

# **The Army after Next: The First Postindustrial Army**

*Thomas K. Adams*

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# THE ARMY AFTER NEXT

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## The First Postindustrial Army

*Thomas K. Adams*



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*It will be enough for me, however, if these words of mine are judged useful by those who want to understand clearly the events that happened in the past and which, human nature being what it is, will at some time or other and in much the same ways, be repeated in the future.*

—Thucydides, *History of the Peloponnesian War*





## CHAPTER 1

# INTRODUCTION

*The Army has no wish to scrap its previous experience in favor of unproven doctrine, or in order to accommodate enthusiastic theorists having little or no responsibility for the consequences of following the courses of action they advocate. While the Army is adapting itself readily to the employment of new weapons and new techniques, nothing currently available or foreseeable in war reduces the essentiality of mobile, powerful ground forces, the only forces which can seize the enemy's land and the people living thereon, and exercise control of both thereafter.<sup>1</sup>*

—General Matthew B. Ridgeway, Chief of Staff, Army, June 27, 1955

In that admirably concise statement, General Ridgeway captured the enduring attitude of the U.S. Army toward change, technology, and the service's role in the national defense. The most important element is probably the last phrase of the last sentence. The Army has always seen itself as the decisive warfighting component because only the Army can seize and hold ground and thereby control its inhabitants. Other services are valuable adjuncts, but without the Army their efforts are at best transient and temporary.<sup>2</sup>

This set of beliefs was seriously challenged during the later part of the twentieth and early part of the twenty-first centuries. Military theorists and others began to believe that new technologies were generating a “revolution in military affairs” (RMA). Everyone agreed that RMA capabilities have profound implications, but there was little consensus on their exact nature, interrelationship, or ultimate outcome. Nevertheless, by the late 1990s RMA concepts had become the central element in the U.S. armed forces' vision of future warfare. Along with the related notions of netwar, cyberwar and information war, it set the terms for discussing future warfare and military requirements.<sup>3</sup>

At the same time, it was believed that the United States was in a “strategic pause,” a decade or more when no serious enemies or large-scale conflicts were expected. It was an ideal time to reduce conventional forces in favor of experiments to “leap ahead” with RMA technologies.

In theory, the RMA’s new technologies combined with new doctrine and organization could be employed to shock and stun an adversary with precision air power in such a way that its will and capability were shattered without the need for large-scale ground combat. Beginning in 2001, President George W. Bush and his Secretary of Defense Donald H. Rumsfeld set out to transform the U.S. armed forces by adopting RMA concepts and capabilities. President Bush promised to “redefine war on our terms” and “to move beyond marginal improvements—to replace existing programs with new technologies and strategies. To use this window of opportunity to skip a generation of technology.”<sup>4</sup> This was to be accomplished through a set of programs collectively referred to as military transformation or just “transformation.”

Military transformation was officially defined as “the set of activities by which DOD [Department of Defense] attempts to harness the revolution in military affairs to make fundamental changes in technology, operational concepts and doctrine, and organizational structure.”<sup>5</sup> For Rumsfeld and those around him this meant a truly integrated joint force led by air power and leaving the Army with a distinctly lesser role.

The basic notion behind military transformation is that information technologies allow you to substitute information for mass. If you buy into that, the whole force structure changes. But the vision of all this is totally dependent on information technologies and the network. If that part of the equation breaks down, what you have are small, less capable battle platforms that are more vulnerable.<sup>6</sup>

In other words, it was a wonderful idea if it worked and a disaster if it did not.

All of this works to the advantage of the U.S. Air Force (USAF), the Army’s principal competitor for the central position in American military strategy. According to David Ochmanek of the RAND Corporation, a strident air power advocate, “The division of labor between ground and air has shifted.” Because of advanced warplanes and precision bombing, “the enemy’s army should be largely destroyed before we get on the ground.”<sup>7</sup> As the world’s leading exponent of the high-tech approach, the USAF was quick to embrace transformation as key to the dominance of air power. Under the slogan “Global Power, Global Reach,” airmen argued that worldwide responsiveness and firepower are best provided by aircraft.<sup>8</sup>

The beguiling vision of quick, precise, and relatively bloodless war from the air has been greatly appealing to politicians. Unlike the slow litany of deaths from Iraq, air power promises to deliver destructive power from a safe distance with missiles or bombs. Rather than a series of bloody tactical battles, it offers to strike directly at the political and military centers of enemy power.<sup>9</sup> Since the First World War, air forces have chafed at the use of their resources to support land and sea forces. Now they can almost see their dream coming true. Billy Mitchell and Giulio Douhet’s

heady vision of air armadas supplanting old-fashioned land and sea forces seems almost within reach.

While candidate Bush was promising to redefine war, the U.S. Army was already in its own Army Transformation program and had been since 1999. It was a massive, costly effort to reinvent itself. Instead of ponderous armored formations with hundreds of thousands of soldiers supported by tens of thousands of vehicles, its units would become much smaller and deadlier, light and agile, capable of rapid deployment across intercontinental distances. This book is a narrative account of Army Transformation, the attempt to create a postindustrial army, the greatest change in American military structure since the Civil War.

The highlight of the RMA was information processing, so the core capability of Army Transformation was to be a network of automated information systems—computer. Land forces would fight as “networked systems” and “distributed formations.” In this new warfare formations would be flexible—battlefields fluid and ill-defined. Using newly developed sensors and a dense computer-enabled communications network, the new kind of army would understand all the relevant information about the battlefield. Its units would have a “common operational picture,” a complete near real-time picture of the friendly and enemy situation. It would find and avoid enemy formations while destroying them from a distance with high-precision artillery.<sup>10</sup>

The short-term exemplar for these changes was the Stryker armored vehicle fielded in 2003, an attempt to replace heavy, tracked armored vehicles with a single class of multivariant ones. Stryker and its variants were to spearhead the movement from an Army organized around the tank and the armored personnel carrier to one that uses fast, light wheeled vehicles, replacing armor with new technology that provides protection through advanced materials and better information. The end product of this high-tech approach would be a radically reorganized force based on a highly speculative Future Combat System, usually referred to simply as FCS. The organization that FCS enabled is called the Future Force.<sup>11</sup>

As originally conceived and endlessly briefed, the Future Force program was an incredibly ambitious effort to replace 70 ton M1 tanks and 35 ton Bradley fighting vehicles with the Future Combat System, an amalgam of about 18 separate high-tech elements. The Future Force would be mounted on 15 to 18 ton vehicles that could perform all the functions of the M1, the Bradley, and conventional artillery with greater lethality and no loss of survivability. As planned, the Future Force would be organized for rapid deployment, the ability to drop a brigade anywhere in the world, fully supplied and ready to fight, in 36 hours followed by the full division (2 more brigades, plus) within five days. Five more divisions would arrive within 30 days.<sup>12</sup> It was remarkable ambition, and nobody had any real idea how to do it.

Like most large, successful institutions, the U.S. Army does not welcome change, especially not radical change; but transformation of some kind is inevitable—the Army will transform whether it wants to or not. There is no choice, given the pressure of new technologies, new enemies, and political realities. However, inevitability does not imply simplicity, nor does it guarantee that correct choices will be made.

There is no easy path to radical change. The collision between ambition and reality has produced results quite different from the ones envisioned.

Events were further complicated by the fact that Army Transformation takes place within the larger vision endorsed by President Bush and championed by Defense Secretary Rumsfeld. There is a collision between visions. The Army still regarded itself as the central element in a transformed defense establishment, supported by the other services. As interpreted by Army officers, the Defense Department leadership saw the Army primarily as a bill payer, to be stripped in order to free up funds for transition initiatives that would primarily benefit the Navy and the Air Force.

But suddenly the decade of relative peace evaporated in the Al-Qaeda terrorist attacks of September 11, 2001. The American sanctuary was breached, and its armed forces no longer had the luxury of a “strategic pause” to absorb RMA concepts and technologies.<sup>13</sup>

The Bush administration responded with a national grand strategy to attack terrorism around the world while undermining and eliminating the regimes, principally in the Middle East, that allowed or supported terrorist organizations. It was at heart a scheme for political reformation, the creation of democracies where none had existed. But much of the method was to be military. Transformation would allow America’s great but still finite military structure to take on indefinite, globe-girdling responsibilities.

The defeat of the Taliban in Afghanistan was widely hailed as a successful example of transformed warfare: a relatively small number of elite Army Special Forces and CIA operators working with local forces to guide air delivered precision munitions against the enemy. But for the airmen, the key lesson was the use of air power.<sup>14</sup>

The spring and summer of 2003 brought a serious bump in the road to the Future Force. The spectacular early success of the Iraq War turned into a grinding occupation that lasted much longer than transformation optimists had predicted. In Afghanistan the Taliban refused to accept defeat and go away. Instead, they pursued a persistent low-level guerrilla war. In order to accommodate these unforeseen realities, the service created the so-called Modular Army, a plan to stretch the overcommitted force by reorganizing as brigade-based task forces rather than conventional divisions. These “Units of Action” would fight the war while the service continued toward the Future Force.<sup>15</sup>

Far-reaching change creates new opportunities and often exacerbates existing frictions. Despite the Department of Defense (DoD) emphasis on “jointness” and inter-service cooperation, the push for transformation has done nothing to quell old rivalries. President Bush and Secretary Rumsfeld focused on air forces, delivering precision guided munitions (e.g., “smart bombs”) on targets developed through automated systems and applications of information technology. The mainstay of the ground forces—sustained, heavy armored combat with tanks, artillery and the like—was dismissed as “old think.”<sup>16</sup>

But events seemed to support the Army view in the wake of the Iraq War. A basically conventional but “information enabled” armored U.S. ground force convincingly trounced a much larger (poorly led, poorly equipped) army and

captured the country's capital in the astonishing time of 21 days. The immediate postwar period was even more salient for the ground forces. The drawn-out struggle toward reconstruction had still less dependence on USAF-style air power and was chiefly an affair of small units and patrols, depending heavily on armored vehicles, including the Stryker, often supported by armed helicopters. The war in Afghanistan was conducted by old-fashioned infantry. Air power was a big help, but no solution.

It was frustrating to Army leaders when Pentagon analysts trumpeted the war as a victory for the new information-enabled way of fighting while diminishing the indispensable role played by heavy armored forces and downplaying the number of soldiers required. Under the urging of Secretary Rumsfeld, the conflicts in Afghanistan and Iraq were touted as demonstrations of transformation—light, agile, “networked” military operations with a premium on technology and a minimum number of personnel on the ground.<sup>17</sup>

The Air Force believes Afghanistan (and to a lesser degree Iraq) prove that air power can provide a quicker, cleaner, and cheaper victory with fewer casualties than ground forces.<sup>18</sup> Furthermore, it is argued, wars of sustained high-intensity ground combat (the Army's specialty) do not happen any more. Indeed, one of the promises of the RMA was that there would be no more sustained war. The extended “postwar” fighting in both Afghanistan and Iraq show what happens when the enemy does not agree with this assessment.

Ground warfare advocates point to these as the kind of unsatisfactory outcomes to be expected in “air centric” warfare.<sup>19</sup> In this view air power was unarguably important, but “obsolete” industrial age infantry and armored formations carried the brunt of the battle. Then insurgents insisted on prolonging the fight. Afghanistan and Iraq demonstrated the effectiveness of the new technologies on the ground and in the air, but warfare is not primarily a technology demonstration. The philosophy of transformation sees warfare as a purely military business. The objective is to attack and destroy military forces and their command and control arrangements. As described by Fredrick W. Kagan:

The advocates of a “new American way of war,” Secretary of Defense Donald Rumsfeld and President Bush chief among them, have attempted to simplify war into a targeting drill. They see the enemy as a target set and believe that when all or most of the targets have been hit, he will inevitably surrender and American goals will be achieved.<sup>20</sup>

But war is a matter of will, not merely capability.

## Asymmetric Warfare

*Predictions are hard to make, especially about the future.*

—Yogi Berra

The opposite set of beliefs about future warfare is often capsulated as the “asymmetric approach,” closely related to the ideas of unconventional warfare (although

that term has a different meaning in U.S. doctrine), terrorism, and insurgency. Sometimes referred to as the *counterrevolution* in military affairs, its central concept is that Western (especially American) methods of warfare can be sidestepped often enough to blunt their potency. In short, this approach concerns “all forms of conflict where the other side refuses to stand up and fight fair.”<sup>21</sup> Except for the campaigns against Iraq in 1990–1991 and 2003, the U.S. military has not been involved in conventional war since Korea. The attempt to force conventional warfare on an unwilling enemy in Afghanistan and Iraq illustrates the difference.

Groups using the asymmetric approach are seldom organized as regular military forces. Too often, they function outside any nation’s control, operate across national boundaries, lack rigid structures, and employ methods of stealth to attack nonmilitary “soft” targets. Terrorists are the best-known practitioners of this form of warfare. An obvious example is the loosely confederated Al-Qaeda network led by Usama bin Laden.<sup>22</sup> The insurgents in Iraq are another too well-known example.

According to military analyst William Lind,

The more successful terrorists appear to operate on broad mission orders that carry down to the level of the individual terrorist. The “battlefield” is highly dispersed and includes the whole of the enemy’s society. The terrorist lives almost completely off the land and the enemy. Terrorism is very much a matter of maneuver: The terrorist’s firepower is small, and where and when he applies it is critical.<sup>23</sup>

Worse yet, these conflicts seem to occur in out-of-the-way places like Afghanistan, Somalia, Rwanda, East Timor, Haiti, and Kosovo, often with little direct bearing on the national interests of the United States. This makes them difficult to reach, objectives are often unclear, operations there are confusing, and they produce mostly ambiguous outcomes. For adherents of the asymmetric approach, all the attention and funding granted to high-tech, military technical methods is at best misdirected and at worst actively dangerous. After witnessing the initial campaign in Iraq (2003), no enemy wants to go toe-to-toe with conventional U.S. forces. For this reason, advocates of asymmetry believe that other-than-war conflicts will continue to be the most common form of military involvement for the advanced countries.

The anti-Taliban and Al-Qaeda campaigns in Afghanistan and the postwar fighting in Iraq have shown the weakness of a high-tech military. Countering asymmetric warfare may include high-tech methods but emphasizes soldiers on the ground, local solutions, cultural awareness, and psychological operations. Success is gradual, incremental, and often visible only in hindsight. Furthermore, there is seldom robust public support for such missions. This is not welcome news in the conventional Army.

The primary military practitioners of asymmetric warfare in the West have been the special operations forces (SOF). In the United States, special operations forces are elements drawn from all the services under the umbrella of the U.S. Special Operations Command in Tampa, Florida. As described by the U.S. DoD, they specialize in conflicts below the threshold of war, such as terrorism, insurgency, hostage rescue, sabotage, and “situations requiring regional orientation and cultural and

political sensitivity, including military-to-military contacts and noncombatant missions like humanitarian assistance, security assistance, and peacekeeping operations.”<sup>24</sup> During their ascendancy in the Vietnam War, they often managed to combine military, political, and informational elements to create a unique capability in their ability to work with foreign civilians and local militaries.

But these quasi-political missions were often derided as “social work” and lost favor both within the SOF community and the larger DoD. During transformation, attention was drawn to the potential offered by SOF (especially Army Special Forces) and air-delivered precision guided munitions (PGMs). Using their commando skills, small special operations elements can be rapidly positioned to guide PGMs with pinpoint accuracy. It was a winning combination in Afghanistan and heralded as a new American way of war. But those methods had little application to the bitter postwar insurgencies in Iraq and Afghanistan.

## **Background to Transformation**

Unfortunately, the questions related to transformation are not decided entirely on their abstract merits. Powerful vested interests are involved in these debates. Each military service has a huge investment in equipment and personnel as well as their traditional roles to protect.

Behind the services are the industrial firms, contractors, and subcontractors in the highly lucrative business of producing the tools for war. So far, these firms have managed to have it both ways—the companies that manufacture the accoutrements of armored land warfare continue to supply the conventional Army, while the Future Force program provides a multibillion dollar cash cow in research and development. All manner of technology firms, researchers, and producers from material sciences to software have seized the opportunity to sell and often oversell the potential of their products. About 23 different companies, each with its own legion of subcontractors, are engaged in building and tying together the incredibly complex “system of systems” that will be the Future Combat System.

In order to make this all work, another new generation of systems is required. None of them are cheap. The orbiting Enhanced Imaging System (EIS) is an example. According to published reports, EIS is designed to help provide high fidelity radar and photo images as part of “information dominance.” The EIS reportedly has the ability to dwell, or “hang,” for a longer period over an area of interest and can transmit its collected data more quickly. This kind of capability is vital to the planned Future Force and the rest of DoD transformation. But each satellite costs a reported \$1.5 billion, not including the Lockheed Martin–built Titan 4B launch vehicle or the ground-based equipment to receive and process the information EIS provides.<sup>25</sup>

The prospect of a new, highly networked Army means that the whole tradition of armored land warfare and the industries that supply it are fighting for their lives. In this fight, partisans of traditional armored war face two problems as illustrated above. First of all, the early twenty-first century seems to hold few enemies worth the



attention of these high-tech, high intensity forces. It is also true that, unlike air power, all the paraphernalia of high intensity land warfare must be transported to war by sea and air over a period of months. Worse yet, they require extensive support including an “iron mountain” of fuel and spare parts to keep them in action.<sup>26</sup>

In order to resolve these concerns, the Army focused on rapid deployability as a critical capability. Nearly all of the changes under the rubric of Army Transformation are intended to enhance rapid deployment across strategic distances. Allegedly, ground forces that cannot do this will become strategically irrelevant, replaced by the “global power, global reach” of air power.<sup>27</sup>

The Stryker Brigade Combat Teams, built around the thin-skinned Stryker light armored vehicle, supposedly exemplify these improvements. These brigades were intended to lead the technological leap to a Future Force based on the advanced FCS. But what makes FCS unique is that the component systems (e.g., vehicles, mobile guns, robots, reconnaissance drones, etc.) will be connected by a very fast, secure computer network enabling them to function as a single distributed system. If it works as planned, the multimission Future Force will provide networked command, control, communication, and computer functionalities; robotic systems; precision fires; sensor platforms; air defense; and Reconnaissance Surveillance Target Acquisition (RSTA) capabilities.<sup>28</sup>

An FCS Brigade is conceived as a sort of virtual unit, a distributed system that combines the functions of infantry, tanks, artillery, and reconnaissance in a web or grid of systems. Hundreds of platforms, both manned and unmanned, will spread across hundreds or perhaps thousands of meters. Separate gun- or missile-carrying robotic vehicles (“platforms”) will move independently of the command vehicle. Using sensors mounted in small unmanned aerial vehicles and reconnaissance robots to direct coordinated fires, this approach seeks to mass “effects” rather than units.

The dates for all of this are very slippery and depend on a shifting configuration of funding, political will, military interest, and technological development. Delays slowed the preparation of the first two Stryker Brigades, and they were judged not ready for the initial phase of the Iraq conflict. Army leaders originally hoped at least one of the futuristic FCS-based units could be operational by 2008. Now it seems more likely that a modest version might be ready about a decade later.<sup>29</sup>

Ironically, the kind of advances sought for FCS might end the style of warfare they are intended to fight. Wide area surveillance combined with the proliferation of precision munitions and small antitank guided missiles may make it impossible to build armored vehicles that can survive the high-tech battlefield. The Stryker Brigade Combat Teams, like FCS, seek to end run the problem by fielding units that use superior “battlefield awareness” to make preemptive attacks while avoiding being targeted themselves. Protection is abandoned in favor of speed and stealth, ending the reign of traditional armored warfare. Information is armor. Once again, the enemy failed to cooperate with this vision. Lacking futuristic weapons, Iraqi insurgents equipped only with small arms, conventional explosives, and rocket-propelled

grenades continued to extract a heavy cost from the U.S. and coalition forces long after the end of “major combat operations.” The Strykers were forced to abandon their rapid-deployment rationale and add heavier armor and special slat screens for protection.

To survive, FCS requires near-perfect information to avoid timely detection by the enemy while still having almost complete knowledge of the battlefield situation. It seems very unlikely that any force, no matter how well-equipped will have such complete information that an enemy can consistently be defeated before it ever comes within direct fire range. But this is what is intended. It is a highly dangerous way to do business. If it fails to occur and occur consistently, the smaller, lightly armored FCS units will almost certainly be overcome by “obsolete” industrial age enemies.

The doctrine clash between the Army and the Air Force becomes even more important in this connection. There is more at stake than an interservice food fight. The Army’s planning for the Future Force is predicated on the assumption that the Navy and Air Force will be willing to invest in new ships and planes to carry the Army. For purposes of rapid deployment, the U.S. Air Force becomes the linchpin. The Air Force is understandably less interested in its role as the Army’s taxi service.<sup>30</sup>

Since the Army, and for that matter the entire Department of Defense, is obsessed with naming and renaming things, transformation programs have undergone a number of name changes; for example, the Future Force program was originally called the “Objective Force.” Infantry Fighting Vehicles are renamed Interim Fighting Vehicles and then Stryker Vehicles. The reasons for these changes are seldom obvious and often confusing. In order to present a clearer narrative, many of these title changes have been simplified or eliminated. To include and thoroughly explain all, or even most, of them would require a much larger book with a matching glossary and thesaurus.

For simplicity’s sake, the first adaptation, grafting information processing systems on the existing industrial-era Army is captured as “Force XXI.” The second, to reorganize the existing fighting structures of the Army is called the “Modular Army” program. The third and most ambitious, the plan to create a wholly new kind of fighting force and new methods of combat is the “Future Force” program. If the organization produced by the Modular Army initiative is the next Army, then the one resulting from the Future Force program is the Army after Next. Remarkably, all of these things are supposedly happening at once.

Despite problems, the United States Army is currently well ahead of other militaries in its effort to adopt present and expected technological advances. But this change is likely to be far less rapid than originally hoped and planned. It seems reasonable to believe that it will require decades from the time those new formations first emerge until the last of the industrial age Army disappears. This timeline is based on the U.S. Army’s own planning with allowances made by the author for expected funding difficulties and the inevitable failure of some technologies to

emerge on schedule. Like everything else about transformation, it should not be taken as guaranteed.

*It must be considered that there is nothing more difficult to carry out, nor more doubtful of success, nor more dangerous to handle, than to initiate a new order of things.*

—Niccolo Machiavelli, *The Prince*

## CHAPTER 2

# THE ROOTS OF THE REVOLUTION

*A satisfactory theory of war never conflicts with reality.*

—Karl von Clausewitz

### The Context of Change

The concept of transformation begins with the fact that possession of unique and advanced military technology is an important part of the American military's self-image. But so is an attachment to tried and tested methods and organizations. Thus, during the 1990s the U.S. Army and the other services steadily made changes to incorporate new technologies, but those changes were superimposed on existing doctrine and structures. Furthermore, as Andrew Bracevitch observed, their concept of warfare continued to resemble "World War II in the fancy dress of high-technology."<sup>1</sup>

The first indication of radical, concrete change came on October 12, 1999, at the annual meeting of the Association of the United States Army. These meetings are normally staid, even boring, gatherings of military leaders and defense contractors. But this one was rocked when General Eric K. Shinseki announced that he was going to transform the entire Army as soon as possible. Gradual improvements were inadequate. New advances would make current ground forces not merely obsolete but irrelevant. Through a process of rapid, radical change, the Army would become lighter, more lethal, and less dependent on elaborate logistics. There would be no more lip service given to the promise of "leap-ahead" technologies. Under an umbrella program called "Army Transformation" the service would "leverage" (i.e., take advantage of) information technologies, improvements in battlefield sensors, robotics, new materials, and other innovations in doctrine, organization, and

equipment to create a wholly new form of ground combat force called the “Objective Force” and have it in place by 2012. In the words of one of those present, Shinseki’s speech “was a mind-blower.” If there had not been a military revolution before, there was one now.

But, great changes do not spring full-blown into existence. The Chief’s announcement had its roots in the West’s faith in progress and the strong technological bias of Western militaries.

## Welcome to the Revolution

Historian Michael Roberts coined the term “military revolution” in 1955.<sup>2</sup> But the contemporary idea began with Soviet Army Marshall N. V. Ogarkov and his notion of a “military technical revolution.” During the 1970s and early 1980s, Ogarkov’s studies led him to believe that the most advanced industrial nations (the United States, Japan, and those in Western Europe) were on the verge of a military-technical revolution that would transform conventional warfare.

His logic and his powers of persuasion must have been considerable because he managed to convince the notably hidebound Soviet Army to accept his vision. Future war would be dynamic, high tempo, and high intensity with land and air operations encompassing vast areas and extending into outer space. The key to victory was information, the ability to understand this complex and deadly combat. This meant mastering the processing, sorting, and analyzing of intelligence products from high-tech collection systems and managing command and control to provide some order in battle’s chaos. It was a very technical view of warfare that put a premium on technological integration, professionalism, and effective training.<sup>3</sup>

One of those most impressed by all this was Andrew W. Marshall, the scholarly looking director of an obscure Pentagon group called the Office of Net Assessment (ONA). He recognized the importance of Ogarkov’s work and became one of its most ardent students. ONA found a number of possible revolutions in past military technologies. The adoption of effective firearms was an obvious one, and most analysts agreed that the mating of the industrial revolution to warfare c. 1850–1914 and the rise of maneuver warfare after World War I also qualified.<sup>4</sup>

More importantly, they saw that true revolutions were more than technical developments—armies could not merely improve their performance. A revolution meant that they had to significantly alter the way they did business. The idea of a mere military-technical revolution seemed too limiting, and the broader concept of a revolution in military affairs (RMA) evolved. Marshall defined an RMA as having three components:

1. Technological innovation.
2. Operational concept (or doctrine).
3. Organizational adaptation.<sup>5</sup>

The last two points are important since new technologies are of marginal benefit if not utilized correctly. The key to utilization is organization and doctrine. An operational concept can grow out of historical concepts or emerge in response to specific challenges. These include not only purely military challenges, but geographic, economic, cultural, political, and demographic dilemmas as well. Although doctrinal issues are often contentious, serious changes in military organization (as opposed to tinkering around the edges) are even more so. Militaries are notoriously committed to tradition and can be counted on to resist radical change. Contemporary armies grew out of World War II and made no fundamental changes for nearly 60 years. They preferred incremental shifts in the mix of force types and command and control, incorporating new technologies as they developed. Up through the early 1990s, there was little recognition of a need to do things differently.

Technological developments outpaced doctrine and organizational adaptation because so many more creative energies and dollars are engaged in the former. Technologies are “real.” They are visible and material and, at least in theory, subject to empirical testing. Operational concepts and organizational changes are “fuzzy,” are subject to endless debate, and attract fewer dollars. Military theorists tended to take considerably less notice of revolutions that were social, intellectual, and organizational, but not technical.<sup>6</sup> For example, American military theorists often credit Napoleon as the first to effectively harness industrialization and mass armies. Less attention is paid to the way Napoleon took advantage of the new mass armies to yield a revolution in command. Even less attention is paid to the importance of the new revolutionary ideologies in bonding and motivating Napoleon’s armies.<sup>7</sup>

The RMA was an intriguing idea and set off an avalanche of articles, papers, and conferences. All were aimed at developing the notion, identifying these revolutions, and determining their consequences, but tended to be a bit vague when it came to concrete applications.<sup>8</sup> The RMA also spawned a jargon of its own featuring terms such as “systems of systems,” “information dominance,” and “asymmetric warfare.” In most uses, however, the concept was little more than a metaphor for rapid change.

Despite the jargon, the RMA vision of the future could be explained fairly simply: New information technology created major advances in military capabilities, e.g., precision munitions, remote battlefield sensors, spy satellites, and so forth. More importantly, all these systems could be networked together and coordinated by a central command. This idea of networking was the central concept of the RMA. This was the system of systems and the source of information dominance. The owners of the network would know more and be able to react faster and more effectively than any enemy. The networking of sensors with computer analysis and long-range precision strike capabilities would revolutionize warfare. As phrased by Nicolas Lemann, “Maybe there would be no battlefield, no ‘closing with the enemy’—just people at terminals launching missiles.”<sup>9</sup>

One follower of Marshall’s theories was Donald H. Rumsfeld, the U.S. Secretary of Defense (SecDef) (1975–1977) under President Gerald R. Ford. Rumsfeld was an early convert to the RMA concept, a set of ideas he would carry forward when he returned to the SecDef job almost 25 years later.<sup>10</sup>

## Finding the Right Way to Fight: Doctrine for Ground Combat

*All great armies of the world rest their land combat power upon the tank...[Soviet doctrine] emphasizes heavy concentrations of armor.*

—1976 Version FM 100-5, *Operations*, p. 2-2

While Ogarkov and Marshall were contemplating technologies on the horizon, most of the world's armies (and all the major armies in the west) were operating on some variety of maneuver warfare doctrine, as demonstrated by the German "blitzkrieg" in World War II. Ground combat prior to World War I had been primarily an infantry affair supported by artillery and cavalry. But the fruits of the industrial revolution (including armored vehicles, the machine gun, aircraft, and wireless communications) were widely applied in the war and heralded enormous changes. Numerous countries including Russia, Great Britain, Germany, the United States, and France experimented with mechanized forces after World War I. During the 1920s and 1930s military writers began to speculate on the use of faster, more reliable armored vehicles and airplanes coordinated by radio to conduct operations in depth. These ideas, as developed by Heinz Guderian in Germany, were put into spectacular practice by the Wehrmacht against Poland and France.

In the American Army, the direct result was the U.S. 1943 model armored divisions that George S. Patton led so successfully against Germany, using variations on Guderian's own methods. World War II in Europe became the dominant element in the Army's self-image because, in the words of Carl Builder, "nothing the Army has done since...can compare to who it was or what it did from June 1944 to May 1945."<sup>11</sup> The methods and organization that made it all possible became the "right" way to fight.<sup>12</sup>

Unfortunately the real world seldom accommodates itself to doctrine, and the Army's next two major engagements offered little scope for sweeping armored battles. In Korea (1950–1953) and Vietnam (1965–1975) not the enemy, the terrain, nor the political circumstances of the war were suitable for the fighting the "right" way. In the wake of Vietnam, General Creighton Abrams, the last U.S. commander there, became Army Chief of Staff (1972–1974) and set about regenerating the Army. For some analysts, the military-technical approach to war (material supremacy, battlefield agility, and massive firepower) had been applied in Vietnam and failed miserably. But, however bitter the outcome, the war failed to shake the Army's fundamental faith in mechanized warfare and military technology. General Abrams turned his back on the Vietnam experience and returned to the post-World War II doctrines of sustained heavy combat as the primary focus of the Army. Messy engagements like Vietnam were an aberration, and there was little patience for those who said otherwise.

Over the following years and several conflicts the specter of something-other-than-conventional war rose up over and over, but the Army and, for that matter, the entire U.S. defense establishment, resolutely avoided making them an important part of its doctrine. A confusing multitude of terms were coined to describe these

involvements: small wars, guerrilla wars, irregular wars, unconventional wars, three-block wars, insurgencies and counterinsurgencies, constabulary operations, stability operations, stability and reconstruction operations, postconflict operations, small-scale contingencies, stability and support operations, wars of the third kind, fourth generation warfare, peacekeeping, or peacemaking, or peace enforcement, Chapter VI or VII (of the UN charter) operations, military operations other than war, and low-intensity conflict, among others.<sup>13</sup> None lent much clarity and at best were considered lesser included cases of conventional warfare. But Vietnam and subsequent engagements did provide one enduring lesson that would condition the next generation of soldiers and politicians: casualty aversion. Long wars would generate unacceptable numbers of casualties and create widespread public opposition. Successful wars had to be short wars with minimal casualties.

## The October War

The U.S. Army was still withdrawing from Vietnam when an event occurred that seemed to vindicate the military-technical approach. On October 7, 1973—Yom Kippur, the Jewish Holy Day of Atonement—the Egyptian Army stormed across the Suez Canal in a sophisticated combined arms attack that caught the Israelis by surprise and threw them back across the Sinai Peninsula. Syria and Iraq joined the assault. Despite initial setbacks, the Israel Defense Forces quickly took the offensive, drove back across the Canal, and were in the act of surrounding the Egyptian Third Army when a cease-fire ended the war.<sup>14</sup> This conflict seemed like a perfect template for America's expected confrontation with the Soviets in Europe. The Israelis had used primarily U.S. equipment to fight a short, sharp, high casualty war against an enemy superior in numbers, attacking by surprise, equipped by the Soviet Union, and employing Soviet tactics. Lessons learned from the Israelis in 1973 were influential in the U.S. Army's thinking, training, and equipping throughout the Cold War. The war highlighted the importance of new technologies including tactical anti-aircraft and antitank guided missiles, sophisticated fire-control systems, and vastly improved tank gunnery. It also served as a welcome antidote to the Army's Vietnam-era concentration on infantry-airmobile warfare at the expense of other forces.

This lesson was welcome in the American Army, where the central focus was purely on military technique, the use of weapons, the maneuver of forces, and the like. Odd as this might seem to soldiers of earlier eras, when political and military knowledge were inextricably bound up together, it was a typical attitude in all the U.S. armed forces. American soldiers ardently believed in the advantages conferred by technology and sought technological solutions. "Soft" solutions, those using tools like unconventional warfare, propaganda, and quasi-political methods, were scorned.

For U.S. military analysts, the October War showed that aggressive ground combat doctrine overcame superior numbers by using attack aircraft and armored vehicles, specifically tanks, to maneuver deep into enemy rear echelons. The Israeli example was also welcome because it followed the model set by Hienz Guderian in



1938—air power as highly mobile artillery able to follow fast-moving ground forces. The focus remained clearly on land power and the tank.

## The Rise of the Active Defense

The traditional military description for the Israeli operations in October 1973 would probably be “strategic defense” accomplished by “tactical offense.” In other words, the overall purpose was defensive; the protection of the national borders. But the means was through aggressive offensive action at the local level. The U.S. Army coined the term “active defense” to describe this type of activity. General William E. DePuy, commander of the Training and Doctrine Command (TRADOC), made it his challenge to devise post-Vietnam doctrine. In so doing, he solidified active defense conducted by heavy armored forces as the Army’s central methodology.

General DePuy personally wrote much of the 1976 edition of 100-5, *Operations*, the Army’s basic how-to-fight manual. To DePuy, the post-Vietnam Army, riddled with doubts about its ability to wage a modern war, required something stronger than the usual simple set of guiding principles. It needed the prescriptive formula of the active defense. The Army of the 1970s was receptive to these ideas, not only because of the humiliation of Vietnam, but because they coincided with very basic beliefs about how success was achieved in war. Large numbers of officers believed passionately in the importance of heavy mechanized forces. The most senior of these, including DePuy, were veterans of World War II where they had experienced decisive combat that contrasted vividly with the stalemate of Korea and the morass of Vietnam.

In July 1976, the Army published the new *Operations* manual, marking the doctrinal exit from Vietnam and a refocus on mechanized warfare. Its message was that Army leaders had been right all along and their faith in the tank was not misplaced. One of those leaders was General Donn A. Starry, commander of the Army’s armored warfare school at Fort Knox and DePuy’s successor at TRADOC while the latter prepared to become Army Chief of Staff. With “tank generals” as chief of staff and chief of doctrine, the active defense strategy was expanded to include simultaneous offensive operations over the full breadth and depth of the battlefield. Active defense became enshrined as AirLand Battle Doctrine, the newest incarnation of maneuver warfare, in the 1982 version of FM 100-5.

This was a clear articulation of fundamentals that American generals had understood and practiced since World War II.<sup>15</sup> Perhaps most attractive of all, AirLand Battle saw ground combat as the only truly decisive form of warfare and, accordingly, made the Army the centerpiece of American military policy. Needless to say, the other military services did not agree with this analysis. But, for the Army, the principal instrument of AirLand Battle was the Army-led combined arms team, fully integrating the capabilities of all land, sea, and air combat systems, rapidly shifting by fire, and maneuvering to concentrate decisive combat power at the proper time and place on the battlefield.<sup>16</sup> In the 1980s the U.S. Army began to practice that art at

a huge National Training Center training area at Fort Irwin, California, an area larger than Rhode Island. Whole armored brigades honed AirLand Battle tactics in the California desert against a simulated Soviet force equipped with Warsaw Pact weapons and vehicles.

AirLand Battle was a highly technological approach to warfare. It depended on sophisticated sensors and surveillance systems to locate deep targets and enemy battlefield forces, rapid communications, and automated data processing to compile information and control forces and weapons systems (including tactical nuclear weapons) with the range and accuracy for “deep battle,” strikes against targets at ranges of more than 100 kilometers. The arrival of new developments in long-range artillery and missiles was expected to allow the Army to extend its striking range well beyond anything it had ever been.

AirLand Battle also endorsed the comfortable and well-understood division structure directly descended from the 1943 model armored division. However, to better support its new doctrine, in 1982 the Army began to modernize these units, adding more artillery and armored vehicles under what it called the “Division ’86” concept. Armored divisions (those consisting principally of tanks) received even more tanks while infantry divisions received more tanks and armored personnel carriers to become mechanized infantry, essentially identical to armored divisions except in the mix of forces. The number of personnel in each such division rose to about 15,000. This left a very uniform fighting force and an extremely heavy one. To deploy a Division ’86 division outside the continental United States could take up to two months for initial elements and up to four months for all the supporting elements to arrive.<sup>17</sup> It reduced strategic mobility to a glacial pace, prompting one cynic to remark that the Army was building the finest irrelevant force in the world.

The cure for this problem was “forward presence.” Heavy armor lacked strategic mobility, but it did not matter because large Army forces were already present in the two places they were expected to be needed, Germany and South Korea. In addition, large stockpiles of equipment were created in Europe, containing the arms and material for additional armored units. All that was needed was to add the troops who were far easier to ship across an ocean. Finally, since the attention of U.S. and allied intelligence assets was firmly fixed on the USSR, it was felt that there would be sufficient strategic warning to begin the necessary troop movements well before any hostilities could begin.

This was all fine and widely accepted, at least among Army planners. But there was still the nagging problem of “out of area contingencies” meaning conflicts outside Europe, in the Middle East, for example. How would the United States respond to that sort of contingency? It was a legitimate worry, and it gave rise to the Light Infantry Divisions (LID). These were smaller (10,000 men) organizations that could be moved from the United States to, say, Saudi Arabia entirely by air in a few days. But speed was purchased by removing nearly all of the heavy equipment from these units, including tanks, artillery, armored personnel carriers, aircraft, and most of the trucks. Once on the ground, the LID was not very mobile and did not have very much to fight with beyond small arms and mortars. Accordingly, the “light” division

began to gain weight as transport and support units were added. These elements would make the LID more effective but at the cost of mobility and increased logistic support. Rapid deployability and combat effectiveness seemed to be mutually exclusive concepts.

Naturally, AirLand Battle Doctrine had its detractors. Within the Army it was objected that the force configured to support that doctrine was too uniform and unsuited for anything other than a major theater war. The other services were apprehensive about any doctrine that made them servants of the Army. This was awkward since the deep strikes the doctrine called for were to be conducted by the Air Force (AF), a relationship that the Army preferred to call "a strong partnership." AirLand Battle was advertised as joint doctrine, but to the Air Force, it sounded more like an Army scheme to control AF assets.

Nevertheless, AirLand Battle doctrine, epitomized by FM 100-5/1986, was probably the high point of industrial age warfare. The service did begin a project called AirLand Battle-Future to explore new force designs, but it was a halfhearted effort and nothing came of it. Having achieved perfection, the Army saw no reason to tinker with its doctrine. In 1988 the Chief of Staff of the Army was moved to say, "AirLand Battle describes how we will fight now and into the foreseeable future."

The year 1988 also saw a quiet harbinger of the future, the AN/PSN-8 "Man-pack," the first portable Global Positioning System (GPS) receiver designed for soldiers in the field. It was big and cumbersome, cost \$40,000, weighed about 17 pounds, and tended to eat batteries. But it could be carried by a single soldier, was easy to use, and provided very accurate and reliable positioning within several meters. The PSN-8 was heralded as a practical application of the electronic revolution, and the Army determined it might eventually need as many as 900 of the units. Within four years the demand for GPS devices had increased to almost 75,000.<sup>18</sup>

## The Role of Air Power

Despite grumbling, the Air Force was remarkably acquiescent to its role under AirLand Battle. New Army tactical missile systems that could strike as deep as 165 km created some friction. Also, some aspects of command arrangements were an issue since the airmen traditionally regarded everything beyond artillery range as theirs.<sup>19</sup> But the air service had been in something of a doctrinal muddle since the end of the Vietnam War. As the mission of strategic nuclear attack lost importance with the waning Soviet threat, the air service lost focus among a welter of lesser tasks. According to a 1989 internal White Paper produced by Headquarters USAF, "The Air Force has lost a sense of its own identity and of the unique contributions air-power makes to warfighting. Fragmentation thus permeates our internal planning and consequently the way we present ourselves to others."<sup>20</sup>

Within the Air Force and its supporters a strong cadre of true believers held with great fervor that air power was the decisive military arm. In the tradition of Hugh Trenchard and Billy Mitchell, they saw air power as the natural replacement for the ground and sea services. This had become apparent with the publication of a

National Defense University thesis by Air Force Colonel John Warden. Called “The Air Campaign,” the work was ostensibly a review of the logic of military goals and objectives and how to reconcile the operational and strategic levels of war.

However, the interesting part for proponents of air power was the underlying theme of air dominance. Although carefully caveated with ritual obeisance to “jointness,” it was, in fact, an air power manifesto, and chapter titles like “War Can be Won from the Air” left little doubt about it. Warden’s ideas and those of other airmen began to coalesce as a new vision of warfare to replace the prevailing view that the Air Force’s principal job was to support the Army. This spirit was manifested in a 1990 Air Force White Paper that coined the slogan “Global Reach—Global Power” and stressed the independent role of air power.<sup>21</sup>

### **Asymmetric Warfare and the Anti-Soviet War in Afghanistan**

America’s most recent and serious bout with an asymmetric opponent had its roots in a faraway conflict that seemed to have no connection with the arcane issues of U.S. Army doctrine. In 1979, the Soviet Union invaded Afghanistan to support a tottering pro-Soviet government. American military special operators were initially impressed with the use of Russian *Spetsnaz* (special forces) but the war turned into a long, messy, and brutal struggle between Soviet troops, their Afghan supporters, and the opposing Muslim fighters called *mujahideen* or *jihadis*, both meaning “holy warriors.” Militarily, there did not seem much to learn from another messy insurgency in a remote corner of the world. The American government protested by boycotting the 1980 Moscow Olympic Games, but that was about the end of it.

Then, under the administration of President Ronald Reagan, the United States began active (but still minimal) support to the Muslim insurgency. With covert aid from the United States, Saudi Arabia, and others, resistance fighters in Afghanistan developed a worldwide recruitment and support network. Assisted by the clandestine services of anti-Soviet nations, especially Pakistan, this network equipped, trained, and funded thousands of the most radical mujahideen.<sup>22</sup> After almost ten years of costly and fruitless struggle, the USSR finally gave up the fight in 1989. It was counted as an important victory for the free world, but, since the Soviet Union was then in its death throes, attention quickly turned elsewhere.

Afghanistan slid toward chaos as rival warlords, local militias, religious factions, and bandit chiefs fought for control of various slices of the country. But some of the hardened mujahideen veterans rejected this Muslim against Muslim conflict and sought new venues for what they saw as a wider struggle against anti-Islamic forces.<sup>23</sup>

Around 1990, the world intelligence community began to turn up indications that the Afghan network was still in operation under the control of one Usama bin Laden, a young Saudi millionaire. Now he seemed to be re-forming the Islamist network as a loose international terrorist organization known by the Arabic word “al-Qaeda,” literally, “the base.”<sup>24</sup> The Afghan mujahideen were among the first recruits.

Also known variously as the Islamic Army for the Liberation of the Holy Places, the World Islamic Front for Jihad Against Jews and Crusaders, and the Islamic Salvation Foundation, bin Laden's network helped finance, recruit, transport, and train Islamic extremists to fight what they considered anti-Islamic forces around the world. This was interesting and perhaps troubling, but the soldiers, politicians, and intelligence officers of the West had other, more urgent concerns.

## **Operation Desert Storm, the Gulf War of 1990–1991**

On August 1, 1990, Iraqi dictator Saddam Hussein made the single worst military calculation of the late twentieth century. His limited patience exhausted by a long simmering dispute over drilling rights at adjacent oil fields, he sent his armored divisions crashing into neighboring Kuwait while threatening Saudi Arabia. On August 6 the United Nations Security Council imposed comprehensive economic sanctions against Iraq. Operating under a United Nations mandate, the United States and its European allies began to assemble a formidable coalition that included even Arab states in a united effort to oust the Iraqis from Kuwait. Meanwhile, Hussein's modern T-72 tanks stood on the Arabian border with a clear road to the ports and airfields at Dhahran and nothing to oppose them except Saudi militia.<sup>25</sup> A credible opposing force needed to be in place quickly, within 24 to 36 hours. America's heavy tank divisions would be ideal, but it would be a month before they could even begin to arrive. Even the LIDs were too slow, so the only units with that capability, the lightly armed 82nd Airborne Division and a USMC Expeditionary Force, were rushed to the Middle East.

The problem of strategic mobility, long wished away, had arrived with a vengeance. The Marines and paratroops could do little more than dig in and hold on until the heavy forces arrived. In the words of one 82nd soldier, "we would have been no more than a speed bump for the Iraqis." Fortunately, the Iraqi tankers displayed neither competence nor a will to fight, and the lightly armed Americans only needed to wait while Hussein dithered.

The first few M1 Abrams tanks did not arrive in Saudi ports until August 31, almost three weeks behind the Marines and paratroopers. The first armored unit was not ready for combat until mid-October. While Coalition forces began the months-long process of actually reaching the scene, analysts filled the popular media with dire predictions. They warned that the veteran Iraqi Army, heavily equipped with modern tanks and artillery and battle hardened after a seven year war with Iran, would become an "Iraqi meat grinder." Whole divisions would be destroyed, and friendly casualties would number in the tens of thousands. But after a month-long air campaign and a ground war of less than five days, the carnage among Iraqi units was so great that U.S. President George Bush stopped the war. Thousands of Iraqi soldiers had died, but the total number of combat deaths for Coalition forces amounted to less than 50. The predominantly American and British Coalition had inflicted a decisive military defeat in a shorter time, with fewer friendly casualties, than anyone had believed possible.

Largely unmentioned, but not unnoticed, was the annoying fact that it had taken the Coalition, including the United States, six months to get to the war. In the last analysis Hussein's unfathomable failure to take the initiative had made the victory possible.

Although it could never replace World War II in the affections of the Army officer corps, Desert Storm quickly became the favorite war of military theoreticians. While the victory was gratifying, the important point for military analysts was the use of advanced technology, especially precision weapons, long-range air power, and information systems. The long awaited "military-technical revolution" had finally arrived.

Two minutes behind the B-2s came eight B-1B Lancers from the 7th Wing at Dyess AFB, Texas, also launched from Anderson AFB and refuelled from KC-10As at Diego Garcia. Their targets were two battalions of troops in barracks adjacent to Bushehr airport. Each unloaded twelve AGM-154 Joint Standoff Weapons (JSOWs) from their weapons bays. Following a two-minute gliding flight, the ninety-six JSOWs, guided by onboard GPS receivers, unloaded their payloads of BLU-97/B Combined Effects Munitions (CEMs). They blanketed over a hundred acres of troop billeting and vehicle-parking areas with thousands of CEMs, and the effects were horrific. The two minutes since the bombs from the B-2 strike had given the troops time to throw on their boots, grab weapons, and rush outside to be shredded into hamburger by exploding cluster munitions.<sup>26</sup>

For the America's soldiers, victory was especially sweet. Desert Storm was the anti-Vietnam of American wars. Where the Vietnam War was long, costly, indecisive, and finally ended in defeat, Desert Storm was a quick, decisive victory at minimal cost. Never mind that it was a unique event, or rather a confluence of unique events—extraordinary military and political ineptitude on the part of Iraq combined with extraordinarily favorable political, technical, climatic, and geographical conditions for the Coalition. Unlike the North Vietnamese, Saddam Hussein set his armies directly against the strengths of the American-led Coalition. He presented the United States Army and its Coalition allies with exactly the war they had been preparing to fight for 40 years, on terrain ideally suited for the purpose. Given that opportunity, the Army fought magnificently. No one denied these facts; indeed, a small group of critics pointed them out endlessly. But the real attention was elsewhere—on the technology involved and the role of air power.

For the most part it seemed to be a war of machines, in particular missiles and airplanes. The record of a new generation of precision guided munitions (PGMs) was especially impressive. In the six-week air war, the Coalition air forces dropped more than double the number of laser-guided bombs used during the nine months of Operation Linebacker II in Vietnam, with more effect and far fewer losses.

After the war, an Iraqi general reflected on his experience under precision bombardment:

During the Iran war, my tank was my friend because I could sleep in it and know I was safe... During this war my tank became my enemy... none of my troops would get near a tank at night because they just kept blowing up.<sup>27</sup>

In large part because of PGMs, the Coalition air strikes were remarkably effective and avoided much “collateral damage” (incidental or unintended destruction). The Air Force was quick to showcase this with videos of F-117 stealth fighters firing precision munitions while the Navy provided shots of its submarines and battleships launching cruise missiles. The ground campaign had been very brief, and the world press corps (virtually none of whom had the least idea what they were seeing) focused on the long air campaign that led up to the ground assault. Space-based assets provided intelligence and communications while unmanned aerial vehicles (UAVs) conducted reconnaissance and surveillance. The Coalition enjoyed such good control of the battlefield that the mere presence of their forces kept the Iraqis from using their own radars. Iraqis were known to simply abandon their equipment on the approach of Coalition units. In one memorable incident, a group of Iraqi soldiers actually surrendered to a UAV.

Some problems also arose during the conflict. Lack of strategic air and sea transport for one. Numerous observers commented on the fact that few enemies were likely to wait quietly for six months while opposition forces flowed in unmolested. Precision weapons were in short supply, and there was an urgent demand for better coordination among all the services. Special operations and intelligence needed to be better integrated into the war plan. Many (or most) of the euphoric reports of PGM success turned out to be exaggerated or sometimes just plain wrong. Weapons put to the test for the first time displayed significant shortcomings, like laser-guided bombs that tended not to work in bad weather.

Despite the Coalition victory, Saddam Hussein remained in power. But then, the announced purpose of the war had been to eject his military from Kuwait, and that had been achieved. At the end of hostilities Saddam was forced to sign a number of agreements under UN Security Council Resolution 687, renouncing weapons of mass destruction while submitting to United Nations inspection. He also agreed to a “no-fly” zone covering much of northern and southern Iraq where his air force would not be allowed. No one really expected the notorious despot to keep his word, and the agreements were well short of a surrender. For this reason, the United Nations did not lift the sanctions imposed before the start of the war, keeping them as leverage to press for Iraqi disarmament.

Even if the outcome was not totally satisfactory, the war seemed to promise a uniquely favorable military future for America. As the world leader in the application of military technologies—and one of the few nations able to apply them on a large scale—the United States could expect to dominate any major future battlefield as decisively as it had the sands of Iraq.

## **Intelligence Operations**

Ogarkov and Marshall had been adamant about the importance of information in modern war. Operation Desert Storm took a great step forward in making strategic information resources available at the tactical level. This was critical to later developments because information, accurate, complete, timely, and available from the

highest to the lowest levels, is the cornerstone of the Future Force concept. Without this kind of data the concepts of early engagement and distributed formations simply will not work. Elaborate automated information processing systems feed on this kind of data, and without it the network will starve. Furthermore, raw data (e.g., sensor input) are of limited value. Data need to be analyzed. Analyzed information is called “intelligence.”

Prior to the desert war the tactical intelligence needed by a theater commander (such as commander U.S. Central Command, aka CENTCOM) came almost entirely from his own resources. National-level intelligence was used for national strategic purposes; it informed policy decisions and even military planning and procurement, but as far as the warfighting commander was concerned the data arrived either too late or not at all. It might as well have been nonexistent. But that changed in Desert Storm—the U.S. Army Intelligence and Security Command (INSCOM) delivered 13 satellite downlink terminals to provide “reach-back,” funneling national level data and analysis from the United States to CENTCOM tactical commanders. INSCOM was the Army’s “echelons above corps” organization that brought together national assets (e.g., satellites) and the service’s intelligence resources at the highest level. It began to bridge the gap to put national level assets at the service of tactical commanders. Corps commanders could receive national intelligence, and in a few specific, critical sectors timely intelligence was passed down to lower echelons. In at least one instance an opposing enemy unit was targeted down to the platoon level.<sup>28</sup>

The commander of the 24th Infantry Division reported that the intelligence was so accurate that in the battle for Basara he was able to hold his forces out of range and destroy Iraqi artillery based on imagery received from across the Atlantic Ocean. It was a real world example of what the revolution in military affairs (RMA) hoped to accomplish on a larger scale. The system was not perfect. Spread out among corps commanders and ten committed divisions, it could support only the most urgent requirements. Maps of Iraqi doctrinal force disposition were relayed by satellite to Saudi Arabia, but then distributed by courier. Many commanders received little or no timely support. Some received none. And there were serious bandwidth problems—in some cases downloading a complex photo product could take up to an hour. Still, it was a huge improvement and a promise of better to come.<sup>29</sup>

## **Air Power Seizes the Revolution**

For true believers in the USAF, Desert Storm symbolized “the domination of air power and a new paradigm of warfare” presaging “a fundamental shift in the way many wars will be conducted and the need for a new way of thinking about military operations.”<sup>30</sup>

There was some validity in the belief that Desert Storm was a new kind of war, but the differences were more of degree than kind. Some new technologies had a prominent role (such as precision guided munitions), but it was not a revolution. Desert Storm was fought by the doctrines of AirLand Battle, a direct descendent of Guderian’s blitzkrieg, enhanced by major improvements in firepower, mobility, command



and control, logistics, and reconnaissance. The mostly British-American Coalition had the good fortune to apply its doctrine against a relatively static defender on ideal terrain, and the results were awesome. But even though the great improvement in air power effectiveness made a wider range of targets possible, the types of targets were the same as during WWII, Korea, and Vietnam. This air success was also made possible in large part because the Coalition had a surfeit of air power available (President Bush had ordered a near doubling of air strength on November 8).

Furthermore, some of the most prominent high-tech systems such as the Army Patriot antimissile batteries turned out not to have performed nearly as well as first thought.<sup>31</sup> Moreover, of the 88,500 tons of bombs dropped, only 6,520 tons—7.4 percent—were precision guided ordnance, according to official Pentagon figures. Most of the weapons used were conventional bombs and artillery. But overall the high-tech weapons (stealth aircraft, laser guided bombs, cruise missiles, etc.) proved uniquely effective and might be considered at least a military technical revolution. Nevertheless, to many commentators it looked like the real thing, an actual revolution in warfare, or, rather, a revolution in military affairs.<sup>32</sup>

Then-Secretary of Defense Richard Cheney believed so. He stated in the official Gulf War after-action report, that the war “demonstrated dramatically the new possibilities of what has been called the ‘military-technological revolution in warfare.’”<sup>33</sup> He also handed kudos to the Coalition air forces, “The air campaign was decisive,” later adding that Iraq could not fight back “because the air war turned out to be absolutely devastating.”<sup>34</sup>

A study of the war conducted by the Center for Strategic and International Studies was equally enthusiastic. It contained an entire chapter entitled “The Revolution in Warfare” that was almost rhapsodic as it contemplated a future of automated battle management systems, space platforms, and unmanned aerial vehicles.

In sum, the nature of warfare is changing. Although the revolution in warfare is still underway, its outlines have become clear. The effects of technology—in precision guided weapons, in stealthy delivery systems, in advanced sensor and targeting systems, in battle management platforms—is transforming and in fact already has demonstrably transformed the way in which armed forces conduct their operations.<sup>35</sup>

Air power enthusiasts, led by the U.S. Air Force, were certain that the revolution was at hand and were quick to trumpet the role air power played in the war. The Battle of Khafji was offered as an example of air power halting an armored advance in a major theater war. Iraq had launched its only offensive of the Gulf War, moving armored units against the lightly defended town of Khafji, just across the border in Saudi Arabia. Their intent was to lure Coalition forces into a ground battle. What they got was flight after flight of Coalition warplanes that hammered the oncoming tanks, turned them, and harried them relentlessly during their retreat. One tank brigade, caught in the open, was practically destroyed from the air. The success at Khafji became the seed of what was later called “halt-phase” strategy, the idea that air power alone could halt an aggressor until friendly ground forces arrived.

Among the most enthusiastic celebrants was General Merrill A. McPeak, the U.S. Air Force chief of staff. Although he was careful to show respect for “jointness” (“all the services made a very important contribution”), he also emphasized that the story of the war “is largely a story about airpower, a success story for U.S. and Coalition air forces. This is the first time in history that a field army has been defeated by airpower.”<sup>36</sup>

McPeak was pleased and impressed with the performance of PGMs in the war, but he also understood their shortcomings, especially their high cost and their inability to function in bad weather. Accordingly, he dashed off a handwritten memo to the Air Force weapons development team, “We need all-weather precision-guided munitions.” And they needed to be cheap, to avoid the quick exhaustion of inventory experienced in Iraq.<sup>37</sup>

The U.S. Air Force celebrated its victory with a White Paper called “Reaching Globally, Reaching Powerfully: The United States Air Force in the Gulf War.” “The Coalition’s victory,” it said, “came from the wise and appropriate application of air power. Air power found, fixed, fought, and finished the Iraqi military.” The paper added modestly that “The Gulf War illustrated that the precision of modern air attack has revolutionized warfare.” In sum, air power had handed the ground forces a walkover.<sup>38</sup>

Finally, it concluded with a gratuitous slap at the Army. Air Force doctrine, it opined, “did not constitute a dusting-off of some doctrinal notions salvaged from the height of the Cold War, or an attempt to rework aging strategic visions to a rapidly changing world. Rather, it constituted a thoughtful, reasoned approach to the use of military force and presence in the post-Cold War period.”

## Post-Desert Storm

Ultimately, AirLand Battle and the Army that created it barely survived its success. The slow motion collapse of the Soviet Union more or less coincided with the Gulf War, and the world looked like a different place afterwards. Surveying the scene, Chairman of the Joint Chiefs General Colin Powell remarked, “I’m running out of demons. I’m down to Kim Il Sung and Castro.” Soon after, an article in *Aerospace Daily*, a leading defense industry newsletter, recalled Powell’s remarks and predicted: “Pentagon Budget Headed for \$150 Billion—Half Current Level—By 1996.” In the absence of any clear threat, policy makers saw the opportunity to trim military spending and demobilize large portions of the standing force.

## Doctrine at the Crossroads

Given the atmosphere of strategic ambiguity and the “easy” victory in the Gulf War, the services were hard pressed to defend their Cold War-era structure. In the Army, doctrine writers, planners, and strategists struggled with the so-called New World Order. Whom and where might the Army have to fight and how should it be done?