analog” or “legacy” (non-digital) systems. The differences in the way that digital and non-digital forces can be employed raise new questions about the proper division of jurisdictions between the Army’s active and reserve components. From the active component’s perspective, digitization may be an opportunity to develop the digital jurisdiction and give away the peacekeeping and humanitarian jurisdictions to the reserves.

The question of digital and analog interoperability is much broader than merely communication among units. Primarily because of the vast differences in command and control capabilities, digital and analog units cannot seamlessly integrate and perform missions in a like manner. A digital commander can see the battlefield, and thus decides where and how to attack the enemy from a position of advantage before his own unit is seen. 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.

Unless the Guard and Reserve are digitized concurrently with the active component, Army commanders risk having to employ subordinate units in a dissimilar fashion. Even if the Guard and Reserve are digitized in the near future, 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 with digital equipment, because digital skills are very perishable.³⁸ As a result, from an efficiency perspective, the Guard and Reserve may no longer be useful for digitized “traditional warfare” – even if they are very useful from a political or budgetary perspective.

Recognizing these differences, David Fautua has argued against assigning *any* information-age 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.³⁹ Yet burst operations will not require or even allow for mobilization, which will render reserve forces inconsequential. As a result, Fautua argues that the Reserve and Guard should develop competencies in “shaping” and peace operations missions, because these missions play to their strengths: small-unit cohesion, a comparative inclination for expeditionary-type missions, and less manpower-intensive training requirements.⁴⁰ In other words, digitization may create an opportunity for the active Army to become a digital force that operates in the high end of the conflict spectrum and to give away peace operations and humanitarian missions to the reserves.

THE SWORD’S EDGE OF COMPETITION

If digitization promises new jurisdictional opportunities, it also promises new jurisdictional competition and encroachment. Jurisdictional competition can generally happen in two ways. First, a profession that makes bad assumptions about its work will perform

its work less effectively than other professions. This may eventually cause it to lose jurisdiction. Second, a profession can lose jurisdiction to other competing professions that offer more effective or more desired services.

Digitization promises both kinds of jurisdictional competition. On the one hand, digitization may make the Army less effective relative to other professions, because it is built on two flawed assumptions:

1. overall, digitization improves the Army's decision-making ability; and
2. information dominance is possible.

The first half of this section will debunk these assumptions by arguing that digitization could actually *degrade* decision-making ability among tactical leaders and that information dominance may *not* be possible, because other organizations, such as the media, will preclude it.

On the other hand, digitization creates new competitors in the wider professional system of "national security". The second half of this section will outline three kinds of direct competition. First, digitization will add a new player to the professional system – civilian contractors. Second, because the Army will not fight independently in the future, joint connectivity means that being a digital force cannot be an Army-exclusive jurisdiction. Third, emerging threats across the conflict spectrum suggest that conventional warfare in open terrain – where the Army has focused its digitization efforts – may not be what future warfare is all about. As a result, the Army may be providing services that its client does not want.

Degraded decision-making ability

Despite the Army's assumption to the contrary, digitization could degrade decision-making ability among tactical leaders, in four ways. First, and most obviously, over-reliance on the computer screen could degrade "traditional" warfare skills. Basic skills like navigating and calling for fire will become rusty, as the digital equipment automates navigation and target acquisition processes.⁴¹ In a more general argument of this phenomenon, Donn Parker argues 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".⁴² For example, "noledge" would include the fire control formulas that are used to compute artillery fire sequences. The end user enters the relevant positions, 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 environmental clues. If digitization works as it is supposed to, soldiers will come to depend on the computer's digital icons as the "true" battlefield. 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 per cent accuracy for friendly forces, 80 per cent accuracy for the environment and 50 per cent accuracy for the enemy.⁴³ As a result, soldiers will need to compare conflicting inputs from the electronic sensors that created the digital picture and from their eyes and ears. When this happens, soldiers may be unable to work out the cognitive dissonance between the screen and “reality” around them. The greater the dissonance, the slower soldiers will be to sort it out, and the less sure their resulting actions and reactions will be.

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, these other inputs – for example, political and environmental conditions – could be more important than the data provided by the screen. Most importantly, leaders will come to rely on the picture their screens present, but the screens are displaying data, not processed information. By bypassing the staff that was supposed to filter and analyze the data for him, the commander now has to perform that task himself. This actually increases his cognitive workload, because the commander must perform both analytical and decision-making tasks.⁴⁴

Third, a digital picture of the wider battlefield could actually be harmful – from a morale perspective – for small unit leaders. This gets at the positive side of the “fog of war”: what soldiers don’t know can’t hurt them. In the past, without a wider view of the battlefield, soldiers had to rely on personal information and depend upon their buddies in the local fight. But as Bateman asks, “Are we opening a new Pandora’s box by allowing information that has not been available to the common soldier for more than one hundred years out of the realm of command and control and back onto the battlefield?”⁴⁵ In other words, what happens when all of the friendly icons in the area get wiped out and the screen is covered with enemy? For example, only a handful of intelligence analysts are authorized to remove an enemy icon from the screen if it is killed, but those analysts frequently are too busy to keep the screens up to date. This delay can make the enemy situation appear worse than it is.⁴⁶ Having the wider picture of the battlefield can be reassuring – until the wider battlefield looks worse than the “reality” of the local fight. Armed with this ugly information, soldiers may go into shock and lose the ability to continue fighting. Regardless, it adds an additional challenge to the tactical decision-making process.

Finally, inherent in dependence on a digital picture of the battlefield is the risk that this digital picture will be taken away. Jamming and hacking could have disastrous consequences for tactical leaders who rely on digital technology to fight. Yet the more units rely on such technology, the more likely it becomes a target for enemy disruption.⁴⁷ For example, what happens if the enemy gets into the network and manipulates the digital picture that friendly forces are seeing? What happens when the screen is “lying”? Obviously, two other factors discussed above – cognitive dissonance and rusty non-digital skills (like navigation and calling for fire) – would compound the effect.

Without overstating the threat, computer viruses, equipment failures, faulty software, enemy intrusion, casual hackers, data theft, and overloaded communications pipes all raise the possibility of having degraded digital capabilities. While the AWEs have simulated some disruption of friendly networks, most jamming and hacking has

been innocuous so as not to interfere with new equipment testing.⁴⁸ As the Army's digitization effort continues, this enemy information warfare simulation should be stepped up, so that leaders can practice making decisions in a degraded information environment.⁴⁹

The media threat to information dominance

Much of the promised capability enhancements that will accrue to the digital force presume that such a force will possess information dominance – “the degree of information superiority that allows the possessor . . . 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”.⁵⁰ Yet even as Joint Vision 2020 insists that “the joint force must be able to take advantage of superior information converted to superior knowledge to achieve ‘decision superiority’”,⁵¹ the information explosion engendered by new technologies may not let any combatant achieve superiority, much less dominance. A major reason is the transformation of the media as it exploits these new technologies as well. In the last five years, a qualitative advance in civilian communications technologies has occurred, and the ability for the military to maintain a secure information environment during conflict has eroded significantly.

While the US Army was learning lessons from the Persian Gulf War, the media was learning lessons, too. During the Gulf War, 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 transportation of stories to the FTUs and reviewed all stories before they were released for transmission.⁵² After the war, journalists vowed never again to be beholden to such military censorship. Thus, while the Army has used the last decade to create a digital battlefield – prompted in large part by the success of precision strikes and information dominance in the Gulf – the media has used the same decade to become as independent from the military in case of a future war 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 would be able to 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.⁵³ 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”.⁵⁴ Advent Communications offers an INMARSAT system that is small enough to be handled by one person.⁵⁵ And Aerobureau of McLean, Virginia, already can 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.⁵⁶

While the US military has begun deploying its system of electronic sensors, so have the media conglomerates. While most media cannot own a high-resolution satellite themselves, they can purchase such products on the open market. Imagery from these

satellites is not prohibitively expensive. For example, SpaceImaging, Inc. offers “news pix” for about \$500, and it will re-task satellite coverage for about \$3,000.⁵⁷ Most new commercial companies have focused their efforts on supplying relatively high-resolution visible and infrared data (five meters or less).⁵⁸ If five-meter resolution is enough to identify buildings accurately,⁵⁹ these satellites create a profound capability for news organizations and other paying customers – including potential adversaries. Moreover, advanced software, along with a cadre of expert ex-military consultants, will enable them to fuse the raw inputs into useful, real-time or near real-time reportage. In other words, the media will become the “poor man’s intelligence service”.

In short, the Army’s goal of seeking information dominance on the future battlefield is profoundly unrealistic. Charles Dunlap rightly argues that savvy militaries should “focus on developing doctrine and strategies for operating in an environment of information transparency or information parity”.⁶⁰ At a minimum, the Army needs to recognize that there will be other non-traditional professions competing for information on the future battlefield. It must be ready to operate in an environment lacking the information dominance it always assumes it will have.

Reliance on civilian contractors

There is no doubt that information technology is complex to operate and maintain under the best conditions; the difficulty increases exponentially when you make such equipment “tactical” and take it into the field. The equipment comprising the digital battlefield includes computers, radios, satellite terminals, switches and software – all of it potentially faulty or weak. This new complexity – with its own process of diagnosis and treatment – requires a new kind of battlefield professional: the civilian contractor.

Information technology has created a new jurisdiction that the Army is unable to fill by itself, and thus civilian contractors are rapidly becoming indispensable on the digital battlefield.⁶¹ The digital Army relies on these contractors to train and equip its forces and keep its digital systems operational. For example, building the Tactical Internet required integrating the efforts of 48 different contractor vendors. During the Task Force XXI AWE in March 1997, 1200 contractors from these 48 vendors were in the field at NTC with the EXFOR, providing advice, maintenance and technical support.⁶² Such support is only projected to increase, as the number of digital systems fielded to Army units rises.

Indeed, the whole process of equipment fielding has been changed by the digitization effort. To equip the 4th Infantry Division, the Army has brought together contractors, TRADOC developers, 4th ID soldiers, AMC acquisition officials and ABCS program officers to create the Central Technical Support Facility at Ft Hood. By placing all of the Force XXI systems in the same building, “marrying up” the end users with the contractors, and running 24-hour operations, “in two years the Army was able to accomplish what it usually does in six”.⁶³ In this new approach – called “spiral development” – the Army develops and fields a 20 per cent solution and then gets immediate feedback before developing any further.⁶⁴ While spiral development certainly makes equipment development and acquisition more efficient, it virtually guarantees civilian contractors a professional jurisdiction in traditional warfare.

There are two major issues associated with this trend of ever-greater civilian involve-

ment. First, civilianizing military functions raises the issue that civilians cannot be compelled to stay on the job in times of crisis.⁶⁵ What happens when the civilians decide to leave when the shooting starts? Second, increasing civilian involvement can cloud the combatant/non-combatant distinction that is key to the law of armed conflict. Operating high-tech systems moves civilian contractors from traditional support functions to what are arguably “hostile” activities, increasing the risk they become characterized as “unlawful combatants” under international law.⁶⁶ To prevent such characterization, some authors suggest establishing a new type of part-time military, without “much of the military regimen” in dress and physical fitness standards.⁶⁷ Although a part-time military structure would 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 is not an Army-exclusive jurisdiction

The second way that a digital Army will increase jurisdictional competition is that in a future conventional conflict, it is almost inconceivable that the Army would ever fight independently. At a minimum, other US services would be involved; indeed, all US armed forces are necessarily moving in the direction of joint connectivity.⁶⁸ Even more likely, the United States would fight as part of a coalition and thus allied forces would also be present. As a result, one of the major issues confronting NATO and other US allies today is the question of interoperability with US forces.⁶⁹

From the perspective of professional jurisdiction, joint connectivity and allied interoperability suggest that if forces must be able to communicate, they must develop common protocols, operating procedures and technical standards. Interoperability among the armed services will mean not just adhering to the same technical standards; it will require common doctrine and procedures in network management. Yet common protocols and standards, by definition, will mean that being a digital force is not a US Army-exclusive jurisdiction. While not necessarily a bad thing, connectivity with others mitigates against the Army’s digitization effort becoming its own “niche” for future warfare. If everyone can use digital equipment, what prevents other armed forces from usurping this professional jurisdiction from the Army?

The wider conflict spectrum

The third way that a digital Army will increase jurisdictional competition is by focusing its digitization efforts on heavy units that operate in the high end of the conflict spectrum. The digital battlefield, as the Army currently conceives it, incrementally improves mechanized and armor forces that still rely on maneuver within the traditional parameter of warfare – dominating an enemy on the physical battlefield. “Components of [the battlespace] are determined by the maximum capabilities of friendly and enemy forces to acquire and dominate each other by fires and maneuver and in the electromagnetic spectrum.”⁷⁰ This newest doctrinal definition expands the battlespace in depth, breadth and height, but it does not fundamentally alter its dimension or challenge the kind of conflict that one would find there.

Paradoxically, if the Army successfully digitizes according to this vision, it will encourage adversaries to pursue asymmetric warfare strategies. After all, given its digital capabilities, who would want to face the Army on an open battlefield? Potential future adversaries acknowledge US military superiority but will find ways to exploit vulnerabilities in the US firepower-centered way of war. As a result, non-traditional adversaries and forms of conflict are evolving that challenge the assumptions underpinning the Army's vision of the future battlefield. As the National Intelligence Council suggests,

This perception among present and potential adversaries will continue to generate the pursuit of asymmetric capabilities against US forces and interests abroad as well as the territory of the United States. US opponents – state and such non-state actors as drug lords, terrorists, and foreign insurgents – will not want to engage the US 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 US strengths, and exploit perceived US weaknesses. Asymmetric challenges can arise across the spectrum of conflict that will confront US forces in a theater of operations or on US soil.⁷¹

According to NIC forecasts, the most common asymmetric strategies through 2015 will be internal conflicts, transnational terrorism, and weapons of mass destruction. Robert Bunker argues that another asymmetric strategy may be for adversaries to move out of the conventional battlefield, which US forces can see with their digital systems, and into the non-human sensing dimension of cyberspace.

Given this perceptual lens, a terrorist in civilian garb who is standing five meters from a US soldier and whom the US soldier views as a noncombatant is at a much greater battlefield range than a hostile tank that is visible 1,000 meters away – and yet is potentially far more dangerous to the soldier than is the tank.⁷²

A third asymmetric strategy would be to force the United States into urban combat, with its inherent risk of higher casualties and collateral damage, its ability to degrade US military advantages and its intensive ground force manpower requirement.⁷³ Given that half of the world's population today lives in urban areas – and by 2025 that figure is expected to reach 85 per cent – this is hardly an unlikely scenario.⁷⁴

Yet the Army's digitization efforts are not enthusiastically addressing these new threats.⁷⁵ While the Army did test its Land Warrior dismounted soldier system in a September 2000 joint experiment, Land Warrior remains significantly less developed than digital systems for heavy weapons platforms. For example, Land Warrior weighs more than 90 pounds, in addition to the food, ammunition and other gear that a dismounted infantryman carries.⁷⁶ As Daniel Bolger says, "Imagine carrying another guy on your back for ever and you get the idea. You cannot fight like that no matter how much physical training you do."⁷⁷ Moreover, because each Land Warrior system costs about \$167,000, not all dismounted soldiers will wear them.⁷⁸ Bolger argues that by not

digitizing all friendly dismounted troops, the Army in effect is telling the enemy where to strike – presumably at the non-digitized soldiers. A more likely scenario, however, is that digitizing dismounted soldiers creates an easier targeting system for the enemy. For example, sniper weapons are being developed to focus on the frequencies transmitted by the Land Warrior system. These weapons would make the sniper's job easier – the sniper would not have to see a body but merely shoot at a frequency transmission.⁷⁹

Yet these second- and third-order effects of digitization on the lower end of the combat spectrum are not getting the same attention that conventional warfare issues are. The Army should not assume that forces using current RMA information technology and precision weapons can meet all demands across the conflict spectrum. Because of their focus on precision engagement and high-speed maneuver, digital forces may be very good at deterring and compelling. But they may not be at all effective when employed in many peacetime engagement, stability, or combat operations in the lower end of the conflict spectrum.⁸⁰

By having chosen in its digitization effort to focus on the high end of the conflict spectrum, the Army is expressing its preferred view of its professional jurisdiction – conventional warfare in open terrain. In general, the Army has not focused on peace operations or urban combat, because it does not *want* to focus on them. Yet if the Army chooses not to prepare for digitized military operations in these other parts of the conflict spectrum – and political leaders want these kinds of operations conducted – the Army risks having its professional jurisdiction poached. Private security firms – like MPRI, Cubic or Dyncorp – and the US Marine Corps' extensive experimentation with new technologies in the urban environment are merely two cases in point.

For example, in contrast to the Army's heavy Land Warrior system, the Marines have developed a palm-top computer for the urban environment, based on Apple Computer's Newton system.⁸¹ The Marines also completed a three-year series of experimental exercises, collectively called "Urban Warrior", culminating in a March 1999 amphibious urban assault into Oakland, California.⁸² These experiments were designed to address the technological challenges of an urban environment – especially the interference caused by concrete walls, phone lines, electronic devices and urban structures. Additional experimentation through 2002 is continued in a program called Project Metropolis.⁸³ The Marines have also expanded their doctrine for the urban environment, so as to perform more effectively in what former USMC Commandant General Charles Krulak called the "three block war". The idea is that Marines may be expected to provide humanitarian aid, administer the peace and fight, all within three urban blocks.⁸⁴

Whether such urban doctrinal and technological experimentation is more comprehensive than similar Army efforts is open to debate. Nonetheless, the Marines are certainly doing a much better job of selling their willingness and ability to perform such urban missions to the public. This is very important, because most professional jurisdiction in the realm of national security comes from the public's acknowledgement of a particular group's expertise. In a telling explanation of the Marines' increased focus on urban conflict, Lt Gen. Paul K. Van Riper, the former commander of the USMC Combat Development Command, observed,

The nation doesn't need a Marine Corps. If the United States Army had disaster on the battlefield, we as a nation would have to re-create the Army. Same obviously for the Air Force or Navy. But if the Marine Corps ever was to fail in a mission . . . there is always someone seeming to say, do we need a Marine Corps? So you'd better offer something unique.⁸⁵

The Marine Corps seems to be making it clear: if the Army will not go into the urban battlefield, then the Marines are happy to oblige. In short, if there is a need for military operations at lower levels of the conflict spectrum, and the Army is not ready to perform them, other "national security" professions will certainly fill the void.

CONCLUSION

As this analysis has shown, information technologies from the contemporary RMA are a double-edged sword for the US Army's professional jurisdiction. While digitization has created new jurisdictional opportunities, it has also created new jurisdictional competition. On the one hand, digitization could create three jurisdictional opportunities for the Army, by:

1. eliminating the need for some command echelons and increasing top-down command centralization;
2. allowing the Army to expand its jurisdiction deeper into the battlespace through precision strikes; and
3. realigning the jurisdictions between the Army's active and reserve components, so that the active Army becomes digital and the reserves shoulder peacekeeping and humanitarian missions.

On the other hand, digitization could make the Army less effective relative to other professions, because it is built on the flawed assumptions that digitization improves the Army's decision-making ability and that information dominance is possible. Moreover, digitization could increase jurisdictional competition within the wider professional system of "national security" by:

1. adding civilian contractors to the professional system;
2. encouraging joint connectivity, which will preclude an Army-exclusive jurisdiction; and
3. focusing digitization on conventional warfare in open terrain, to the disregard of emerging threats across the conflict spectrum.

How the Army has chosen to digitize is an expression of its view of its expert knowledge and professional jurisdiction. Army digitization efforts have focused on heavy forces operating in the high end of the conflict spectrum – conventional warfare. Yet the professional system of "national security" encompasses much more than just conventional warfare. Emerging threats across the conflict spectrum suggest that conventional warfare in open terrain – the way the Army would *choose* to fight – may not be what

future warfare is all about. By consciously or unconsciously ignoring non-traditional forms of warfare all along the conflict spectrum – and the potential professional competitors that such warfare will bring about – the Army risks being caught unaware and disregarded. The net result will be a bankrupt profession incapable of countering the threats that endanger the nation's security.

In other words, the Army profession is focusing on a jurisdiction that the client does not want and may not need. And, as Abbott warns, no profession delivering unwanted or ineffective services can stand indefinitely against competent outsiders, however powerful it may be.⁸⁶ Especially with military professions, jurisdictional contests are often decided by client choice. If there is no demand for a profession's services, the profession will inevitably lose its jurisdictional claims. What makes this conclusion so tragic is that battlefield digitization was originally envisioned as an Army effort to regain its strategic relevancy in the post-Cold War world. Ironically, the way the Army has chosen to digitize may be making it more irrelevant for future conflict than ever.

NOTES

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4. Karl von Clausewitz, *On War*, ed. and trans. by Michael Howard and Peter Paret, Princeton, NJ: Princeton University Press, 1976. In Clausewitz's words, "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", *On War*, p. 101.
5. The hypothesis the Army has been testing during its digitization experiments is "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 LTC Ron Gregory, "Army XXI: Issues Associated with Development of Doctrine and TTP for the Digitized Force", at <http://www-tradoc.army.mil/jadd/adxxi2/sld001.htm>, accessed 20 October 2000.
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