

Case Study in Army Transformation:

Creating Modular Forces

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Introduction

U.S. defense transformation is noted for its emphasis on acquiring modern information networks and other advanced technologies, but less so for creating new force structures and weapon platforms. The dramatic exception to this pattern is the U.S. Army transformation plan, forged in 2003–2004 and currently being implemented. This plan is imposing major changes on how Army forces are structured and also intends to acquire an entirely new set of weapon systems over the coming years. The centerpiece of this ambitious plan for restructuring is creation of the “modular brigade combat team” (BCT), which is being applied to all combat brigades in the active Army and the reserve component forces, and to new brigades that are being added to the force structure. Unlike old combat brigades, which were embedded in divisions and drew upon them for essential support, the new BCTs are to be entirely self-contained with combat and support units, and thus deployable on their own and usable as separate formations on the battlefield. Accompanying these BCTs are parallel, modular-creating changes to the Army command and control structure as well as its combat support and combat service support (CS/CSS) assets, and its aviation assets. The effect is to spread the concept of modularity across virtually the entire Army force structure.

The overall purpose of this sweeping conversion to modular forces is to make the Army more flexible, agile, and rapidly deployable for expeditionary missions and better able to carry out modern doctrines and force operations for the Information Age. Thus far, the Army has expressed satisfaction with the progress that has been made since 2004, along with determination to continue this plan to its completion. When the effort is finished and new, lightweight, networked weapon platforms and other vehicles—called Future Combat Systems (FCS)—have been acquired, the future Army will be quite different from the force posture that existed when transformation began. Hopefully, an active Army composed of 43–48 modular brigades and armed with networked FCS weapons and associated assets will be able both to conduct major combat operations and to perform the sustained stabilization and reconstruction (S&R) missions of the sort that have been taking place in Afghanistan and Iraq.

This case study analyzes the Army’s modular plan as well as its overall approach to transformation, including key rationales, goals, and main features. It begins by describing the pre-transformation Army force structure that was inherited from the Cold War and its aftermath. It then assesses how the Department of Defense (DOD) transformation philosophy and recent experiences in expeditionary operations—especially Iraq and Afghanistan—provide a strategic framework for determining how the Army has approached changes to its force structure. Then, it briefly describes the Army’s original transformation roadmap, which ruled during 2001–2002. Next, it portrays the main features of the current Army transformation roadmap that was adopted in 2003–2004. Then, it analyzes the BCT concept, as well as other modular formations being created by the Army—including their attractive features, their tradeoffs, and criticisms that have been levied at them. Next, it assesses the Army’s plan to create networked FCS weapons and other assets. Finally, it concludes with observations about future prospects and challenges facing Army transformation.

The Historical Legacy: World War II, the Cold War, and the 1990s

The Army force structure that existed in 2001, when transformation accelerated, reflected several decades of experience that took place during World War II, the Cold War, and the post-Cold War decade of the 1990s. Coverage of this history is important here because it helps illuminate the magnitude and complexity of the task confronting the Army as it pursued transformation, and it serves as a benchmark for illuminating how far the Army plan departed from the status quo. The key point is that from 1940 through 2001, the Army successfully confronted numerous challenges in building large, multifaceted forces capable of performing the shifting strategic missions at hand. The Army that existed in 2001 reflected this positive historical legacy, and was not broken or dysfunctional in some fundamental sense. But its large and cumbersome structure did require important changes in order to be able to carry out new expeditionary missions with greater speed and agility. The challenge facing the Army was to make these changes in ways acquiring the necessary capabilities, but without throwing out the baby with the bathwater.

World War II

During World War II, the Army principally was assigned the demanding mission of liberating Western Europe from Nazi rule. During the campaign of 1944–1945, the Army deployed a huge force of three million soldiers and 61 divisions to empower its offensive drive, along with British and other allied forces, from Normandy to the Rhine River and into Germany. The manner in which Army forces were structured played a major role in determining how their theater-wide campaign plan was carried out. Essentially Army combat forces were organized into large field armies of 3–5 corps apiece. Each corps was equipped with 3–5 divisions of about 14,000 soldiers apiece. Each division, in turn, was normally equipped with three maneuver regiments. Forerunners of Cold War brigades, these infantry regiments commanded three maneuver battalions. These regiments, however, were normally not independent, self-sustaining units, with their own permanently assigned support assets. Instead, they were organic parts of their parent divisions. The regiment commander had mainly tactical and operational responsibilities, and had only the three maneuver battalions, each totaling about 900 soldiers, plus a company of six artillery tubes, an antitank company, and a logistic support company—a total of about 3,200 soldiers—under his personal leadership. Virtually all types of combat support and logistic support, including artillery firepower, were provided by upper-echelon commands, particularly division and corps commanders. For example, division commanders had 72 artillery tubes and an engineer battalion under their control; corps commanders had 252 artillery tubes and 4–8 engineer battalions under their control.¹

¹ See Dwight D. Eisenhower, *Crusade in Europe* (New York: Doubleday, 1948). At the height of its buildup in Western Europe, the U.S. Army deployed 50 infantry and airborne divisions and 15 armored divisions that were distributed among five armies and 15 corps. Allied forces included 11 British divisions, 6 Canadian divisions, and 6 French divisions. Supporting them were large U.S. and British air forces. Additional U.S. and allied divisions were deployed in Italy. For discussions of U.S. and allied ground and air operations, see also David Eisenhower, *Eisenhower: At War 1943-1945* (New York: Random House, 1986) and Charles B. MacDonald, *A Time for Trumpets: The Untold Story of the Battle of the Bulge* (New York: Bantam Books, 1984).

This practice of embedding regiments in divisions was especially true for infantry divisions, which dominated the Army force structure. For armored divisions, a different approach was followed. Each armored division was composed of three regimental combat teams (RCT), each of which had its own organically attached support structure. As a result, these RCTs could be removed from their parent divisions, sent a considerable distance away, and operate on their own or with other forces. The effect was to provide modularity and flexibility in how armored forces were used in the European theater. But infantry divisions were another matter. Their regiments could not be readily detached from their parent divisions and sent elsewhere. Army infantry divisions were thus cast as units whose main components normally remained with them.

The Army's emphasis on allocating substantial assets to upper-echelon commands provided division and corps commanders with multiple options in deciding how to allocate critical amounts of combat power among their maneuver units. For example, a corps commander could allocate a substantial share of his artillery fires and logistic support to one of his three divisions, thus enabling that division to conduct offensive actions with extra strength and vigor. The favored division commander, in turn, was able to concentrate his support assets among one or two of his regiments, thus enhancing their potency. A core purpose of this approach was to enable Army forces to conduct a massive, theater-wide campaign in ways that combined the benefits of widespread geographical coverage and localized force concentration. Essentially, U.S. and allied forces had enough divisions to form a contiguous front line across the entire 700-kilometer theater of operations, and to employ nearly all of these divisions in constant offensive actions. The effect was to compel the undermanned German Army to disperse its forces across this entire front in order to protect Germany's borders. Within this framework, U.S. and allied commanders were able to concentrate artillery fires, maneuver operations, and logistic support at multiple selected, shifting points, thus enabling their forces to achieved localized advantages in combat power that drove German forces backward and inflicted substantial losses on them. In addition, U.S. and allied forces benefited from major tactical air support from bombers and fighters, which inflicted major losses on German combat forces and support assets. As a result, the German Army, which lacked comparable staying power, was gradually weakened while the U.S. and allied forces, which benefited from much greater ammunition stocks, other supplies, and casualty replacements, continuously maintained their strength at high levels. In this way, the German Army was gradually pulverized and eventually compelled to surrender in May, 1945.

This portrayal of a linear, broad-front, and attrition-oriented campaign plan by U.S. and allied forces, embodying slow but steady advances across the entire front, does not mean that bold, sweeping maneuvers by concentrated forces were not employed when the opportunity arose. For example, General Patton's Third Army broke through German defenses at St. Lo in July, 1944, and employed an encircling maneuver to trap much of the German Seventh Army. Similarly, British General Montgomery in early fall, 1944, launched a highly concentrated attack into the Netherlands that was aimed at driving into Germany's Ruhr area and winning the war quickly. This attack failed to achieve its most ambitious objectives, but it did succeed in liberating considerable Dutch territory from

German control. These big maneuver operations, however, were the exception, not the rule. For the most part, the war in Europe was waged and ultimately won by virtue of a broad-front strategy of many divisions and corps lined up abreast in a linear array, and that employed massive firepower, air strikes, steady attrition, superior sustainment, and unrelenting pressure across the entire theater to wear down a German Army that, although possessing excellent troops and weapons, simply lacked the numbers to compete indefinitely.

A key point is that the Army force structure of World War II played a positive role in allowing this broad-front strategy to be pursued successfully. In that conflict, combat regiments and their battalions did much of the tactical fighting, but they were not the main units upon which theater-level plans were forged. The main units were divisions and corps, and major combat operations were mainly anchored in how these large formations were employed and supported. Indeed, the Army corps, rather than the division, was normally the centerpiece of campaign planning. It provided a focal point for bringing together infantry, armor, artillery, and logistic support to form the Army's integrated, combined arms team. Maneuver regiments were important cogs in this machine, but not always its heart-and-soul. Indeed, in some cases infantry regiments were employed as tactical means to enable artillery to find and strike enemy positions. To an important degree, the Army prevailed not only because of its hard-fighting soldiers and effective combined arms operations, but also because of its excellence at employing artillery firepower and the logistic support required by it. Massing artillery fires was the main business of divisions and corps, not of maneuver regiments. Equally true, the Army's entire hierarchy of multiple command echelons—stretching from regiments and divisions to corps and field armies—proved effective at performing the two principal command functions of resource allocation and battlefield operations that were essential to carrying out a grueling war this huge and long-lasting. In that conflict, five decades before the Information Age, all of these echelons were needed, and none of them could have been dispensed with.

Finally, widespread standardization of Army force structures was a dominant theme of World War II. In order to facilitate training and logistic support for such a huge force—nearly 100 Army divisions were eventually fielded in Europe and Asia—an imperative existed to design Army divisions and regiments along a few standard models: mainly infantry, armor, and airborne units. When alteration of combat formations was needed, it typically was pursued by inflating or deflating the number of divisions assigned to corps, or corps assigned to field armies in numbers ranging from three to five. Maneuver regiments and battalions were typically treated as standardized units, whose combat assets remained constant and were not often altered to meet the demands of particular situations. The same philosophy of standardization also applied to the design of combat support and combat service support (CS/CSS) units: e.g., artillery, engineers, maintenance, and truck transport. The implication was that Army divisions and corps were intended to strongly resemble each other, and each was assigned a standard issue of internal components intended to provide a fully functional combined arms team that would not have to be torn apart and reassembled in response to shifting combat

conditions. This approach was suited to the demands and capabilities of mass production in the Industrial Age and to the operational requirements of World War II.

The Cold War

When the Korean War broke out in 1950, the U.S. Army force of multiple infantry divisions that deployed there reflected its World War II heritage, with its reliance upon triangular combat formations (e.g., three regiments per division) and large CS/CSS forces aimed at providing high firepower and enduring sustainment. After the Korean War, U.S. military strategy during the mid-to-late 1950s shifted to reliance on nuclear weapons and massive retaliation rather than sustained conventional defense. As a consequence, Army divisions were reconfigured to a pentomic design of five small brigades apiece, and were dominated by a doctrine of tactical nuclear warfare. The early 1960s, however, saw U.S. military strategy switch from massive retaliation to flexible response, which greatly increased the importance of being prepared for conventional wars. In response, U.S. Army divisions reverted to their traditional triangular formations, with three brigades apiece and large CS/CSS assets. During the mid-1960s, a large Army and Marine force of about 500,000 troops, along with air and naval forces, deployed to Vietnam to wage war against Viet Cong and North Vietnamese forces. This ground force was traditionally organized, was led by a highly echeloned command structure, and was equipped with large CS/CSS assets. Combat operations were dominated by infantry, airmobile, and artillery units that focused mainly on securing and protecting South Vietnamese territory while inflicting high attrition on enemy forces. The effect was to reinforce the Army's reliance upon traditional structures and formations. The main innovations of that war were use of attack helicopters and creation of airmobile units that employed large numbers of helicopters to quickly move infantry troops around the countryside.

When the U.S. Army returned in the early 1970s from the frustrating experience of Vietnam, it was badly demoralized and in need of modernization to replace its aging weapon systems, particularly its M-60 tanks and M-113 armored personnel carriers (APCs). Moreover, it was heavily an infantry and airmobile force: its few armored and mechanized divisions had atrophied because so much attention had been devoted to Vietnam. Low defense budgets prohibited systematic attention to the Army's need for enhanced readiness, new doctrines, and new weapons. In the mid-1970s, however, the Army encountered a new mission that called for major changes: conventional defense in Central Europe against the growing Soviet/Warsaw Pact threat. In Central Europe, the Army was assigned the mission of defending two major sectors along NATO's long inter-German border: the V and VII Corps sectors in southern Germany. In addition, it also was assigned the mission of rushing reinforcements from the United States to Europe in an emergency in order to provide NATO with additional, badly needed operational reserves. The Army's III and XVIII corps were assigned this reinforcement mission. By the early 1980s, fully 13 of the Army's 16 active divisions were oriented to NATO and Central Europe, where the emphasis was placed on fast-moving armored and mechanized infantry operations, not light dismounted infantry forces.

The mounting requirements of defense preparedness in Central Europe resulted in important innovations to the Army. Several infantry divisions were converted to armored/mechanized status, thereby producing an active Army of nine heavy divisions and seven light divisions (i.e., infantry, airmobile, and airborne units). In addition to the five division-equivalents permanently deployed in Central Europe, several division sets of Army equipment were prepositioned there in order to permit fast reinforcement from CONUS. Army reserve component units (i.e., National Guard divisions and brigades) were configured for European operations in order to permit their deployment there after mobilization in a crisis. The Army's goal was to be able to provide a D-Day force of ten deployed divisions after ten days of mobilization and reinforcement, backed by a total deployment of 20–25 active and reserve divisions after about two or three months of reinforcement.²

When larger budgets became available during the Reagan Administration, the Army embarked upon a major modernization effort, which was led by procurement of the new M-1 Abrams tank and the Bradley Infantry Fighting Vehicle (IFV), both of which were developed during the 1970's. These two weapon systems provided a badly needed infusion of extra firepower, mobility, and survivability for contending with well-armed enemy forces. Acquisition of attack helicopters, MLRS weapons, and the Patriot air defense system further strengthened Army forces. Because NATO's ground posture of 45 divisions at D-Day was outnumbered by the Warsaw Pact's 90 divisions, the Army endeavored to make each of its divisions as powerful as possible in order to enable them to fight outnumbered and win. Major emphasis was placed on generating massive artillery firepower. Divisions were equipped with enough artillery tubes, MLRS, and war reserve stocks to fire over 1,000 tons of ammunition per day: well more than double the rate of World War II. Moreover, each armored and mechanized division was equipped with about 275 tanks and 275 IFVs, plus several hundred TOW and Dragon anti-tank guided missile launchers capable of destroying large amounts of enemy tanks and infantry fighting vehicles. Large numbers of attack helicopters capable of anti-armor strikes were also acquired and distributed among the Army's divisions and corps. As a result of this widespread modernization, Army divisions virtually doubled their combat power and greatly improved their capacity to operate on the modern battlefield.

These new weapons enabled the Army to broaden its traditional focus on generating artillery firepower and stationary operations to include a greater emphasis on mobile operations. In response, Army doctrine gradually shifted from linear defense to non-linear operations in which armored and mechanized formations planned to conduct assaults against exposed enemy flanks and to employ other types of swift battlefield maneuvers. The Army's guiding concept was to enable each corps of three divisions to defeat a Soviet formation of five divisions and then to fight a second, five-division formation to a standstill. Overall, this preparedness effort was successful. By the time the Cold War ended in 1990, NATO's ground posture, led by the U.S. Army, had become

² For more details of the history of the NATO-Warsaw Pact military confrontation in Europe and its affects on U.S. force planning, see Richard L. Kugler, *Commitment to Purpose: How Alliance Partnership Won the Cold War* (Santa Monica, Ca.: RAND, 1993).

capable of mounting a stiff initial defense in Central Europe to the point of denying the Warsaw Pact confidence that it could prevail in a war.

The Army emerged from the Cold War as the world's premier ground force, capable of operating powerfully not only in Europe, but also in the Persian Gulf and Korea as well. Yet its force structure continued to reflect a traditional design. Its command structure continued to be highly vertical and layered, stretching from field armies and corps to divisions and brigades. The Army thought principally in terms of large-scale operations by corps and divisions: brigades of all types were mostly still embedded in divisions and not capable of independent operations on their own. Instead, division commanders were expected to draw upon their CS/CSS units to create brigade task forces that possessed the necessary support assets for each occasion. In addition, the Army continued to emphasize large CS/CSS structures provided by divisions, corps, and higher echelons. As a result, each division of 16,000 troops came attached with fully 32,000 support troops that were commanded by corps and field army headquarters. Taking its non-divisional support troops and war reserve stocks into account, an Army heavy division weighed over 300,000 tons, and a three-division corps, over a million tons. The effect was to make these formations highly powerful, but also big and unwieldy, incapable of deploying rapidly to distant areas that lacked prepositioned equipment and a well-developed infrastructure.

The 1990s

The liabilities and assets of the Army's traditional, weighty structure were put on display during the Desert Shield/Desert Storm campaign in the Persian Gulf during 1990–1991. When Iraq suddenly invaded Kuwait and threatened Saudi Arabia, the Army was slow to deploy to the region. Initially it was able to swiftly deploy only the 82nd Airborne Division, which lacked the tanks, IFVs, self-propelled artillery, and other heavy weapons needed for combat against Iraqi armored forces. As a result, initial defense of Saudi Arabia relied mostly on tactical air and naval forces, which were able to deploy swiftly, linked to a thin ground defense incapable of mobile armored operations. A period of high danger slowly passed as heavy Army and Marine forces began to arrive on the scene over a period of weeks and months. Fully five months were required to deploy a full force of nine Army/Marine divisions, with their large inventories of weapons, layered command structures, and large support assets. Once this ponderous deployment was completed, however, the U.S. ground force was ready for decisive operations. Employing its combined arms assets skillfully when the Desert Storm campaign was finally launched, the Army/Marine force, supplemented by British, French, and other allied formations plus air strikes, easily overpowered the Iraqi Army, defeating it in a matter of days. The lesson was that the Army could perform expeditionary operations in distant areas, but only after taking considerable time to arrive on the scene with its traditional, well-endowed structure.³

³ The coalition assault against the Iraqi Army was composed of a frontal assault against its main body coupled with a high-speed "left hook" attack around its exposed flank, carried out by the Army's VIIth corps and XVIIIth corps.

After the Persian Gulf War was won, the Army went through a period of consolidation during the 1990s. Its active force was reduced from sixteen divisions to twelve divisions, and then to ten divisions. The divisions themselves—equally divided into light and heavy divisions—retained much of their traditional character. Brigades remained embedded in divisions, and divisions remained under command of corps and field army commanders. The Army's CS/CSS support structure and its war reserve requirements also remained large and unwieldy. Preservation of this traditional structure was partly a product of the Army's lack of desire to experiment with major changes, but it also reflected the imperatives of U.S. defense strategy at the time. Throughout this decade, DOD focused its defense planning on being prepared for two nearly simultaneous Major Theater Wars (MTWs), which presumably would occur in Southwest Asia and on the Korean Peninsula. Each contingency was deemed to require about one-half of the active Army—five divisions apiece—plus Marine forces. The practice of planning for two contingencies this large reinforced the tendency of the Army to continue thinking in traditional terms.⁴

The Army remained well-prepared for contingencies requiring multiple divisions and corps, each of which could be sent with all of its organic combat and support assets. But what about situations requiring a mixture of forces that did not naturally arise from the existing force structure? Here, a less flexible and adaptable situation applied. An example will illustrate the troubles confronting the Army—a hypothetical contingency requiring three different types of brigades: one light infantry, one air assault infantry, and one armored. In order to assemble this force, the Army would have been compelled to remove each of these brigades, along with its CS/CSS support structure, from three different parent divisions. The act of detaching and assembling the necessary units would be time-consuming, thus inhibiting a quick deployment. In addition, the three parent divisions would have had key assets removed from them, thereby damaging their readiness until the necessary adjustments could be made. The bottom line is that the Army's existing structure did not readily permit the flexible design of uniquely configured task forces made up of several different types of combat brigades—the type of requirement likely to arise in many new-era expeditionary missions. In addition, the heavy weight of most Army units, brought about by weighty weapon systems and large support structures, made them almost impossible to deploy by airlift and therefore highly dependent upon sealift coupled with ready access to well-prepared ports. As a result, the Army entered the Information Age with a reputation for being muscle-bound, but slow-moving and lacking versatility.

In the eyes of critics, the Army's sluggishness at swift-deployment operations seemed to be confirmed when, in early 1999, NATO went to war in order to eject Serbian forces from Kosovo. U.S. air and naval forces quickly deployed to the scene and mounted an effective air bombardment campaign that achieved its goals over a period of several weeks. Although U.S. and NATO political leaders wanted to avoid commitment of large ground forces to Kosovo, a decision was made to deploy a small force of U.S. Army attack helicopters to the battle zone. Beset with a large, cumbersome logistic support apparatus and lacking a prepared infrastructure, these attack helicopters were slow to

⁴ For an analysis and critique of MTW planning during the 1990s, see Steven Metz et. al., *Revising the Two MTW Force Shaping Paradigm* (Carlisle, Pa: Strategic Studies Institute, U.S. Army War College, 2001).

deploy and equally slow in achieving operationally available status. The war ended before they were used in combat. Ultimately the war was won by airpower alone, but afterward, Army forces entered Kosovo in order to perform peacekeeping missions there in ways paralleling the peacekeeping mission that had been performed in Bosnia since 1995. These peacekeeping missions not only exposed the Army to new types of operations, but also called attention to the growing need for light armored vehicles; heavy M-1 Abrams tanks sometimes were unable to cross weak bridges in Kosovo. The 1990s ended with the Army's battlefield supremacy unrivalled, but with growing questions being asked about its suitability for performing a widening spectrum of expeditionary missions that seemingly loomed on the horizon.

Impact of Defense Transformation and Warfare in Afghanistan and Iraq

The Army's decision in 2003–2004 to alter its traditional force structure was influenced by two strategic imperatives, both of which merit brief discussion here: the DOD approach to defense transformation and the experiences encountered during warfare in Afghanistan and Iraq.

Defense Transformation

Although the idea of defense transformation had its origins in the 1990s, major efforts officially got underway in mid-2001, when DOD released its new *Quadrennial Defense Report (QDR 2001)*.⁵ A central purpose of defense transformation was to take advantage of information networks, precision munitions, stealth, plus other new technologies, weapon systems, doctrines, and structures in order to make major changes in U.S. military forces in ways that would produce substantial increases in their combat capabilities for carrying out Information Age, network-empowered operations and for enhancing military superiority over adversaries. Modern information networks composed of computers, sensors, distribution systems, and trained soldiers promised to greatly increase the effectiveness, efficiency, and multi-mission capacity of force operations. The core plan was to establish integrated communications, intelligence, operational, and logistics networks that could increase and speed the flow of information, thereby creating a common operational picture for all command echelons and among all service components. Precision strike munitions, in turn, promised to greatly enhance the lethality of U.S. forces, thereby allowing them to destroy enemy forces more rapidly or, alternatively, to allow smaller forces to perform combat missions previously reserved for larger forces. Information networks and smart munitions especially promised to enhance the combat capabilities of air and naval forces, but they also offered to make ground force operations easier and more effective as well.⁶

⁵ See Secretary of Defense Donald Rumsfeld, *Report of the Quadrennial Defense Review* (Washington D.C.: Department of Defense, 2001).

⁶ For additional official analysis, see Office of Force Transformation, *Transformation: A Strategic Approach* (Washington D.C.: Department of Defense, 2003).

Although many defense transformation initiatives had a technical focus (e.g., creation of a Global Information Grid), the effort was also guided by important strategic imperatives. Defense transformation abandoned the old DOD focus on threat-based planning anchored in a few canonical contingencies, substituting in its place “capability-based planning,” which decreed that U.S. military forces must have sufficient flexibility and agility to handle a wide spectrum of military operations, including fighting wars in unpredictable locations. In addition, defense transformation placed a high premium on joint force operations in ways that would fuse ground, air, and naval forces into a seamless web capable of working closely together on the battlefield. Also important, defense transformation focused on preparing U.S. military forces, including the Army, for expeditionary missions requiring swift deployment of joint forces to distant areas lacking a prepared infrastructure. Together, these strategic imperatives called for networked U.S. military forces that would have a different focus than had been the case during the Cold War and the 1990s. In particular, the growing emphasis on joint operations meant that all components, including ground forces, could no longer focus mainly on their own combat domains, but instead would have to think in terms of how operations in multiple domains could be blended together to create powerful effects on the battlefield.⁷

For the Army, joint operations meant that airpower would be providing enhanced support to ground forces, which dictated that planning for land warfare would need to take into account how the precision strikes of air forces could best be employed to achieve success on the ground. The presence of lethal airpower meant that Army forces could pursue more ambitious goals than before, and in some cases, employ fewer forces than before. The emphasis on expeditionary operations, in turn, meant that Army forces would need to be highly flexible and adaptable, capable of being swiftly packaged and deployed to meet an ever-shifting array of operational requirements. In previous years, contingency-based planning meant that the Army had the luxury of employing predetermined, constant force packages to meet operational requirements in a relatively narrow set of circumstances. The new focus of capability-based planning and expeditionary missions meant that the Army would be compelled to treat each strategic mission as unique, to shape uniquely tailored forces for each case, and to deploy them more rapidly than in the past. For the Army, this was an unfamiliar environment for which its traditional forces structure was not always well-suited.

Beyond this, defense transformation aimed to open the door to a new era of military doctrines and operational concepts on the battlefield that had important implications for how Army forces were structured and employed in warfare. Previously U.S. military doctrine had focused heavily on mechanical attrition processes in order to defeat enemy forces. Army doctrine, in turn, had focused mainly on massing large forces with formidable firepower in order to launch concentrated strikes against enemy troop formations. In previous years, for example, Army doctrine called for divisions to be deployed along relatively narrow frontages of 25–50 kilometers apiece, and for corps to cover frontages of 75–150 kilometers. By contrast, defense transformation switched focus away from attrition, and concentrated instead on a wide set of battlefield effects through

⁷ For additional official analysis, see Department of Defense, *Joint Vision: 2020* (Washington D.C.: Joint Staff, 2003).

dominant maneuvers and precision engagements aimed at unraveling the enemy's cohesion, thereby fracturing its capacity to operate effectively. This emphasis on battlefield effects, in turn, switched emphasis away from concentrating U.S. ground forces toward dispersing them on the battlefield in appropriate situations so that they could rapidly attack the enemy from multiple different axes of advance. A doctrine of dispersed, non-contiguous force operations meant not only that Army forces would be deployed across much larger distances, but also that maneuver brigades would need to develop the capacity to operate independently, at locations well-removed from their parent divisions and corps.

Afghanistan and Iraq

For the Army, the implications of expeditionary missions and Information Age operations became increasingly apparent when the United States invaded Afghanistan in late 2001, following the terrorist strikes of September 11. U.S. air and naval forces swiftly deployed to the scene, ready to conduct a precision bombing campaign against Taliban and al Qaeda strongholds. Small teams of U.S. and allied special operations forces (SOF) also quickly deployed, and were instrumental in helping air and naval forces strike their targets. But Army maneuver brigades—infantry units from the 10th Mountain Division and the 101st Airborne Division (Air Assault)—were able to deploy only by early winter, first entering major combat when Operation Anaconda was launched in February and March. The absence of Army combat forces in earlier weeks and months allegedly hampered efforts to trap Osama bin Laden and other top al Qaeda leaders when the opportunity was available at the battle of Tora Bora. During the subsequent Operation Anaconda in the mountain-surrounded Shahikot Valley, the Army's lack of mortars, artillery, attack helicopters, and armored vehicles compelled a reliance on massed air strikes by the Air Force, Navy, and Marines to win the battle. The phase of major combat operations in Afghanistan was successfully concluded by spring 2002, but the Army soon found itself with the mission of permanently deploying several brigades across a very large countryside in order to perform S&R operations and to prevent the Taliban from rebuilding a foothold there. By 2003–2004, it had become evident that the Army's presence in Afghanistan, supplemented by NATO forces from Europe and other allies, would be longer-lasting than originally envisioned.⁸

The invasion of Iraq that was launched in early 2003 provided the Army a further introduction to the unique demands and enduring requirements of expeditionary operations in the Greater Middle East. In prior years, CENTCOM war plans for major theater war there had contemplated the deployment of large ground forces totaling 6–7 Army and Marine divisions, followed by prompt withdrawal after the war was won. In the months preceding the 2003 invasion, however, careful study by DOD and CENTCOM revealed that a significantly smaller ground force would be needed to defeat the Iraqi Army and topple Saddam Hussein's government. The main reasons for a smaller force requirement were joint operations employing air power in ground attack roles and the superior lethality and maneuverability of U.S. ground forces. When the invasion was

⁸ For a journalistic account of Operation Anaconda, see Sean Naylor, *Not A Good Day to Die* (New York: Berkley Caliber Books, 2005).

launched, the coalition ground force included only two U.S. Army divisions—the 3rd Infantry Division (Mechanized) and 101st Airborne Division (Air Assault)—plus a brigade of the 82nd Airborne Division, coupled with a division-sized Marine Expeditionary Force and a the UK 1st Armored Division. The Army’s 4th Infantry Division (Mechanized) was also present offshore, but held in a reserve status. This relatively small force employed bold, fast maneuvers and precision strikes to quickly defeat the unraveling Iraqi Army and to occupy Baghdad and other major cities. This phase of the invasion was accomplished swiftly with quite low casualties, in ways suggesting that future major combat operations against some military rivals could be carried out with smaller ground forces than previously was thought possible.⁹

Within a few months of this overwhelming victory, hopes to promptly withdraw the bulk of U.S. ground forces from Iraq dissolved when insurgency operations began growing and Iraq proved to be highly unstable, marked by violent religious rivalries between Sunnis and Shiites. By early 2004, deteriorating events in Iraq were making clear that the U.S. military would need to maintain a ground force of 130,000 troops or more there for a considerable period of years, while carrying out demanding S&R missions and performing new types of counterinsurgency operations. The result was to confront the Army and DOD with an entirely new strategic situation than when transformation had gotten underway only two years earlier. On the one hand, the enduring requirements to maintain large ground forces in Iraq and Afghanistan, totaling more than 150,000 troops, meant that the Army would need to perform lengthy rotational operations in both countries: i.e. rotating troops and units out of these countries after about one year of presence, and substituting fresh troops in their place. On the other hand, the Army had to remain continuously ready for wartime deployment missions to Korea and elsewhere.

These two missions—enduring presence in Iraq and Afghanistan coupled with preparedness for war elsewhere—compelled the Army to temporarily add 30,000 troops to its active roster and to make greater use of activated Reserve Component (RC) forces (e.g. National Guard units) than ever before. Even with the presence of this added manpower, the new strategic situation created a previously unanticipated requirement for a larger active Army and for more combat maneuver units, especially for more combat brigades that would be available for duty in the Greater Middle East and for other preparedness missions. The Army’s existing posture of 33 such brigades, housed mainly in its ten active divisions, was not large enough to meet this requirement. Finding an effective solution to this problem, while also making the Army’s force structure more agile and mobile, was to prove a main focal point of the Army’s new transformation strategy that was adopted in 2003–2004.

⁹ For a description of DOD force planning for Operation Iraqi Freedom, see Tommy Franks, *American Soldier* (New York: Regan Books, 2004). See also Michael R. Gordon and Bernard E. Trainor, *Cobra II: The Inside Story of the Invasion and Occupation of Iraq* (New York: Pantheon Books, 2006).

The Army's Transformation Plan of 2003–2004: Toward Force-Wide Modularity

During 2001–2002, the Army issued its initial transformation roadmap, which contained important innovations, but proved to be short-lived because it did too little to reorganize and upgrade its combat forces for expeditionary missions in the near-to-mid term. This plan divided active Army forces into three categories: Legacy Force, Interim Force, and Objective Force. The plan mainly focused on the latter two categories. The Interim Force was to be composed of five Stryker brigade combat teams, four active and one reserve component. The Stryker units were to be medium-weight brigades dominated by Stryker combat vehicles that would help create a bridge between the Army's large numbers of light and heavy brigades. The Stryker brigade was the first modular BCT to employ a new organizational structure and RSTA squadron. The Objective Force was a distant vision of how the Army would take shape when its new FCS vehicles would be fielded in 10–15 years. The Army's plan for the so-called Legacy Force—encompassing 29 of its 33 active combat brigades and all ten active divisions—was focused primarily on achieving digitization, and on acquiring the new Crusader artillery tube and Comanche attack helicopter. Both of these weapon systems however, were subsequently cancelled when they were judged to be insufficiently transformational and otherwise failed to meet operational requirements. Critics besieged the Army with complaints that the Legacy Force was left mired in the status quo until sometime in the distant future when the FCS systems might be fielded.

Strategic Premises of Modularity

In 2003–2004, the Army reacted to these criticisms by issuing a new transformation plan that was portrayed in full detail in an officially published document of July, 2004. This revised plan abandoned the earlier framework of Legacy, Interim, and Objective Forces by creating two categories: Current and Future Forces. It retained the Stryker brigades and sought to accelerate introduction of FCS technologies. Its most important change, however, was an ambitious plan to reorganize how the combat brigades, divisions, and corps of the Current Force were structured. The centerpiece of this plan was creation of a new brigade “Unit of Action” (UA): the modular brigade combat team (BCT), which promised to dramatically reconfigure how Army combat brigades were structured and employed on the battlefield. Modularity was not restricted, however, to combat brigades alone. Rather, it was applied also to the Army's higher-echelon command structures and to the organization of its CS/CSS forces and aviation forces.

The Army's *2004 Army Transformation Plan: A Campaign-Quality Army with Joint and Expeditionary Capabilities* provided a strategic approach to transformation along with a “campaign plan” for executing the desired changes—by both adopting modular formations and later fielding networked FCS systems—in a carefully phased manner over the coming decade and beyond.¹⁰ The new plan began by discussing the imperatives of

¹⁰ See United States Army, *2004 Army Transformation Roadmap: A Campaign-Quality Army with Joint and Expeditionary Capabilities* (Washington D.C.: Department of Army, July 2004).

defense transformation and the Army's roles as a member of the joint force. It placed emphasis on learning the lessons of ongoing operations in Iraq and Afghanistan, which were blurring the traditional distinction between combat and stability operations, and were revealing enemies becoming more skilled at insurgency, terrorist attacks, and asymmetric operations aimed at blunting American technological superiorities. In addition, the Army transformation plan emphasized the important role of new-era joint concepts in determining how new ground forces and capabilities should be built. As spelled out in Joint Staff documents and the Army plan, these concepts included "joint operating concepts" (e.g., major combat operations and stability operations), "joint functional concepts" (e.g., battlespace awareness, force application, focused logistics, and network-centric operations), and "joint integrating concepts" (e.g., forcible entry operations, global strike, joint logistics, and joint urban operations). The effect of these joint concepts was to create an operational framework within which transformation efforts by all services, including the Army, were to be carried out. Also important, the Army transformation plan emphasized the importance of pursuing joint interdependencies for expeditionary operations as the future unfolded. It cited five key interdependencies: joint battle command, joint fires and effects, joint air and missile defense, joint force protection, and joint sustainment.¹¹

This strategic framework led the Army transformation plan to conduct an assessment of key Army capabilities for joint and expeditionary operations that would need to be developed for both the Current Force and the Future Force. Desired current capabilities included such areas as network-enabled battle command, force protection and logistics for noncontiguous battlefields, networked precision fires, and ability to conduct joint urban operations. Desired future capabilities included such areas as dynamic C4 architecture, better deployability and mobility, better ISR assets, lethal overmatch, improved training, and sustainment of modular forces. In order to create such capabilities, the Army transformation roadmap articulated a multi-year plan that would focus mainly on improving the Current Force from 2004–2010, and then gradually transition to focus on building the Future Force in the following years.

Although the Army transformation plan recognized that some future operations might require deployment of multiple divisions and corps—a conflict on the Korean peninsula was one possibility among others—it also responded to the growing likelihood that many expeditionary missions would require smaller forces, possibly only a few combat brigades and associated support assets. But because many of these contingencies promised to be demanding, the smaller forces deployed for them often would have to be multifaceted—e.g., a mixture of infantry, air assault, armored, and SOF units—as well as highly capable, equipped with modern weapons, modern information networks, and other Information Age assets that would enable them to perform as well as, or better than, the larger forces that would have been deployed in previous years. Acquiring these assets and ensuring the presence of well-trained troops attuned to the demands of such operations was a main concern of the Army transformation plan.

¹¹ See Department of Defense, *Joint Operations Concepts* (Washington D.C.: DOD, 2003).

Creating modular forces thus was not the only strategic imperative animating the Army's transformation plan, but it provided the overarching military framework for pursuing other capability enhancements in the near term and long term. While the initiative to create BCTs attracted the most public attention, the plan's larger potential impact derived from its mating of BCTs with modular forces in the other areas of command structures, support assets, and aviation units. The combination of modular forces in all four areas, in the eyes of the transformation plan, promised to significantly speed the process by which Army forces stationed in the United States could be selected, configured, and deployed for expeditionary missions while leaving the rest of the Army intact, capable of responding to other contingencies. Moreover, each of these modular formations promised to operate more effectively on the battlefield not only individually, but collectively as well. The combination of modular brigades that interlocked into a cohesive whole, improved command structures, leaner and more effective logistic support assets, and better-tailored aviation units was intended to significantly improve the Army's aggregate capacity to carry out a wide spectrum of expeditionary missions with forces that likely would be smaller than in previous years, but still amply large to get their jobs done—all while not draining other forces away from other missions. Beyond this, modular forces provided a modern setting within which to pursue long-term transformation with modern information networks, FCS weapons, and other new-era capabilities. This, at least, was the appealing vision put forth by the Army transformation plan, which imposed changes in force structures and weapons that went beyond those being pursued by the other services.

Key Features of Army's Modularity Plan

- Creation of New Unit of Action: Modular Brigade Combat Teams (BCTs)
- Fielding of 43-48 active BCTs, all independently deployable
- Consolidation of old layered command echelons into UEx and UEy modular units
- Reorganization of CS/CSS assets into modular units.
- Creation of modular aviation units
- Assignment of FCS weapons and associated systems to modular formations

Modular BCTs

The Army's plan for creating modular forces, including BCTs, stemmed logically from its comprehensive, multi-year approach to transformation. Whereas traditional Army combat brigades were embedded in parent divisions, the new BCTs were to be independent formations capable of operating entirely on their own. In order to achieve this independence, the Army plan called for critical CS and CSS support assets to be transferred from division commanders to brigade commanders. As a result, BCT commanders would now have under their control the full spectrum of combat and support assets needed to deploy independently and operate effectively without drawing heavily upon support from parent divisions and corps. These new BCTs were to be organized into three types: Heavy (armored and mechanized), Infantry (including airborne and air assault), and Stryker BCTs. The size of each Heavy BCT was to be 3700 soldiers, and each Infantry, 3400 soldiers. This troop level was substantially less than the 5300 troops

normally assigned to old-style brigades when their task-organized structure resulted in their full share of divisional CS/CSS assets being counted. The Army achieved this manpower reduction by assigning each Infantry and Heavy BCT only two maneuver battalions, of four companies apiece, rather than the three battalions assigned in the past. Only the Stryker BCTs were to retain three maneuver battalions apiece. By drawing upon the resulting manpower savings and a temporary increase in Army end-strength of 30,000 soldiers, the Army was plan, to be carried out over a period of several years, was to increase the number of its active combat brigades from 33 old-style brigades to 43–48 BCTs. In similar fashion, the Army plan called for RC brigades (National Guard units) to be reorganized into 34 BCTs. In a subsequent program review, DOD approved creation of 43 active BCTs, but earmarked the final 5 BCTs for validation depending upon future requirements.

In the Army's view, this larger number of active BCTs promised to greatly increase its flexibility and versatility for future expeditionary missions. Modularity meant that the Army could swiftly task-organize combat forces for each unique mission without tearing apart existing divisions and extracting cobbled-together brigades from them. Instead the Army would be able to flexibly draw upon whatever combination of Heavy, Infantry, and Stryker BCTs were needed for the situation at hand. The act of assembling such a tailored force, in turn, would leave the rest of the Army intact, thereby providing a large pool of BCTs which themselves could be drawn upon in order to handle multiple concurrent contingencies.

The Army's plan, moreover, called for this enlarged BCT force to be maintained at tiered readiness in order to provide for phased force generation. It articulated a 3-year readiness cycle for active BCTs, during which soldiers would be assigned to their parent units for the entire time. BCTs, the plan said, would be fully ready for deployment for about two-thirds of this time. As a result, at any given time, a large number of BCTs would be ready for prompt deployment within 30 days, some would be standing down and resetting from prior high readiness status, and some would be undergoing training for a future period of high readiness in a few weeks or months. A pool of high readiness units would mean that enough forces would always be available to perform sustained presence missions of the sort being carried out in Iraq and Afghanistan, including providing replacement BCTs for those BCTs that were completing their tours of duty in wartime theaters. Meanwhile, enough BCTs would always be available for additional emergency deployments, some after a relatively short period of mobilization and preparedness—including by drawing upon BCTs that were either recovering from earlier high readiness status or nearing completion of their training periods for future preparedness missions. The large pool of RC BCTs, in turn, meant that additional combat brigades could be promptly mobilized for demanding situations in which the active force was overstretched. The Army plan put forth a 6-year readiness cycle for ANG BCTs that would allow for 40 percent of units to surge for a contingency while still maintaining the capacity to support other missions, including homeland defense and disaster recovery. In addition, the plan created an Army Reserve Expeditionary Force of ten force packages, each of which would be eligible for a nine-month mobilization period one time during the 6-year cycle.

The Army transformation plan called for conversion of existing active brigades to BCT status during 2004–2009, coupled with fielding of the 10–15 entirely new BCT units during this period. The 3rd Infantry (Mechanized), 101st Air Assault , and 10th Mountain divisions were slated to be the first converted, followed by the remaining active divisions thereafter. Meanwhile, conversion of the 34 Army National Guard brigades to BCT status would take place during 2005–2010. The sequential phasing of this plan enabled the Army to focus on 4–6 active brigades and 6–8 National Guard divisions per year. It also enabled overseas-deployed brigades to begin converting to BCT status after they returned home from their tours in Iraq and Afghanistan. Completion of the entire BCT conversion plan by 2010 or shortly thereafter, in turn, was intended to have an entirely new force structure in place by the time that FCS systems began arriving on the scene. Successful deployment of FCS systems by 2014 and thereafter would mean that the entire, complex Army transformation plan could be completed by 2020 or sooner.

Surface appearances suggested that the act of removing one of three maneuver battalions would leave each Heavy and Infantry BCT with significantly less combat power in comparison to old-style brigades. The Army’s transformation plan, however, endeavored to compensate for this drawback by strengthening each BCT in other ways. Each of the two maneuver battalions would be combined arms units, possessing engineers, scouts, and sustainment forces. Each Infantry and Stryker BCT would be assigned a RSTA squadron capable of reconnaissance, surveillance, and target acquisition functions; each Heavy BCT would be assigned a cavalry squadron that would possess RSTA assets plus armored vehicles that provide firepower. Each BCT would also have a Fires battalion composed of two artillery batteries with target acquisition and countermortar radar systems. Each BCT would also have a Brigade Troops battalion composed of command posts, intelligence, and signals units, plus a support battalion consisting of transportation, distribution, and maintenance assets. Each BCT would also have a Support battalion for logistic supply. The Army plan argued that when the advantages of these assets and modern information networks were factored into the equation, the new BCT would possess aggregate capabilities that matched or exceeded those of old-style brigades. In essence, in the Army’s plan, the new BCTs were intended to offset less quantity with more quality.

Key Features of Army Modular BCTs

- Two maneuver battalions for Heavy and Infantry BCTs; three maneuver battalions for Stryker BCTs.
- RSTA squadron or cavalry squadron.
- Fires battalion composed of artillery batteries.
- Brigade Troops battalion for multiple functions.
- Support Battalion for logistic supply.

Notwithstanding such qualitative assets, some critics continued to argue that a BCT of only two maneuver battalions would suffer from the absence of either nearly 1000 infantry troops or 130 tanks and IFVs that otherwise would be available. The consequence presumably would be an insufficient number of troops and weapon systems

for missions in which numbers mattered as well as quality. The rejoinder to this criticism was that in such cases, each BCT could control more than two maneuver battalions once advanced information networks were fielded. Alternatively additional BCTs could be deployed to provide the necessary numbers. For example, a deployed Army division could be provided four or five BCTs rather than the standard three old-style brigades. A second criticism fretted about the potential consequences of permanently allocating to brigade commanders many of the CS/CSS assets normally owned by the division commander. The new BCT structure, critics alleged, could deprive division commanders of their important capacity to flexibly determine the amount of support that could be provided to the brigade commanders under their leadership. For example, division commanders no longer would possess the capacity to focus the bulk of their artillery fires in support of one brigade rather than uniformly distribute it among all three brigades. Yet a third criticism argued that BCT commanders would be saddled with too many responsibilities, and would have trouble performing their operational duties while also attending to such logistics functions as maintenance and supply. A fourth criticism argued in favor of a smaller number of larger brigades (e.g. 5000–7000 task-organized troops apiece), rather than a larger number of smaller BCT units. This viewpoint presumably would have left the active Army with 25–30 big, heavily armed brigades rather than 43–48 BCTs.¹² The Army transformation plan rejected these and other criticisms, yet this plan made conscious tradeoffs whose effectiveness could be tested only through operational experience. Even so, the switch to a larger number of modular BCTs offered obvious advantages in enhancing the Army’s capability for dealing with a widening spectrum of expeditionary missions.

Modular Headquarters

Another important feature of the Army’s transformation plan was its decision to create new, modular headquarters for commanding its BCTs. When the Army entered the Information Age, it continued to possess three high-echelon commands for operating its forces: divisions, corps, and field armies. The Army’s initial transformation plan made no changes to this structure, but the new plan of 2003–2004 sought to alter it by consolidating the three command echelons into two echelons, both of which were to be lean modular structures: the Unit of Employment X (UEX) and the Unit of Employment Y (UEY). In the eyes of critics, surface appearances suggested that the UEX and UEY would be merely linear improvements to old-style divisions and corps, but the Army plan argued that the changes would be truly transformational by virtue of creating decidedly new command structures that would be better able to carry out expeditionary missions.

The UEX was designated to be the Army’s main tactical and operational warfighting headquarters and for directly commanding BCTs for full-spectrum missions. Assigned no organic units apart from headquarters staffs, it was intended to be small and modular, capable of rapidly deploying abroad. Its staff was to include a command group, communications units, maintenance, security, and signals units. The UEX was intended to control up to six BCTs, to include any mix of Heavy, Infantry, and Stryker brigades. It

¹² See Douglas A. Macgregor, *Transformation Under Fire: Revolutionizing How America Fights* (Westport Ct.: Praeger, 2003).

also was intended to control a tailored mix of other warfighting functions, including CS/CSS brigades for artillery fires, RSTA, aviation, and sustainment. The UEx's span of operations and control thus resembled the traditional division command, but its modular nature was intended to allow it to be deployed independently and promptly to take command of whatever combination of combat and support brigades was necessary to meet battlefield requirements. For relatively small contingencies, a single UEx was to be capable of commanding all deployed Army forces, while (assuming appropriate reinforcements) performing many of the functions normally allocated to corps and army headquarters. For larger contingencies (i.e., requiring more than six maneuver brigades), two or three UEx units could be deployed, and would function under command of the UEy headquarters. The Army plan identified a requirement for ten active UEx and eight RC UEx—the same number of division headquarters currently in the force structure.

The UEy headquarters was intended to consolidate functions traditionally performed by corps and army service component commands. That is, it would mainly play the role of providing for the flow of resources to UEx headquarters and their subordinate combat and support brigades. In major combat operations, it also would normally become the JFLCC (Joint Forces Land Component Command) of the regional combatant commander, and exercise tactical control of land forces, including their deployment and commitment to battle. In addition to command staffs, the UEy would include sustainment, protection, and battlespace awareness assets. Similar to the UEx, it was to be a lean, modular organization, capable of deploying swiftly and providing command support to whatever mixture of combat and support forces were allocated to the situation at hand. While the Army plan did not say how many UEy staffs would be created, the existing posture of four active corps headquarters suggested the number that might be contemplated. A core premise of the Army's transformation plan was that the combination of modular UEx and UEy headquarters could perform the full range of command functions that would be required on the modern battlefield, while providing the flexibility and agility needed to respond to the full spectrum of missions and contingencies likely to be encountered.

Modular Support Brigades

In order to meet requirements for support assets stemming from Afghanistan and Iraq, the Army transformation plan announced measures to alter its force structure by shifting 100,000 active and RC troops to units that faced especially high demands. Manpower reductions and rebalancing of active/RC units were made in field artillery, air defense, engineer, armor, and ordnance battalions. The liberated manpower was to be distributed among military police, transportation, POL/water supply, civil affairs, PSYOPS, and biological detection units—all areas of high demand in carrying out S&R missions in distant areas. The effect was to increase the number of troops available for non-combat S&R missions, an improvement that had been urged by critics.

In addition, the Army transformation plan applied the philosophy of modularity to support brigades that primarily would be placed under control of its UEx commands. The main types of support brigades included aviation brigades, fires brigades, RSTA brigades,

maneuver enhancement brigades, and sustainment brigades for providing logistic support. Such modularity was intended to allow for prompt task-organizing and deployment of these assets in accompanying BCTs and UEx staffs on expeditionary missions. While modular and standardized, each of these types of support brigades were to be designed with flexible structures that would enable them to absorb additional assets if the situation demanded. For example, fires brigades could be expanded to absorb additional artillery tubes if necessary. Equally important, the exact number and mixture of support brigades could be varied to deal with the situation at hand. For example, whereas one contingency could require two fires and three sustainment brigades, another contingency could require a different mixture of these two units. Modularity allowed for such diverse requirements to be handled readily.

The Army's transformation plan endeavored to provide the kind of modularity and flexibility that would enable CS/CSS support structures to be tailored to the unique demands of each situation, rather than be deployed in fixed, prearranged packages that often would require larger-than-necessary support assets in order to ensure that all functions could be performed with the necessary strength. An important implication of this plan for flexible, modular support is that in expeditionary missions, the Army's previously long logistics tail could be shortened significantly, thereby allowing for speedier force deployment and smaller requirements for manpower and war reserve stocks coupled with better performance and reduced imprint on the battlefield.

In addition, the Army transformation plan announced an ambitious effort to use information networks and other new technologies to improve the performance the Army's entire logistic support system for battlefield forces. This plan called for improvements across the entire range of functions, including arming combat forces, transporting ammunition and stocks to distant areas and distributing them to committed forces, and achieving improved maintenance. Modular logistics units, ranging from rear-area supply depots to support units embedded in BCTs, were critical to this design for enhancing end-to-end support and sustainment, while reducing supply echelons and excess stockage requirements and increasing joint logistics planning. The ultimate goal was creation of a networked, lean, and highly responsive logistics support for the full spectrum of expeditionary missions, each of which would likely generate unique requirements and demands by engaged combat forces that could be widely dispersed over the battlefield and deployed long distances from ports and supply bases.

Modular Aviation Brigades

Surface appearances suggested that cancellation of the long-awaited Comanche had dealt Army aviation a serious setback. But the Comanche had suffered from problems during its development that weakened support for it within the Army. Unlike the Crusader, which had been cancelled by DOD, the Comanche was cancelled by the Army itself. Reacting to the cancellation, the Army transformation plan announced measures to apply funds saved from the Comanche program in order to recapitalize or modernize fully 2400 existing helicopters. For example, efforts were to be taken to improve avionics, attack

weapons, survivability, and maintenance. This shift of priorities offered to significantly increase the capabilities of the existing force, thus offsetting loss of the Comanche.

The Army's plan for refurbishing its aviation forces, however, did not end there. In addition, the Army transformation plan called for creation of modular aviation brigades. In order to correct for performance shortfalls encountered in Iraq and elsewhere, the Army plan called for active aviation forces to be organized into three different types of standardized, modular, and multifunctional brigades based upon company-sized building blocks: heavy, medium, and light brigades, each containing a mixture of 52–76 attack, utility, and general support helicopters. With its emphasis on flexible companies and brigades, this reorganization was intended to shift away from concentration of helicopters at the corps in order to provide for greater, responsive distribution to UEx units and BCTs. Other goals were improved sustainment, supportability, modular maintenance packages, and airspace control. The Army plan called for this reorganization of active and RC aviation forces to be carried out during 2004–2008.

Information Networking and FCS Systems

For the near term, the Army transformation plan called for a “network enabled” force, which implied less ambitious goals than the “network centric” capability being sought throughout most of DOD. But the Army plan was far from indifferent to the pressing need for capability enhancements in this important area. It put forth a plan for practical improvements in several areas, especially in intelligence (e.g., the Distributed Common Ground System-Army), widespread adoption of blue force-tracking assets (FBCB2-BFT), the JTRS radio communication system, and better networking of UA, UEx, and UEy headquarters. For the long term, the Army plan was significantly more ambitious. It called for full development and deployment of the Army's LandWarNet system, which would serve as the Army's portion of the GIG, analogous to the Air Force ConstellationNet and the Navy's Force Net. The desired effect was to create a fully integrated joint communications architecture that would facilitate global military operations by all combatant commands and their components. Along with LandWarNet came an ambitious long-term plan to greatly expand the Army's access to wide bandwidth through 2020. The Army's plan for LandWarNet and access to wide bandwidth, in turn, set the stage for pursuing full networking not only among high-echelon commands, but down to the tactical level of Army brigades, battalions, companies, and individual weapon systems. The vision articulated was that by 2020, the Army would be fully networked from top to bottom.

This vision of a network-empowered posture was central to the Army's plan for fielding FCS systems. The idea of creating a networked Army of lightweight combat vehicles had its origins in earlier Army force improvement efforts, including Force 21 and Army After Next. The FCS concept was officially unveiled in the initial Army transformation plan of 2001–2002, and then brought to fruition in the 2004 transformation plan. The contract award for lead system integrator of the FCS effort took place in 2002. In this plan, the Army's FCS program called for prompt fielding of new technologies and systems as they gradually became available through spiral development, thus progressively transitioning

the Army from the Current Force to the Future Force. FCS vehicles were designed to employ common chassis and standard parts, thereby reducing logistic support costs and the number of total vehicles required. Ultimately, the plan called for development and fielding of fully eighteen new FCS combat vehicles, including mounted armored vehicles, infantry carrier vehicles, cannons, mortars, air defense vehicles, command and control vehicles, unmanned aerial vehicles (UAVs), unmanned ground vehicles (UGVs), non-line-of-sight launch system (NLOS), medical vehicles, and logistic support vehicles, some of them robotic. In the Army's plan, all of these FCS vehicles were to be fully networked, and joined together in a seamless communications and information architecture that would facilitate highly integrated combat operations. Another important theme was that these FCS vehicles were to be lighter-weight than their predecessors, many of them light enough to be loaded aboard C-130 transports, which could carry only about 20 tons apiece. In the Army plan, light-weight weapons translated into faster deployability, including into distant locations lacking a well-developed infrastructure of modern airfields and sea ports.

The FCS plan to create lightweight weapons reversed decades of experience in which Army platforms had become increasingly weighty. Such lightweight vehicles meant that the new FCS systems could have fast tactical mobility on the battlefield as well as adequate firepower and lethality when the beneficial effects of sensors, computers, and new weapons were taken into account. The drawback, critics alleged, was that FCS systems might not have the high survivability that is commonly associated with thick armored protection, which accounts for much of the weight of traditional weapons. The proposed reduction of weight was especially noteworthy in the design of FCS replacements for the M-1 tank, which weighs nearly 70 tons, and the Bradley IFV, which weighs 35 tons. The same calculus applied to self-propelled artillery vehicles, which currently weigh well over 20 tons. If the new weapon platforms were to weigh in the vicinity of 20 tons, they could not, with current technology, possess nearly as much protective armor as their predecessors.

The Army transformation plan placed considerable emphasis upon the ability of a successful RDT&E effort to produce new technologies (e.g., new types of protective armor and sensors to warn of impending attack and enemy use of IED explosives) and thereby achieve a successful new-era balance among these competing imperatives. Army leaders expressed confidence that by using such new technologies, lightweight weapons could be designed with the necessary blend of firepower, mobility, and survivability. Critics, however, expressed worry that many of these new technologies were still on the drawing board and unproven, that the multiple FCS goals could not all be accomplished at the same time, and that the RDT&E process, in striving for a big leap forward into new lightweight technology, advanced sensors, ultra-sophisticated computers, and airborne systems was being pushed too far, too fast, and possibly beyond the art of the possible.

In addition, critics worried about another potential problem: the Army's aggregate combat power when the combination of BCTs and FCS systems was taken into account. They fretted that the package of lightweight vehicles and BCTs fielding only two maneuver battalions would deny the BCTs the mass, firepower, and survivability needed

to prevail against well-armed, tank-heavy opponents in close combat. The Army plan countered this criticism by asserting that the FCS-equipped BCT would be optimized to perform combat missions at distances beyond direct contact with the enemy. That is, the BCT would employ sensors and long-range fires (e.g., by artillery, missiles, and attack helicopters) to quickly disrupt and destroy large numbers of enemy forces before direct contact and close combat ensued. As a result, FCS-armed BCTs presumably would have ample fighting strength to destroy residual forces through fast maneuvers and lethal fires when direct contact occurred, thereby prevailing swiftly while also minimizing their own vulnerability to massed enemy forces. Critics continued to worry about the validity of this assertion, but as a practical matter, the long-range FCS plan ensured that many M-1 tanks and Bradley IFVs—principal heavy weapons for close combat—would remain in the Army inventory for many years. The long-range viability of the FCS plan for close combat, in turn, would depend upon how FCS systems prospered during the RDT&E process and whether their demanding design goals proved achievable.

The Army transformation plan called for accelerated development of FCS capabilities, not only by introducing new subsystems into the Current Force, but also by speeding creation of entire FCS-equipped BCTs. Whereas the original plan called for the first such BCT to be fielded in 2010, the plan of 2004 called for the first FCS-equipped BCT to be fielded and employed for evaluation in 2008. Successive spirals of FCS deployment would then expand the number of such active BCTs over a period of several years. The Army plan called for 8 FCS-equipped BCTs to be fielded by 2010, for 21 units to be fielded by 2012, and for 32 units to be fielded by 2014. FCS conversion of the Army's remaining 11–18 BCTs presumably would follow in succeeding years, as would eventual conversion of RC BCTs. Provided adequate funds were available and the FCS RDT&E effort unfolded successfully, the bulk of the Army was to be converted to FCS status around 2020 if not before.

Conclusion: Prospects and Challenges

In the years immediately following 2004, critics of the Army's modularity plan continued to worry about its alleged drawbacks, but the Army continued to express satisfaction that adequate progress was being made on implementing it in the aftermath of its adoption. Supporters of the modularity plan, inside the Army and outside, celebrated its innovativeness and other transformational qualities, as well as its potential contributions to making the Army more swiftly deployable, better able to handle multiple different contingencies, and more effective on the battlefield. While its ultimate effectiveness will need to be tested by missions and operations in the future, thus far (through no inherent fault of its own) it has not proven to be a panacea in Iraq and Afghanistan. From 2004–2007, the stability operations and associated S&R missions there continued to demand an enduring combined presence of 150,000 troops, and they eventually proved to exert substantial pressure on the Army's ability to sustain such large troop presences abroad. In order to help meet these demands, DOD in 2007 decided to further enlarge the active Army from 512,000 soldiers to 547,000, with this goal to be accomplished by 2013. In 2007, DOD also adopted a plan temporarily to surge an additional 30,000 soldiers to Iraq

in order to help quell violence there, and by early 2008 plans were being considered to send an additional 3,000 troops to Afghanistan for the same purpose.

The bottom line is that although the modularity plan enlarges the number of maneuver combat brigades in the Army, it thus far has not settled deeper questions about how large an Army is needed in order to handle multiple expeditionary missions abroad. Nor does it resolve the problem of the Army gradually becoming worn down in the face of large enduring missions demanding multiple brigades and thousands of troops that stretch the Army's rotational base. How large does the future Army need to be in order to handle such contingencies and demands? This question will need to be answered, and it cannot be resolved by the modularity plan alone. Beyond this, the Army's modular force is intended to be optimized for major combat operations and high-tech missions. While this focus is understandable in light of the Army's world-wide responsibilities, the equal reality is that enduring expeditionary missions in the Greater Middle East and adjoining regions demand not only combat maneuver brigades, but also large numbers of the CS/CSS troops that are needed for stabilization and reconstruction. For example, modular BCTs might not be the best organization for advising foreign militaries as they perform stability operations in their own countries—an issue now under review by the Army.

Will the modular Army, with its current structure, be able to provide sufficient numbers of both types of forces, or will further changes in its posture become necessary? In the eyes of critics, modular FCS-equipped forces might have trouble—owing partly to too much exotic technology (e.g., robotics) and too few foot soldiers—to perform S&R missions, counterinsurgency, and related operations in urban areas. In response to these and other criticisms, an alternative proposal called for the Army to create an S&R division that would include modular S&R brigades capable of being distributed to the combatant commanders.¹³ Another proposal was even more sweeping. It called for creation of a bimodal Army, with one part configured for swift high-tech combat operations, and the other part designed for enduring S&R presence and similar long-lasting expeditionary missions.¹⁴ The Army rejected both proposals, but together, they illustrated that although the Army's modular plan is a good step in the right direction, it is not necessarily seen, at least in the eyes of critics, as a permanent solution to reconfiguring Army forces for the full set of missions that could lie ahead.

Another important question arises: Exactly how swiftly deployable will be the Army's modular formations and FCS systems? Clearly modular formations will enable the Army to organize and prepared expeditionary forces more quickly. Also, smaller brigades, command structures and support assets, combined with lightweight FCS weapons, will reduced the tonnages that must be sent overseas in any given situation. In theory, a limited number of BCTs could be dispatched overseas via strategic airlift. But deploying a larger force of BCTs, along with their support assets, is another matter. The core

¹³ See Hans Binnendijk and Stuart E. Johnson, eds., *Transforming for Stabilization and Reconstruction Operations* (Washington D.C.: Center for Technology and National Security Policy, 2004).

¹⁴ For more budgetary detail, see Richard L. Kugler and Hans Binnendijk, *Shaping Future Defense Budgets: Defense and Technology Paper 6* (Washington D.C.: Center for Technology and National Security Policy, 2004).

constraint is that even if USAF air transports are fully mobilized, they can lift only about 15,000–20,000 tons per day to long distances, and a significant portion of this airlift must be employed in order to provide USAF combat formations with adequate support. For major deployments, the reality is that the Army will remain dependent upon fast sealift and overseas prepositioning of equipment in order to converge rapidly on diverse scenes. Further improvements in both of these areas will be necessary if the full benefits of faster Army deployability are to be realized.

Similar challenges evidently lie ahead for the Army's plan to introduce FCS systems in the coming years. The FCS plan is undeniably visionary, but its broad, sweeping scope—embodying not only new weapon platforms but also a major infusion of sensors and information networks—stretches the Army's RDT&E capacity, and that of supporting defense industries, well beyond anything ever attempted before. For example, the task of developing sophisticated new software is especially challenging and uncertain. Is the RDT&E process capable of performing this complex, demanding agenda? As of 2004, critics were expressing doubts on this score, and by 2007, their doubts had not vanished. Only time will tell whether the FCS effort succeeds, but as of this writing, it can best be regarded as an uncertain variable, not an assured constant, in the Army's transformation equation. Beyond this, questions loom about the affordability of the FCS plan on its current timelines. The Army's procurement budget is not as large as that of the Navy and Air Force. Major expenditures will be needed to repair or replace equipment worn out by extended duty in Iraq, and the FCS plan apparently will cost \$100–150 billion. Whether the Army will be able to afford such a large expense is uncertain, and this uncertainty is further enhanced by the large procurement requirements, totaling about \$1 trillion, facing DOD as a whole through 2020 and beyond.¹⁴ Not only does the Army need FCS systems, but the Air Force needs many new aircraft, the Navy needs new vessels, and ballistic missile defenses will need to be deployed. If future DOD budgets are not large enough, the combined effect of these multiple procurement challenges could compel setting of painful priorities, and the Army's FCS systems could suffer some of the consequences.

These challenges thus raise issues regarding how the Army transformation plan will unfold in the future in both its contents and pace. But such is the case for all ambitious transformation plans, including those of the other services. Much will depend upon how the future unfolds, and how the Army chooses to handle it. What can be said now is that even if the Army transformation plan embraces sweeping visions in the face of myriad practical challenges, it has at least put an end to accusations that the Army is hide-bound, tradition-minded, and locked in the past. This alone says something good about the Army's ability to handle future challenges as well as it has handled those of the past.

Instructor's Guide to Case Study of Army Transformation Plan

This case study of the Army transformation plan provides an opportunity to survey major changes taking place in Army forces and weapons, to gauge how sweeping transformations plans can affect military force structures in general, and to provide insights on the controversies, difficulties, and risks encountered in such an enterprise. This case study can be taught with the following objectives in mind:

Objective 1: Assess how the Army's historical legacy set the stage for pursuing transformation and Information Age forces.

Objective 2: Discuss how the Army's transformation plan of 2004 fitted into DOD transformation as a whole, and how it compared to plans of the other services.

Objective 3: Examine the benefits and tradeoffs of the Army's plan for creating modular BCT combat brigades.

Objective 4: Discuss other aspects of the Army's plan for modularity, including the impact on command structures, support assets, and aviation units.

Objective 5: Evaluate how the Army's plan for creating modular forces worked together with its futuristic design for fielding networked FCS systems to create a viable long-term vision for transformation.

Objective 6: Assess the goals, priorities, and risks of the Army's plan to create networked FCS forces in the long term.

Objective 7: Examine the capacity of FCS-equipped BCTs to employ standoff fires in order to prevail against well-armed opponents in impending close combat.

Objective 8: Evaluate the capacity of Army future forces to perform both major combat operations and expeditionary missions involving large enduring force presences and S&R operations.

Objective 9: Discuss the affordability of the Army's plan for acquiring FCS systems in the context of constraints on DOD procurement budgets.

Question for Objective 1: How did the Army's historical legacy affect its challenges and requirements for pursuing transformation and Information Age forces?

Historical experience from World War II through the Cold War and the 1990s, most of it successful, made the U.S. Army the world's most powerful ground force as the Information Age approached. But U.S. Army forces, which primarily were designed for major land wars, were large and cumbersome, and lacked the agility for swift deployments to new-era expeditionary missions. Their heavy weight, brought about by weighty weapons combined with large support assets, made them almost impossible to

deploy by airlift in large numbers, and dependent on sealift coupled with access to well-prepared ports. With their combat brigades embedded in divisions and not easily detachable, they were also not well-tailored to dispersal on modern battlefields and for similar operational concepts that emphasized multiple axes of attack rather than massing closely together for concentrated advances.

Question for Objective 2: To what degree did the Army transformation plan of 2004 respond effectively to the goals and priorities set by DOD transformation policies, and how did it compare to the transformation plans of other services?

The initial Army transformation plan of 2001–2002 was visionary in its long-range pursuit of FCS systems, but apart from creating new Stryker brigades, it failed to make major changes in so-called Legacy Forces, which comprised the bulk of the Army's structure. By contrast, the Army transformation plan of 2004 sought to introduce modularity across active and RC forces and to speed the arrival of FCS technologies and systems. As such, this new plan fitted comfortably into DOD's overall approach to transformation by promising to create better forces for new-term expeditionary missions while also pursuing radically new weapon platforms in the long term. Compared to other services, the Army plan envisioned greater changes in force structures and weapon platforms.

Question for Objective 3: What were the benefits and tradeoffs of the Army's plan to create 43–48 modular BCT brigades?

The Army transformation plan for BCTs offered the major benefit of not only increasing the number of combat brigades in the active structure, but also making them more swiftly deployable, more readily tailorable for task-organized expeditionary missions, and more suited to dispersed, independent operations on the battlefield. In the eyes of some critics, the BCT design took too many support assets away from division and corps commanders, and it suffered a loss of combat power by fielding only two maneuver battalions rather than the standard three battalions. The Army sought to compensate for the loss of this battalion by strengthening the BCT in other ways, such as assigning RSTA assets and organic artillery tubes.

Question for Objective 4: To what degree did Army plans for restructuring command echelons, support forces, and aviation units promise to further enhance the modularity of the Army?

The Army plan called for two command echelons—UE_x and UE_y units—to replace the existing three echelons, for streamlined and modular CS/CSS assets, and for multiple types of modular aviation units. These changes promised to further increase the capability of the Army to organize and swiftly deploy forces for expeditionary missions, and to employ them effectively on the battlefield by carrying out modern combat doctrines with less-layered command structures, leaner support assets, and aviation assets better able to provide direct help to engaged BCTs.

Question for Objective 5: How did the Army's plan for creating modular forces work with its futuristic design for creating networked FCS systems combine together to create a viable, cohesive transformation plan for the near term and long term?

Basically the two component plans were designed to operate sequentially in interlocking ways, thus providing successive waves of changes to the Army during 2004–2020. The pursuit of modular forces came first, with most changes to be accomplished by 2010 or before. As this phase of transformation was being completed, initial efforts to field FCS-equipped units were to begin, resulting in the fielding of 32 FCS-equipped BCTs by 2014, followed by the rest of the active and RC structure afterward. Essentially the creation of modular forces was intended not only to provide usable combat capabilities in the near term, but also to create a foundation of new combat formations for introducing networked FCS systems in the aftermath. In the long term, the combination of modular BCTs and networked FCS systems was intended to provide a fully transformed Army for new-era missions and operations.

Question for Objective 6: What were the key goals, priorities, and risks of the Army's plans for creating networked FCS-equipped forces?

The Army plan endeavored to create a highly networked force—equipped with ultra-modern computers, sensors, UAVs, information networks, and robotics—that would enable its multiple lightweight FCS combat vehicles to perform joint expeditionary missions with greater speed and fighting proficiency than before. In the Army plan, FCS vehicles would have tactical speed on the battlefield coupled with high lethality deriving from direct fire, indirect fire, and overhead systems. In the eyes of critics, the main risks were questionable battlefield survivability of FCS platforms caused by insufficient armor protection, coupled with uncertainty about the RDTE plan's ability to achieve the desired standards of technological innovation and proficiency for the entire set of FCS systems and subsystems, including information networks and weapon platforms.

Question for Objective 7: How did the Army's plan for lightweight FCS weapons propose to deal with the problem of close combat with well-armed enemy forces?

Critics alleged that the FCS-equipped BCTs would lack the defensive protection systems and armor protection to survive in close combat with well-armed enemy forces. The Army plan offered two solutions to this allegation. The first solution was technological innovations that would provide FCS systems with better protection. The second solution was to rely upon lethal fires to destroy the bulk of enemy forces at distances beyond visual contact, thereby ensuring that FCS-equipped BCTs could swiftly overpower residual enemy forces when close combat did take place.

Question for Objective 8: To what degree does the proposed Army force structure provide a well-endowed strategic capacity to perform major combat operations as well as expeditionary missions that include enduring presence and S&R operations?

The proposed Army force structure is to be optimized for major combat operations, but its BCT brigades will be able to perform other types of expeditionary missions, and its increased numbers of CS/CSS support units in several areas will provide additional assets for non-combat S&R missions. Proposed expansion of Army manpower to 547,000 troops will provide additional resources, including for sustained presence missions abroad. Even so, some critics allege that the Army will still not be large enough for future missions, and they argue that the Army remains too preoccupied with major combat capabilities and insufficiently attentive to S&R missions and related expeditionary operations. Regardless of how such criticisms are appraised, the transformed Army will be capable of deploying abroad more quickly than now, but it will still be dependent upon fast sealift and overseas prepositioning of equipment to deploy large numbers of BCTs rapidly to distant locations.

Questions for Objective 9: To what degree is the Army's FCS plan affected by constraints on future DOD procurement budgets?

The Army's FCS effort likely will require investment expenditures of \$100–150 billion in the coming years, which will require increases in Army procurement budgets. The availability of these funds will depend on DOD's overall budget, the expenses needed to reset Army equipment after Iraq, and potential competition from other DOD procurement programs, including fighter aircraft, naval vessels, and ballistic missile defenses.