

**Conceptual Foundations
of a Transformed U.S. Army**

by

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and
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**The Institute of Land Warfare
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The Wass de Czege-Sinnreich collaboration began during the development of AirLand Battle doctrine and the founding of the School of Advanced Military Studies in the early 1980s and continues now during the annual series of Army Transformation Wargames and Defense Advanced Research Project Agency exercises to develop Future Combat System command and control.

This paper represents the opinions of the author and should not be taken to represent the views of the Department of the Army, the Department of Defense, the United States government, the Institute of Land Warfare, or the Association of the United States Army or its members.

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Foreword

Although military transformation only recently has become a matter of widespread public discussion, efforts by the U.S. Army to understand the requirements of a rapidly changing strategic and technological landscape have been underway for more than a decade.

Veterans of several years of Army studies and war games, the authors believe these efforts have matured to the point where it now is possible to describe with some confidence both the challenges U.S. military forces will confront in the next several decades, and how the Army must adapt itself to them.

At the heart of transformation are changes in the geopolitical context of operations, the physics of the battlefield, and the nature of future threats. Recent events in this country and elsewhere provide an unarguable example of just how quickly and unexpectedly the geopolitical environment for military operations can change. The prospect is for more of the same. Future military forces must be prepared for operations of uncertain duration and intensity, launched with little or no warning, against a diversity of enemies who have adapted their own patterns of operation to their perceptions of U.S. strengths and weaknesses.

To cope with this challenge, Army forces must, in the authors' view, be able to integrate rapidly and smoothly with other joint forces, deploy rapidly from strategic distances directly into battle, sustain themselves in an austere theater, and defeat changing enemy patterns of operation faster than the enemy himself can exploit them. Meanwhile, the Army's own operations must be so fluid and disconcerting that an enemy's adaptation to them is belated and ineffective.

While the concepts outlined here anticipate improvements in information and other military technologies, they are less dependent on technological than on cultural change. At base, the challenges confronting the Army today have less to do with materiel than with organization, doctrine, education and training. As in the past, victory on future battlefields will not result from technology alone, but rather from the creativity with which it is employed.

GORDON R. SULLIVAN
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March 2002

Conceptual Foundations of a Transformed U.S. Army

Introduction

Although military transformation only recently has become a matter of widespread public discussion, efforts by the U.S. Army to discern the requirements of a rapidly changing strategic and technological landscape in fact have been underway for more than a decade. They began almost immediately after the Persian Gulf War with the Army's "Louisiana Maneuvers" and continued throughout the 1990s with a series of Advanced Warfighting Experiments and "Army After Next" studies and wargames.

During the past two years, the Army has extended these efforts through a more focused series of Army Transformation studies and experiments, including major wargames such as the annual "Vigilant Warrior" series and field exercises at Fort Hood, Texas, Fort Lewis, Washington, and the National Training Center at Fort Irwin, California. These did not foresee the specific nature and extent of the 11 September 2001 Al Qaeda attacks on the United States, but they did anticipate the threat of combinations of terrorist networks and criminal syndicates based on the territory of rogue nations and shielded by their conventional military forces.

Nevertheless, while these efforts have generated a host of important lessons and insights, they have not yet produced a coherent portrayal of the way Army forces will fight in a future conflict in partnership with their sister services. As one thoughtful officer recently wrote, "The Army's picture of future war is intuitively obvious to those who have immersed themselves in this effort for the last two years, but it consistently eludes those who restrict their military education to what they read on the Washington Metro every morning. If we do not offer a simple, clear picture of how we will fight, our concept will be supplanted by simpler, narrower images that are easy to sell but impossible to execute."¹

Having actively participated in the Army's study efforts during the past seven years, the authors believe the latter have matured to the point where it now is possible to describe with some assurance the challenges U.S. military forces will confront in the next several decades, and how the Army must play its part in meeting them. This paper is the result.

Why Transform?

While the essential nature of war has changed remarkably little throughout history, the conduct of war has changed repeatedly in response to geopolitical, demographic and technological developments. Armies that adapt successfully to these developments win. Those

that fail to adapt lose, and the nations they defend with them. Organizational adaptation thus is a vital and continuing professional military obligation.

It also presents several dilemmas, however. Neither war itself nor the circumstances in which it erupts and must be conducted are easily predictable, especially for democratic societies committed to resisting rather than promoting aggression. Few armed forces have the luxury of pursuing future capabilities unhampered by the obligation to be ready to fight with the means at hand. Even the most innovative army therefore must constantly reconcile its modernizing ambitions with potential near-term requirements.

Nor is that simply a matter of finite resources. Even well-funded adaptation inherently is disruptive. Soldiers and weapons must be integrated into new organizations, the latter must be trained and exercised, and their leaders must learn to employ them in new ways. Doing all that takes time, and while the eventual result of those changes may be a more effective fighting force, in the short term they exact an inescapable price in readiness.

Technology likewise is a two-edged sword, especially when it changes with great rapidity. Thoughtfully applied, technological innovation can provide a measurable battlefield advantage. But the laboratory and the battlefield are dissimilar environments, and promise in the former by no means guarantees performance in the latter. Historically, technological advantage alone rarely has been decisive in war. Instead, the most impressive victories more often than not have been achieved by forces using technology equally available to both sides, but employed by the winner in an innovative and therefore unexpected way.

Finally, no adaptation is likely to be successful that is insensitive to changes in the nature of the threat. War remains above all a contest of competing minds and wills. The ultimate test of any military transformation is its relevance to the threats with which it is confronted.

Throughout most of the Cold War, the major threat confronting the Army was that posed by the Soviet Union and by other nations that, with regional variations, patterned their military forces after those of the Soviets. The very consistency of that pattern simplified the design of the Army's doctrine, organization, equipment and training. When the threat diverged from that pattern, however, as it did in Vietnam, the Army had to improvise.

Today, foreign military forces are shedding Cold War patterns and developing capabilities more suitable to their unique circumstances, requirements and capabilities. By and large, apart from major powers such as Russia and China, these forces design primarily against local and regional threats. Having several times witnessed the results of U.S. intervention, however, many also are searching for methods within their economic and technological means to deter or defeat such intervention, if only by making it intolerably expensive.

In the meantime, the rise of ethnic, religious and tribal rivalries unleashed since the end of the Cold War, together with growing access of terrorist and criminal groups to advanced weaponry, has engendered new forms of violence that increasingly exceed the ability of civil authorities to manage, inflict immense human suffering, and in some circumstances risk escalation to serious regional conflict. While U.S. military intervention in such cases remains controversial, that has not prevented the repeated commitment of Army forces to humanitarian, peacekeeping, peace enforcement and counterterrorism tasks, further expanding the range of potential requirements that Army Transformation must accommodate.

The shift from a readily definable military threat based on widely common capabilities and a relatively consistent pattern of operations to a growing range of threats reflecting varying objectives, capabilities and methods presents a force design dilemma all its own. Solving it requires above all a comprehensive understanding of the environment in which future U.S. military operations are likely to take place, an analysis of its implications for their conduct, and a clear-headed appraisal of the ability of today's Army to cope with them.

The Changing Operational Environment

The U.S. Army emerged from the Persian Gulf War the world's undisputed master of the conventional land battlefield. Endowed with superb soldiers and leaders and in close partnership with sister services and coalition allies, it exhibited unprecedented mobility, lethality and survivability, traversing vast distances at extraordinary speed and winning every engagement by margins so lopsided that they scarcely merited the term "battle."

It did so, however, in circumstances uniquely favorable for the style of warfare in which it had trained for more than a decade, and against an enemy far less capable than those it was organized and equipped to confront. Required to deploy into an undeveloped theater, Army forces were able for nearly four months to assemble and prepare for combat unhampered by enemy interference. That same leisure, together with the open topography of the battle area and virtually continuous overhead surveillance, enabled the Army to conduct an intelligence preparation of the battlefield far more extensive than most attackers ever have enjoyed. Once committed to battle, it confronted attrited and operationally static enemy formations in largely open ground in conditions of unchallenged air supremacy and with an overwhelming advantage in information, mobility, firepower and protection.

These operational advantages were only enhanced by the strategic conditions in which the conflict transpired. The enemy was isolated within his region, without strong allies and with no sources of external support or sanctuary. In contrast, the United States enjoyed both widespread international political support and the direct military assistance of a multinational coalition, including unimpeded access to the regional territory, coastal waters and airspace essential to the successful conduct of operations.

Finally, combat took place in terrain extraordinarily favorable to both air and mechanized operations. Apart from Kuwait City, the battle area comprised no significant urban areas, and Kuwait City itself was evacuated by the enemy uncontested. Neither mountains, nor rivers, nor heavily forested areas impeded trafficability. Maneuver space was limited only by lines of communication, and rearward operations such as sustainment, communications, and command-and-control were threatened only by the relatively primitive Iraqi Scud missiles. Air, maritime and logistical operations likewise were largely immune from threat, as were departure, transit and arrival port facilities and staging areas.

The Army cannot count on these conditions to recur. And it is important to look beyond current operations in Afghanistan. Just as the crises of the past were unpredictable, so will be those of the future. On current evidence, the next few decades will confront the United States with an unstable and highly uncertain geostrategic environment. Potential military threats may emerge from revanchist or aspiring great powers, new regional alignments and/or transnational terrorist or criminal organizations. The global explosion in communications, together with continuing proliferation of military technologies, will allow even less wealthy states to field

ground combat capabilities once reserved only for armies fielded and supported by fully industrialized national economies.

In these circumstances, we can reliably predict neither the locus nor the nature of a future threat to U.S. interests requiring major military intervention. What can be said with some confidence is that the conditions of that intervention may well be more challenging than those of the Gulf War in every dimension.

For example, while forward stationing and prepositioning remain important tools of deterrence in regions of known threat such as Korea and Southwest Asia, the very uncertainty of the environment makes it more likely that U.S. forces will find themselves committed to operations where no such forward presence exists. As in 1990, therefore, the United States may well have to deploy forces from strategic distances to an undeveloped theater. Unlike 1990, however, it may have to do so without easily accessible regional staging points and in the teeth of a significantly increased anti-access threat.

As in 1990, the United States likely will seek to deter and if necessary fight as part of a coalition. Unlike 1990, however, the proximity of coalition partners to a future theater of operations cannot be assumed. Indeed, in some cases, their very proximity may inhibit support by regional allies fearful of a growing missile and weapons of mass destruction (WMD) threat. Meanwhile, participation by more distant coalition partners may simply increase the deployment and sustainment burden on U.S. strategic mobility assets.

The physical characteristics of a future theater of war also are likely to prove more challenging. Continuing global urbanization increases the probability that U.S. forces will confront complex topography even where nature itself does not impose it. That, and the probable intermingling of hostile forces with noncombatants, whether inadvertent or deliberate, will make both movement and targeting more difficult, and may significantly diminish the effectiveness of both air and surface-to-surface standoff fires. Proliferation of hostile communications, sensor, missile and special operating force capabilities, together with a growing WMD threat, may radically increase the zone of vulnerability of support systems and facilities formerly immune from direct attack, and may require even combat forces to avoid prolonged occupation of detectable and therefore targetable locations.

Finally, and perhaps most important, a future military confrontation likely will present the United States with a significantly more challenging threat. In that respect, like any victor, we inherit the consequences of our own past success. American operations in the Gulf War, in Somalia, in Kosovo and in Afghanistan have furnished potential adversaries a five-foot shelf of information on our preferred patterns of military operation, the capabilities on which they depend, and their strategic, operational and tactical strengths and weaknesses.

Taken together, those operations reveal several exploitable vulnerabilities. At the strategic level, they include slowness to respond to crisis, resistance to commitments that may result in prolonged military engagement, political sensitivity to casualties and collateral damage, and a continued attraction to the independent coercive employment of standoff attack. At the operational level, they include continued dependence on developed ports and airfields in the operational area, the need to establish robust in-theater sustainment stocks and facilities, and continued heavy reliance on ground lines of communication. Finally, at the tactical level, they include a tendency toward set-piece and thus relatively rigid tactical planning, combat forces

optimized for operations in open terrain, and dependence on a complex network of sensors, communications, and command-and-control systems.

An adversary perceiving these vulnerabilities is likely to conclude that the longer he can delay an effective U.S. response, and the more prospectively expensive he can make it appear, the greater his chances of avoiding it altogether. Where possible, he will seek to deter U.S. intervention by means ranging from diplomacy to the threat of direct action against the United States and its allies, including, increasingly, cyber threats to vital military and economic support systems. He will seek through a combination of persuasion, bribes and intimidation to deprive the United States of regional allies, and thus of access to local territory, airspace and port facilities. Failing to deny such access outright, he may seek to delay U.S. deployments by means ranging from ballistic and cruise missile attack on the forces themselves to attack of departure, transit, arrival and staging areas by special operating forces, information operations, and weapons of mass effect. The longer it takes the United States and its allies to project an operationally significant force, the more effective such anti-access efforts are likely to be.

Meanwhile, absent an ability to dispute control of the airspace outright currently possessed by few potential adversaries, a future aggressor instead will seek to reduce his exposure to standoff attack by avoiding massed formations, dispersing, concealing and hardening critical assets, and operating wherever possible in and from complex terrain, to include exploiting the physical and moral sanctuary furnished by heavily populated areas and urban terrain. From this protected posture, a determined enemy will use his own standoff attack capabilities, together with unconventional operations and conventional ground attacks carefully restricted in time and space, to degrade or destroy U.S. and allied forces and facilities, inflict casualties, and thus prolong and increase the price of continued hostilities.

Finally, all these operations will take place in the context of new and changing domains of conflict. As cyberspace expands globally, traditional interference with communications and psychological operations will be augmented by information operations whose effects may extend well beyond the theater battle. Access to space already is becoming universal, and the increasing difficulty of moving and positioning military assets undetected will affect our own operations as much as, and perhaps more than, an enemy's. And far more than in the past, future military operations will transpire in the glare of global media whose expanding access to independent information and communications systems will make their activities virtually impossible to monitor and control.

Implications for the Conduct of Military Operations

Taken together, these changes in the strategic context of operations, the physics of the battlefield, and the nature of the threat inevitably condition the way future U.S. military operations will have to be conducted. Moreover, they affect not only the Army, but also America's joint forces as a whole. Their likely impact on operations can be described under four broad headings: General-purpose capabilities, operational maneuver from strategic distances, multidimensional operations, and adaptive force dominance.

General-purpose Capabilities. If there is a defining quality to the operational environment outlined in the previous pages, it is the growing convergence of military challenges once associated with distinctly different kinds of contingencies. Where formerly the challenges associated with conducting conventional military campaigns against modern, industrial age

armed forces were easily distinguishable from those associated with defeating an unconventional threat, and the latter similarly distinguishable from military support of essentially civil activities such as disaster relief, border security and suppression of civil disorder, those distinctions increasingly are eroding. As recent humanitarian and peace enforcement operations have shown, even low-intensity requirements may escalate at any time and with little warning into outright hostilities against enemies whose growing access to advanced technology may allow them to threaten even conventional armed forces.

Meanwhile, as special operating forces and capabilities proliferate, and as traditional legal and moral restraints on the use of force surrender to communal, religious or ideologically driven absolutism, clear distinctions between conventional and unconventional conflicts are fading, and any future major conflict is almost certain to see a routine commingling of such operations. Similarly, once useful demarcations between front and rear or between theater and strategic operations will continue to evaporate as the instrumentalities of war become more interdependent and, as is increasingly true of communications and space systems, less easily separable from their civilian and commercial counterparts.

Because of this gradual but accelerating convergence of military challenges, it is becoming infeasible to design military forces, especially ground forces, to deal uniquely with one aspect of the conflict spectrum or another. Even in low-intensity conflict, the requirements for firepower, mobility and protection are growing, while the likelihood that a major conflict would transpire without concurrent unconventional and civil support and security challenges is becoming vanishingly small.

Instead, the emerging operational environment will place a premium on Army forces that are organized, equipped and trained to shift rapidly and smoothly from any point on the conflict spectrum to another, precluding the need to improvise for any mission that diverges in scale or character from a single preconceived design requirement.

Until recently, achieving that sort of versatility was limited largely by the physical attributes of weapons and equipment. Emerging technologies increasingly promise to overcome those limitations. The challenges that remain are in part doctrinal and organizational, but above all a matter of leadership and training. Development of a true general-purpose Army thus implies significant military cultural as well as technological adaptation.

Operational Maneuver from Strategic Distances. Regardless of the nature and intensity of a future military contingency, it is clear that the United States no longer can afford to rely on forces designed to operate from an established theater infrastructure, or that require the prior development of such an infrastructure as a precondition for launching operations.

Instead, we must expect that future joint operations will have to be mounted and to a large extent sustained directly from the United States, its territories and those of allies choosing to support us, creating minimal essential theater support facilities concurrent with and as an integral part of combat operations.

It is worth noting that this is a novel requirement only in the context of the last fifty years, during which the forward stationing of U.S. forces accustomed us to both a relatively permanent support structure and extensive host nation facilities. What *is* novel is the increasing time compression affecting future force projection, and the expanding radius within which future theater infrastructure, however austere, will be vulnerable to attack.

It also is important to understand that the crucial measure of successful force projection is not the speed with which the first combat element engages, but rather the rate at which the United States and its allies are able to achieve decisive operational superiority, depriving an enemy of freedom of action and making his ultimate defeat both inevitable and irreversible.

In short, the purpose of operational maneuver from strategic distance is achievement of a deployment momentum that not only permits rapid seizure of the initiative, but also never relinquishes it. That objective obviously has implications for the strategic mobility assets on which all the services rely. But it has equally important implications for the way in which all of America's future forces must be organized, equipped and trained.

Multidimensional Operations. Historically, military operations on a single line always have been vulnerable. At best, they produce expensive victory through attrition. At worst, they invite a clever enemy to economize where he is threatened and exploit the resulting freedom of action to attack elsewhere. One-dimensional operations in effect simplify the enemy's planning problem, confronting him with a finite threat against which he can focus planning and operations confident that he will not be surprised.

What is true at the operational level is also true at the strategic level. Nations confronted with a single kind of threat, whether blockade, bombardment or outright invasion, find ways to defend against it that still enable them to strike back against their enemies, prolonging their own resistance, enlarging their enemies' costs, and sometimes, when the relative strengths are not wholly disproportionate, turning the very tide of war.

Far from altering that historical pattern, future operations are likely instead to reconfirm it. Indeed, as advanced military capabilities proliferate, and as the physics of the battle area become more complex, the penalties associated with one-dimensional operations likely will increase. Even relatively primitive military forces have added new technological arrows to their quivers, as Russia's experience in Afghanistan and more recently Chechnya and our own experiences in Somalia and Kosovo attest. In the latter conflict, a nation ranking 38th in the world's roster of military power endured nearly three months of relatively uncontested bombardment without significant degradation of its warmaking potential.

As military capabilities improve worldwide and as potential adversaries adapt their own patterns of operation to their perceptions of U.S. strengths and weaknesses, the premium associated with operations that attack an enemy simultaneously on multiple lines, against multiple points of vulnerability, and using multiple but complementary means will only increase. Such operations deprive an enemy of the freedom to concentrate his own efforts, overload his planning and coordination mechanisms, and compel him to expose his forces to new threats in the very effort to protect them against others.

Thus, operations in Afghanistan against Taliban forces were more rapidly decisive because surrogate ground forces were available to compel enemy forces to concentrate, and coalition airpower in conjunction with special operating forces was able to exploit the resulting exposure. But surrogate forces may not always be available, and even when they are, there are no guarantees that their campaign objectives and ours will coincide. The dominant force on the ground inevitably shapes campaign design disproportionately.

Operations in Afghanistan also demonstrated that multidimensionality will be essential if we wish to be able to modulate the application of violence to accommodate shifting operational and

strategic objectives. As the familiar saying has it, when all one has is a hammer, every problem looks like a nail. No transformation can succeed that forfeits the ability of America's military forces to match their tools to the full range of tasks with which they may be confronted.

Adaptive Force Dominance. In the last sense discussed, multidimensionality simply is one aspect of a broader requirement flowing from the emerging operational environment: the need for America's armed forces in general, and the Army in particular, to field capabilities designed with the inherent operational and tactical flexibility to defeat adversaries who are themselves highly adaptive.

One reason that is becoming more important has already been mentioned. As nations formerly wedded to Soviet equipment and patterns of operation strike out in new military directions, their employment options increase commensurately. That increased flexibility, moreover, provides both the opportunity and the incentive to exploit emerging military technologies in ways that their continued embrace of Soviet-style doctrines might well have inhibited. Among the areas in which alternative approaches are especially attractive and well within the technological reach even of second- and third-tier militaries are functions such as distributed command-and-control, cooperative engagement from standoff, layered air defense, information operations, and the use of commercial space systems.

At the same time, the explosion in information technologies is a potent enabler of aspiring military forces, including the paramilitary elements of transnational terrorist groups and criminal organizations such as drug cartels and mafias. Indeed, unconstrained by legal or bureaucratic obstacles, such groups have even more freedom to experiment with new and emerging technologies than do most military organizations.

The very breadth of alternatives open to such potential adversaries presents a dilemma for more conventional military forces, accustomed to defining their own doctrinal and training standards in terms of observable and relatively consistent patterns of potential enemy behavior. For example, the Army's mechanized combat proficiency was honed throughout the 1980s by exercises at the National Training Center against an opposing force modeled closely on Soviet forces. That effort paid off handsomely in the Gulf War against Iraqi forces armed and trained by the Soviet Union. Whether it would do so as effectively in a future conflict against an enemy operating in a very different style is far less clear.

The reality is that any such preconceived assumptions about the operational behavior of potential adversaries, especially smaller adversaries, are very likely in the future to prove wrong to some degree. Even where an adversary's behavior can be forecast, moreover, it is likely to change significantly when battle is joined, and the longer hostilities are prolonged, the more it is likely to alter.

To cope with this uncertainty, U.S. forces require adaptive dominance—the ability rapidly and without major reconfiguration to defeat changing enemy patterns of operation faster than the enemy himself can exploit them. Meanwhile, our own operations must be so rapid and fluid that an enemy's adaptation to them is belated and ineffective.

To a very considerable extent, adaptive dominance is a product of military culture, fostered or inhibited by training and leadership. But it also presumes a versatile and robust force design that incorporates such qualities as aggressive situational awareness, organizational flexibility,

agile ground and air mobility, close integration of fires with maneuver, and effective synchronization of sustainment with combat operations.

Today's Army Forces

Given these implications, what can be said about the suitability of today's Army to meet future requirements? The question may best be answered by a review of current Army capabilities and the condition of the fighting systems on which they depend.

Today's Army was designed primarily to defeat a numerically superior mechanized threat backed by strong air and naval forces, on the territory of an ally, and from a forward-deployed posture in which essential combat support and sustainment infrastructure already was in place.

For the heavy ground forces on which this mission primarily relied, equipment and organizational design placed less importance on rapid deployability than on tactical robustness and survivability. The Army's current fighting platforms were optimized for close combat against similarly powerful enemy systems supported by vast quantities of standoff firepower, in terrain affording relatively unrestricted ground maneuver. Support systems such as air defense, engineers, intelligence and communications were optimized for area support from largely secure rearward locations, with little concern for strategic or operational mobility. Both combat and combat support forces could rely on sustainment from a developed theater base replenished through an extensive network of host nation ports, airfields and theater transportation facilities.

For unexpected contingencies in areas without prepositioned forces, the Army today relies on its highly professional airborne and air-deployable rapid-reaction forces. However, while these can deploy very rapidly and operate for a limited period with austere sustainment, they lack both the ground mobility, lethality and survivability to defeat a mechanized threat and the logistical robustness to engage in prolonged operations even against a less powerful adversary. Commitment of such forces to any but the least demanding contingency thus presumes early augmentation with heavy Army combat formations and the accompanying buildup of a theater sustainment base.

Because of this organizational bifurcation, today's Army forces require extensive mission tailoring for any off-design contingency. At best, such tailoring reduces response time, degrades unit cohesion, and impairs initial combat effectiveness. In addition, the need to sequence forces of widely differing mobility and sustainability into the battle area diminishes operational momentum and risks ceding the initiative to the adversary.

Constraints on strategic lift, which must be apportioned among all the components of the joint force, merely increase that risk, delaying the buildup of an operationally significant ground combat capability, hence the ability of the joint force to conduct multidimensional operations. Prepositioned stocks diminish strategic lift requirements only in the specific regions in which they are positioned. Even then, lift constraints impose a predictably sequential deployment pattern that delays the achievement of a decisive theater superiority and invites a creative adversary to attack U.S. forces where they are most vulnerable—in identifiable chokepoints such as airports, seaports and tactical assembly areas.

Lift constraints are magnified by the heavy logistical demands of today's force, which not only retard its commitment in areas where sustainment is not prepositioned, but also impede its

ability to shift rapidly from one line of operations to another, diminishing its operational tempo and requiring pauses that provide breathing space to the adversary, furnish him exploitable opportunities, and delay achievement of the strategic objective.

Operational rigidities resulting from strategic deployment and sustainment constraints likewise are aggravated by an Army organizational design optimized for set-piece battles with clearly defined and contiguous deep, close and rear battle areas, and far less well-suited to operations in highly fluid conditions in which the operational focus changes rapidly, and in which a secure rear area cannot be guaranteed without retarding operational tempo.

Finally, operational agility suffers from the limited ability of U.S. ground forces to conduct intratheater maneuver by air. While air envelopment long has been a doctrinal Army requirement, the same limitations that impede the strategic deployment of heavy combat formations also preclude tactical air maneuver. Especially in an operating area dominated by complex terrain and lacking a developed ground transportation network, the inability to maneuver and sustain tactically powerful and survivable combat formations by air is a significant limitation.

Quite apart from its design shortcomings, today's Army equipment is aging. For example, most of the Army's major combat systems—the Abrams tank, the Bradley infantry fighting vehicle, the Apache attack helicopter, the Black Hawk utility helicopter and the Patriot air defense system—are products of post-Vietnam modernization. Others, such as the M109 howitzer, are even older.

All have been and continue to be upgraded. But all rapidly are reaching or already have reached the end of their intended service life, and for some, such as the M109, further upgrade is neither feasible nor economical. Meanwhile, maintaining these aging fleets yearly requires greater effort and larger supplies of increasingly expensive repair parts.

If the Army is to remain ready, as it must, it cannot afford to dispense with these legacy capabilities, and their recapitalization and modernization remains essential. Moreover, their utility can be further improved at relatively little cost by applying to the Army's current forces some of the operational and organizational insights derived from recent Army studies, and which are not dependent solely on new technology investments.

In the end, however, recapitalization and reconfiguration alone clearly cannot satisfy all of the operational requirements outlined in the previous pages. At some point, new concepts imply changing the means with which they are effected. Emerging technology is beginning to furnish potential solutions to challenges from greater strategic and operational agility to improved battlefield information and reduced combat consumption. If America is to retain its current military predominance, the Army must exploit these emerging capabilities.

To do that, Army Transformation must be grounded in a clear understanding of the way future joint and combined operations are likely be conducted. Thanks to the cumulative insights afforded by several years of study and wargaming by all four military services and by other relevant governmental agencies and consulting organizations, we now have a pretty good idea of the pattern those operations likely will follow.

In describing it, the pages that follow focus on defeating regional military aggression. As earlier discussion suggested, that is by no means the only requirement that may confront the

Army in the next few decades. It may not even be the most likely. But apart from war with a major nuclear power, it remains the most difficult and dangerous requirement, hence the benchmark against which conventional U.S. military capabilities must be measured. In any case, as will be apparent, the challenges presented by other potential military operations such as peacekeeping will in many respects differ in degree but not in kind from those presented by a direct military confrontation.

The Changing Pattern of Aggression

Some insist that the Persian Gulf War spelled the end of conventional ground combat. While we do not share that view, we do concede that the emerging environment will confront a future aggressor seeking to invade a neighbor with new challenges. Chief among these will be the need to plan and prepare for aggression in conditions of increasing information transparency. The days when large armies could be mobilized and assembled undetected are coming to a close. Modern visual and electronic surveillance systems, to say nothing of the increasingly ubiquitous and uncontrollable media, make the maintenance of operational security increasingly difficult. To achieve strategic surprise and thus minimize the risk of preemptive intervention, an aggressor must overcome this transparency.

At the same time, efforts to prevent premature detection and diagnosis of his intentions must not diminish an aggressor's ability to rapidly defeat the forces of the nation he is invading. The longer it takes him to attain his military objectives, the greater the risk of external intervention, and the greater the exposure of his own forces. Time therefore is critical to successful aggression, and the more nearly the latter can be conducted as a *coup de main*, the more likely it is to succeed, at least to the extent of confronting the United States and its allies with the requirement to reverse rather than thwart it.

Of course, as the Gulf War demonstrated, even a rapid and successful invasion does not automatically immunize an aggressor against intervention. But provided that, unlike Iraq in 1990, the aggressor is prepared to fight aggressively to retain what he has won, it does shift the offensive burden to the intervening powers, presenting the latter a much more difficult and potentially expensive problem.

Such a determined aggressor's first objective will be to deny intervening forces easy access to the theater, by establishing and enforcing an operational exclusion zone encompassing areas within the aggressor's reach in which intervening forces and their deployment entry points, air bases and maritime operating areas can be targeted.

The same information transparency that formerly burdened the aggressor now works to his benefit, with the added advantage that intervening forces have little prospect of achieving strategic surprise. Using off-the-shelf information systems and special operating forces, supplemented with inexpensive coastal mining and prepositioned man-portable air defense, even a relatively weak nation can make conventional military deployment expensive. A more powerful state possessing ballistic and cruise missiles, diesel submarines, and access to his own or third-party space surveillance and communications resources can make it even more costly.

At the same time, having defeated indigenous resistance, the aggressor will seek quickly to consolidate both his own and his newly acquired territory, establishing integrated air, land and sea defenses aimed at thwarting successful counterinvasion. By locating forces in urban and

other complex terrain, making extensive use of obstacles and decoys, and fortifying key systems and facilities, such prepared defenses can be made difficult to detect, hard to attack effectively from standoff, and costly to invest.

Nor is the aggressor restricted to passive defensive measures. By exploiting periods of reduced visibility and his superior knowledge of the ground, using deception effectively, and carefully synchronizing movement with air defense and fires, he can mount limited conventional attacks notwithstanding an inferiority in air and information assets. He can employ unconventional forces even more confidently, especially if he is not scrupulous about putting civilians at risk. And of course, he will use whatever standoff capabilities he himself possesses when and wherever U.S. and allied forces present a lucrative target.

Finally, if he has the means—and those means are becoming ever easier to acquire—the aggressor also can operate directly against the homelands of the intervening powers and, with perhaps greater effect, those of regional states supporting them. Such attacks may be conducted with information operations, missiles, special operating forces, sympathetic terrorist groups, and in the extreme case, weapons of mass effect.

Even an aggressor willing and able to do all these things cannot relish the prospect of a war with the United States. But if aggression occurs, it must reflect either miscalculation of U.S. intentions, as in 1990, or the confidence that if intervention occurs, it can be made costly enough to induce the United States and its allies to accept a settlement favorable to the aggressor.

Coping With Future Aggression

Given such a pattern, the challenges facing joint and combined military forces charged with defeating regional aggression are apparent. To win rapidly and at least cost, they must:

- ◆ take immediate steps to strengthen and prolong the resistance of indigenous forces. Such efforts will be much easier where peacetime military-to-military engagement already has cemented professional military relationships and identified potential military assistance requirements.
- ◆ begin immediately to prevent the enemy from establishing an operational exclusion zone, by securing regional ports and facilities from sabotage and disruption, establishing an effective air and missile defense umbrella, securing unimpeded entry to littoral waters as required, and destroying enemy air, missile and command-and-control capabilities, and where appropriate, war-supporting civil infrastructure such as communications, electrical power and vital transportation arteries.
- ◆ conduct counteroffensive operations to defeat enemy ground forces before they can assume a coherent defensive posture. Such operations require early integrated air and ground efforts to disrupt the operational integrity of attacking forces, sever their sensor-to-shooter links, deprive them of freedom of maneuver and mutual support, destroy selected formations, and isolate the remainder from sustainment or reinforcement.
- ◆ reestablish security in recovered territories, to include disarming residual conventional and paramilitary forces and restoring civil order.

- ◆ continue and expand these operations until the enemy capitulates or defined armistice conditions are achieved.

Given the evolving pattern of aggression described earlier, the most rapid, inexpensive and reliable means of satisfying these interdependent requirements will be through a systematic multidimensional campaign.

The Multidimensional Campaign

The central objective of a multidimensional campaign is to transform what otherwise would require a Normandy-style invasion into a strategic meeting engagement, in which the aggressor is prevented from establishing a well-prepared defense before confronting overwhelming force. Its hallmarks are speed and violence, and an operational flexibility permitting the joint force to refocus combat power repeatedly against selected major enemy formations and facilities. It is designed to deny the aggressor the ability even to achieve his initial offensive objectives, much less retain what he has won.

Although the precise circumstances of aggression rarely are foreseeable, any counter-aggression campaign is likely to occur in four identifiable though overlapping phases:

Deterrence. As with U.S. military operations generally, the first objective of future multidimensional operations will be to deter aggression outright. In that sense, sustaining and enhancing deterrence is the central objective of all military transformation. At the same time, however, if deterrence depended solely on a calculus of relative military capabilities, few states would risk aggression where there was the slightest chance of U.S. intervention. Instead, as repeated episodes from Korea to Kuwait have demonstrated, deterrence is at least as contingent on an aggressor's estimate of our intentions.

Successful deterrence thus presumes some persuasive evidence that the United States and its allies are prepared to respond in a particular case. Where diplomatic, economic and especially military ties are routinely strong, assurances of support against aggression are likely to be believed, still another argument for peacetime military engagement. Where, on the other hand, bilateral relationships are more distant or ambiguous, such assurances are less likely to be believed unless and until reinforced by visible military action.

In either case, ideally, the first response to warning of potential military aggression should be a deliberate effort to furnish visible evidence of America's intentions. Options range from expanded diplomatic and military consultations with the threatened government, to increased surveillance of the potential aggressor, to the preparatory movement of naval and Marine Corps expeditionary forces, to increased readiness on the part of U.S. and allied forces, to the outright preemptive deployment of military forces to the threatened region.

In the future, such flexible deterrent options in the prospective theater of operations may well have to be accompanied by concomitant measures at home. As the vulnerability of the United States and its allies to information operations, terrorism and sabotage grows, heightened domestic security will become an increasingly essential ingredient of crisis response. Measures could range from enhanced border security to closure of military stations, deployment ports and airfields, to the mobilization and deployment of active and reserve military units to safeguard critical military and civilian facilities and resources.

Unfortunately, all these deterrent actions, foreign and domestic, are politically difficult to adopt, not least because they risk increasing tension at the very time the United States and other affected governments are trying to dampen it. For that reason if no other, they are likely to be belated. Hence, while such measures if executed promptly can significantly accelerate military operations if deterrence fails, the joint commander cannot count on them.

That acknowledged, if and when flexible deterrent options are exercised, their composition and the rapidity with which they can be executed will be critical to both their deterrent and warfighting utility. The longer it takes to assemble and integrate the forces underwriting such options, the less useful they will be. Deterrence therefore will place a premium on the ready availability of standing joint task forces of flexible composition and strength, able to deploy rapidly without lengthy prior preparation.

Preclusion. As soon as it is clear that deterrence has failed, the priority of the multidimensional campaign will shift to preclusion—the effort to halt or delay the enemy’s offensive while concurrently shaping the theater battlespace for early and decisive counteroffensive operations. Key activities involved in preclusion include:

- ♦ achieving information superiority. This requires establishing a robust reconnaissance, surveillance and target acquisition environment and beginning the process of dismantling the enemy’s corresponding capabilities and the command, control and communications networks supporting them.
- ♦ achieving theater air supremacy, including not merely the destruction of the enemy’s air assets, but also the neutralization of his integrated air defense capabilities.
- ♦ rolling back the enemy’s operational exclusion zone by establishing robust air and missile defenses able to protect both indigenous forces and critical joint and combined force deployment points of entry, neutralizing long-range missile systems, gaining control of sea approaches to the theater, and dismantling the reconnaissance, surveillance and special operations networks supporting the enemy’s anti-access efforts.
- ♦ initiating early air–ground operations to bolster defending indigenous forces, destroy selected enemy offensive forces before they can assume a hardened defensive posture, and secure the deployment and maneuver space from which to mount decisive operations.

There can be no prescribed sequence for these activities, inasmuch as their conduct will depend critically on how rapidly U.S. and allied forces are committed, how effectively indigenous forces are able to defend, and how comprehensive and effective the enemy’s anti-access measures prove to be. Ideally, all should occur concurrently. The more nearly that can be achieved, the earlier decisive operations can begin.

Decision. Given the speed with which future aggression is likely to unfold, and the local combat power that even a regional aggressor can muster, the earlier decisive operations begin, the shorter and less expensive in lives the campaign is likely to be. The goal of a future multidimensional campaign thus should be to eliminate as far as possible any significant interval between the initial engagement of air, ground and naval forces and the achievement of combat power superiority sufficient to permit transition to decisive offensive operations.

The extent to which this operational seamlessness can be achieved of course will depend on the scale of the aggression, the extent of prehostilities deployment, the topography of the

theater, the availability of strategic lift, and the success of joint and combined preclusion efforts. While these conditions may influence how quickly the decisive phase begins and its duration, however, they should not be allowed to dictate its operational character.

The centerpiece of the decisive phase is a series of rapid joint offensive operations designed to dismantle the enemy's system of defense, isolate its tactical elements, deny him the ability to maneuver, and force him into locations in which he is deprived of mutual support and sustainment and is vulnerable to piecemeal destruction.

Successful prosecution of such operations at the intended tempo will require a continuous flow of high-quality enemy and friendly combat information, close and continuous air and ground cooperation, responsive supporting fires, careful integration of sustainment with maneuver, and a flexible and adaptive command-and-control system.

It is not necessary to destroy every enemy formation to achieve operational control of the theater. What is essential is rapid neutralization of the enemy's system of defense, so that he loses the freedom to engage at times and places of his own choosing and the ability to focus maneuver and standoff fires effectively. In many cases, it may suffice to contain static enemy formations while maintaining security against breakout and unconventional threats. The faster the enemy's principal conventional formations are destroyed or contained, the faster indigenous and follow-on forces can reestablish territorial security.

Large urban complexes present a unique challenge. From an operational standpoint, the longer their clearing can safely be deferred, the better. Even in the best of circumstances, clearing them will be difficult and time-consuming, and the likelihood of collateral civil damage makes the process politically sensitive. On the other hand, cities are vital national resources, and their prompt liberation or seizure easily can become a political imperative. Moreover, to the extent they provide sanctuary for vital war-supporting systems from long-range missiles to command-and-control, clearing them may become a military as well as a political necessity.

Where such clearing is required for any reason, the central operational challenge will be to prevent it from distorting the overall pattern of the campaign, consuming resources whose diversion from other operational priorities risks furnishing the enemy an opportunity to regroup and reconstitute. Instead, whenever possible, the clearing requirement should be treated as an independent operational task, assigned to forces designated, prepared and resourced specifically for the clearing mission under separate command-and-control.

Resolution. While decisive operations guarantee achievement of the military objective, they are not guaranteed to end hostilities. Even if the aggressor capitulates outright or his major conventional forces surrender autonomously, it may be necessary to dispose of pockets of conventional resistance, unconventional forces, and armed militia or gangs. When there is no formal capitulation and large formations remain intact and hostile in disputed territory, resolution becomes even more challenging.

In linear warfare, such "mopping up" operations by follow-and-support units are an almost automatic byproduct of the advancing front line. In the dispersed and fluid conditions likely to characterize a future multidimensional campaign, no such automaticity can be assumed. Rather, plans must make deliberate provision for the reestablishment of territorial security concurrent with offensive operations and in a way that does not obstruct them.

As with decisive operations, this will require sequence and selection. Provided that enemy forces are denied freedom of movement, not all pockets of resistance need be reduced with the same haste. In some cases, political requirements may dictate early clearing, especially within the borders of the invaded nation. In others, clearing may be necessary to destroy or capture the enemy's military and political leadership, long-range systems, or weapons of mass effect. And in still others, residual enemy forces may occupy ground essential to or that interferes with continuing major operations or their sustainment.

Where none of these requirements prevails, it may suffice simply to isolate the remnants in question until they surrender, or until the conclusion of major operations allows them to be dealt with at leisure. Regardless, resolution is likely to take time and boots on the ground.

Impact on Joint Force Requirements

It should be apparent that a campaign of the sort just described cannot be conducted without close integration of multiservice capabilities. Preclusion alone, if it is to be successful, will require near-simultaneous air, maritime, ground, space and special operations to deny the aggressor early offensive success and avoid permitting him to emplace some portions of his defensive system unhindered while others are attacked.

Still more is that true of decisive operations, which perforce will require direct tactical engagement of enemy forces that for one reason or another are not vulnerable to standoff attack, and whose continued freedom of action at best would prolong and at worst could endanger achievement of the military objective.

In addition, both successful preclusion and rapid decision will depend on the ability of the joint force to achieve a deployment and employment momentum that allows the aggressor no opportunity to adjust his plans, reconfigure his forces or reconstitute damaged assets. Joint forces must be able to engage effectively immediately upon deployment, and once begun, the latter must proceed without pause and without braking operational tempo. To a considerable extent, of course, this hinges on the adequacy of strategic lift, both air and maritime. But it also will require all the services to seek ways of achieving greater combat power output per unit of deployment.

In many respects, sustainment is the most challenging aspect of this requirement. Future investments in joint force combat systems will mean little unless the latter are sustainable across strategic distances. Indeed, the potential for increased combat power per ton and cubic capacity of strategic lift may be greater for supporting capabilities than for combat platforms and formations. Certainly that is true for the Army, whose combat support and service support organizations historically have been far heavier consumers of strategic and theater transport than its close combat formations.

For both combat and supporting organizations, part of the answer to sustaining operational maneuver from strategic distances lies in reducing and more effectively pacing the demand for combat consumables such as fuel, ammunition and spare parts. Technology can help with improved engine efficiencies, precision sensors and munitions, and better ways of packaging. But it may be nearly as important to improve the "fit" of supply to demand through better prognostics, more effective matching of munitions to desired effects, and a logistics C⁴ISR

(command, control, communications, computers, intelligence, surveillance and reconnaissance) capability able more rapidly and reliably to adjust supply to demand.

Even so, the very nature of war limits the extent to which sustainment can be improved by demand management alone. Historically, Americans prefer to waste bullets rather than lives, and that is unlikely to change. Instead, the most promising improvements in our ability to project and sustain combat power at strategic distances are likely to be found in redesigning both logistical organizations and the combat and combat support formations they sustain.

Recent wargames repeatedly have revealed that much of the load on strategic mobility assets, especially in the early phases of conflict, is associated with organizational overdesign—the inclusion in basic tables of organization of capabilities and resources that are essential to combat performance only in certain conditions or at certain stages of battle. By modularizing these capabilities, it may be possible to more effectively tailor both combat and support units for deployment, and thus significantly reduce the strategic transportation burden, especially in the preclusion phase of a campaign.

An additional reason to do so, if one were needed, is to expand the capability of ground forces, both combat and support, to maneuver operationally by air. In the fluid conditions visualized by multidimensional operations, sole reliance on ground mobility for maneuver and sustainment will be difficult and dangerous even in a theater of operations endowed with a developed road network. In a less developed theater, it inevitably would diminish operational tempo. And in both cases, it would force an increasing diversion of combat resources to protect an expanding network of ground lines of communication.

Tactical ground mobility always will remain an essential element of combat power. Indeed, as noted earlier, lack of such mobility today is among the chief limitations of the Army's light forces. The challenge is to complement ground tactical mobility with an increased ability at the operational level to maneuver, support and sustain the force by air. As with strategic deployment, while part of the solution to that challenge resides in future aircraft designs, it also will require new ways of organizing and equipping the forces themselves.

Finally, neither the strategic nor the operational momentum associated with future multidimensional operations can be achieved without quantum improvement in information and command-and-control connectivity. Despite inflated claims, the fog of war will not wholly dissipate, and future conflicts will continue to witness a two-sided struggle to obtain and deny information. That and battlefield friction will continue to inhibit the achievement of perfect situational awareness. Nor do effective multidimensional operations require such perfection. What they require, rather, is the ability to create time windows of information superiority to inform critical operational and tactical decisions, and mechanisms providing reliable early warning of unanticipated enemy activities.

On the one hand, this will require a multidisciplinary effort to locate, track and evaluate the condition and apparent intentions of selected enemy formations, including the ability to disseminate this information rapidly and in easily digestible form to every relevant decisionmaking echelon. On the other, it will require an active effort to disrupt and degrade the enemy's ability to locate and target our own forces, and to retard his reaction to their operations until the information on which it is based no longer is relevant.

In the fluid conditions of future multidimensional operations, both efforts will require near-seamless connectivity among and between operational and tactical echelons. That will be a major challenge for joint forces accustomed to relying on service-unique information and communications systems, and an even more serious one for coalition forces, especially those of non-NATO allies. And while, as with other aspects of future multidimensional operations, emerging technologies may help, meeting this challenge also will require new approaches to the organization and operation of theater and subordinate headquarters, information collection agencies, and communications facilities.

Space-based systems of course are increasingly essential to both information collection and communications connectivity, as well as other vital functions from navigation to targeting. Today, the United States enjoys a superiority in such capabilities approached by few other nations and equaled by none.

That happy condition cannot be counted on to endure. Like other military resources, our own space systems are vulnerable to attack. Meanwhile, as third-party and commercial space systems proliferate, their products are becoming increasingly accessible to any user who can pay for them, or with whom the owners of the providing systems have a political or economic mutuality of interest.

How to deal with this growing space competition is a controversial political and strategic issue, and its resolution is well beyond the scope of this paper. From a design perspective, however, future Army operations can assume neither uninterrupted access to our own space-based systems, nor the unrestricted ability to deny an aggressor access to space products.

It follows that for every essential space-based capability, nonspace-based fallbacks must routinely be available, and the organizational and operational design of future joint forces must permit shifting rapidly and smoothly between them. Likewise, we must assume that the enemy may enjoy at least some of the battlefield transparency on which our own forces will rely.

Implications for Army Force Design

The preceding considerations suggest that if the Army is to contribute effectively to multidimensional operations at any point on the spectrum of conflict, as it must, its future fighting organizations must embody several key design characteristics:

Modularity. Future Army formations must reconcile operational versatility with organizational stability. Because the nature, scale and ultimate duration of ground force commitments cannot be prejudged, Army formations must be adaptable to a broad range of operational tasks without major reconfiguration, but also without forfeiting the cohesion essential to effective combat performance.

That cohesion is most essential at the tactical level of engagement, where both soldiers and units are under the greatest stress, and where rapid combined-arms synchronization is most vital. Accordingly, the Army will require stable combined-arms formations at the smallest level likely to be committed independently to an operationally significant task anywhere along the spectrum of conflict.

After the tactical unit of action, paradoxically, the next most important requirement for organizational stability is at the operational level of employment. Here the challenge is less one

of situational pressure than of the sheer complexity of operational command, control and sustainment functions. It also is here that multiservice, multiagency and coalition activities routinely will be coordinated. Accordingly, while the size of such organizations may vary from one contingency to the next, the more functional stability that can be designed into them, the better.

It is between these two levels, at the level of tactical employment, that the opportunities and incentives for force tailoring are greatest, and where modularity can most effectively be exploited. Designed properly, future tactical units of employment should be reconfigurable as required with modular combat and combat support units, thus assuring the operational agility to conduct high-tempo operations and allowing smooth force expansion and contraction as conditions require. It also is at this level that integration of active with reserve component units is likely to be most effective.

Agility. Regardless of the nature of the contingency, operational maneuver from strategic distances will require Army forces optimized for rapid commitment on short notice to operations of uncertain magnitude and duration in undeveloped theaters. To achieve this without loss of operational momentum, units must be able to deploy quickly, engage immediately upon arrival, and expand as required concurrent with continued employment.

In turn, that implies future force designs assuring unimpaired operational coherence from the initial arrival of forces in theater through completion of the military mission. Both initial and follow-on units must be deployable in integrated force packages that furnish a continuous balance of combat, combat support, sustainment and command-and-control capabilities across the services.

Modularity will contribute to agility. But the latter also will require adjusting existing and future tactical unit designs to reduce or eliminate altogether capabilities that can be more effectively furnished from pooled assets or reachback, or that are likely be needed only in unusual circumstances or at a later stage of operations and whose deployment therefore can be deferred.

Similarly, higher-level commanders must be able rapidly to shift combat support and sustainment priorities, “stack” that support when necessary on one or a few subordinate units, and do both across a broad geographic area. The ability to shift concentrations of support rapidly from one point on the battlefield to another can vastly multiply the combat power even of smaller tactical formations, enabling them to overwhelm numerically larger enemy forces. Achieving it will require a comprehensive redesign of combat support and sustainment from the corps level down to the tactical units of action.

Finally, tomorrow’s Army must be significantly more capable than today’s of air maneuver and sustainment without penalty to ground tactical mobility, lethality and survivability. And it must be able to perform those functions on an operationally significant scale. That implies development of lighter, less consumption-limited combat and support platforms and the aircraft to move them, together with a sustainment system freed from reliance on early establishment of ground lines of communication. And it implies an investment in those capabilities sufficient to produce not just tactical, but rather operational results.

Interoperability. Multidimensional operations inherently are joint and usually will be combined. Army formations therefore must be designed from the outset for routine

subordination to a joint and/or combined task force, and for smooth integration with U.S. and allied air, maritime, amphibious, space and special operating forces. They likewise must be able routinely to support and be supported by nondefense agencies in areas ranging from information operations to civil security and humanitarian services.

As a practical matter, it is infeasible to integrate those capabilities at every Army echelon without producing overlarge and unwieldy tactical formations. Indeed, that reality is one of many reasons echelonment remains essential. At the operational level, at which joint and combined interdependence must be routine, both command-and-control and sustainment should be designed from the outset for support of and by sister service, allied and interagency organizations.

At the tactical level, where interoperability needs are more limited, every future Army formation still must have the intrinsic capability to share information with joint, sister service and allied organizations, and the ability on short notice to receive, employ and support augmentation capabilities permitting closer integration. In turn, those augmentation capabilities need to be incorporated directly into the design of the force like other specialized force packages.

Robustness. The principal risk confronting any military organization seeking to enhance its strategic and operational agility is that of insufficient robustness to cope with unanticipated battlefield demands or the loss or degradation of critical combat enablers. Such episodes are intrinsic to the nature of war and, because they invariably occur inopportunistically, are difficult to accommodate unless provided for in advance.

The more uncertain the future commitment environment, therefore, the more essential it will be for the methods, organizations and equipment of future Army forces to “degrade gracefully” through sufficient built-in redundancy to absorb losses without becoming ineffective, and the ready availability of fallbacks for vital reachback enablers such as fires, information, communications and sustainment. In large part, this is a matter of doctrine and training. But it also urges careful attention to organizational and equipment self-sufficiency.

Thus, weapons optimized for nonlinear-of-sight engagement using remote sensors must nevertheless be able to function if those sensors or their communications links are damaged or destroyed. Platforms optimized for cooperative maneuver and engagement must be able to operate autonomously without fatal loss of effectiveness. Communications, navigation and sensor systems dependent on access to space platforms must be backed up by terrestrial alternatives. And units must have enough durability to operate autonomously for limited periods should reachback support and sustainment functions be interrupted.

Adaptability. By far the most important single design requirement of America’s future Army forces will be the training and education of adaptable soldiers and leaders. The less predictable the demands for which they must prepare, the less we can afford to base their training and education on a rigidly consistent doctrinal template.

Instead, future Army doctrine, education and training must be designed deliberately to accommodate uncertainty, and to foster a culture of institutional initiative and self-reliance that encourages soldiers and leaders to react calmly to the unexpected, avoid predictability, treat rapid changes in mission and environment as routine, and act aggressively within the framework of the force objective if and when forced to rely on their own resources.

How Army Forces Will Fight

The ultimate test of any army is its ability to fight and win. Clausewitz said it best: “The whole of military activity . . . the end for which a soldier is recruited, clothed, armed, and trained . . . is simply that he should fight at the right place and at the right time.”² Among all the manifold tasks to which U.S. armed forces may be committed, their one irreducible obligation is to win in battle.

Of course, the very definition of victory will vary with strategic conditions and objectives. What follows takes for granted both the diversity of potential commitments described in previous pages and the inescapably joint character of those commitments. To the extent it focuses on conceptual issues primarily associated with ground combat operations, it is simply because those are the issues for which the Army has both responsibility and competence. What follows addresses them in terms of the broad activities any ground combat force must be able to conduct successfully.

Close Combat. Despite more than three millennia of improvement in man’s ability to see and strike his enemies from a distance, victory in war sooner or later comes down to the ability to threaten and if necessary execute direct ground combat operations to capture or destroy an enemy’s soldiers and weapons, seize the territory he controls, and break his continued will to fight. Combat in the “red zone” remains the most arduous, dangerous and costly military activity, and the first objective of any Army operational concept must be to assure its success in the least possible time and at least cost in lives.

The potential costs associated with close combat have led some to discount both its necessity and utility in future conflicts. Instead, they believe, a careful application of standoff precision fires can obviate the requirement for ground forces to close with the enemy, certainly in open terrain, and with improved sensors and munitions, perhaps even in more complex topography as well.

Such views ignore some fundamental realities about conflict with a determined adversary. Few wars or battles end with the outright physical annihilation of the loser. In most cases, defeated armies and nations capitulate when they perceive defeat to be inevitable. Fires alone, however, rarely will induce that perception. By nature they are transient, and while they can inflict great shock, their moral effect diminishes rapidly over time. Modern history is replete with instances of armies that have withstood prolonged and devastating fires without losing either cohesion or the will to fight. Even in the Gulf War, in the face of overwhelming coalition standoff firepower, many regular Iraqi units stood and fought.

That is the more true for enemies defending ground they have prepared. Standoff fires brought to bear on a concentrated formation attacking over open ground may well succeed in blunting the attack (though there have been all too many instances when they have not). The same fires applied against a dispersed enemy, in close terrain, or defending prepared positions are much less likely to be decisive unless the transient effects they produce are exploited rapidly and relentlessly, as they were in Afghanistan by Northern Alliance forces.

Moreover, while fires can in some instances deny, they cannot secure. Few military conflicts are resolved without exerting physical control over disputed ground. Even where, rarely, strategic objectives don’t mandate such control, tactical or operational requirements

almost invariably will. There have been few if any occasions when such control has been achieved without close engagement or its threat.

For all these reasons, reliance on fires alone effectively concedes the initiative to the enemy. In the worst event, that may enable him to evade defeat. But even if he perceives ultimate defeat to be inevitable, delaying it may be advantageous to him in several ways. It may increase his adversaries' domestic political pressures. It may strain relations among opposing coalition members. It may encourage intervention by third parties, or permit the introduction of new military factors such as weapons of mass effect that alter the character of the conflict. In these ways and others, it may produce—or, what amounts to the same thing, encourage him to believe it will produce—a better outcome than precipitate surrender.

In the meantime, once their initial destructive effects have been achieved, the longer the delay in exploiting fires by close engagement, the greater the latter's ultimate costs are likely to be. Reliance on standoff fires alone therefore gambles on the enemy's powers of endurance, and if that gamble fails, belated close engagement is likely to prove much costlier than had it been incorporated from the outset.

Competent combined-arms commanders know that, and routinely balance the risks of overreliance on fires against the risks of close combat. No two situations are identical, and the balance between fires and close engagement constantly must be adjusted to the mission, the enemy and the battlefield. But there always will be a balance, and a force deprived by design of the ability to apply it would be tactically and operationally crippled.

Instead, the real challenge is to conduct close engagement as cheaply and effectively as possible. Barring major disproportion in force strength—and frequently despite it—two conditions invariably influence this requirement: the ability of the winner to prearrange the conditions of the fight to his advantage, and his ability to strike the enemy while limiting his own exposure. A fight in which the enemy is surprised by and exposed to the blows of a prepared and protected friendly force is a fight half won before the first shot is fired. Close combat by future Army forces must exploit emerging information and weapons technologies to make that ambush-like pattern routine. Its two central features are dominant situational awareness and cooperative engagement from beyond line-of-sight.

The first will allow friendly units to move through a battle area dispersed without loss of speed and coherence, achieve firing positions undetected, and thus produce engagements in which the first awareness of contact even by an enemy defending a prepared position is his attack by lethal fires.

Dominant situational awareness requires routine access by every tactical formation down to the individual fighting platform to real-time information on the terrain, relevant enemy and friendly unit locations, and known obstacles, derived from redundant sensor sources and fused to refine resolution and eliminate duplication. It also requires a concurrent effort through supporting information operations and air and surface fires to destroy or degrade enemy information collection and target acquisition systems and the command, control and communications mechanisms through which they are managed. Its measure of effectiveness is the extent to which tactical engagement begins only at the initiative of the friendly force.

The second prerequisite is the ability to engage enemy units effectively from defilade, and thus without exposing friendly units to line-of-sight fires. It visualizes cooperative target

acquisition and engagement by a tactical system-of-systems based on multiple platforms, both manned and robotic, connected through robust, jam-resistant communications.

The ability of a concealed soldier or platform to engage a target detected by another, or by an external sensor such as an unmanned aerial vehicle, provides inherent protection to both sensor and shooter, confuses enemy reactions, and prolongs the ability of the friendly element to engage successive targets without moving to evade return fire. It thus multiplies the lethality and survivability of each tactical unit. Its measure of effectiveness is the degree to which it enables friendly units to confidently engage and destroy much larger enemy formations regardless of their offensive or defensive posture.

In practice, both dominant situational awareness and cooperative engagement from beyond line-of-sight are sensitive to battlefield friction. As with most other capabilities, moreover, their application in urban and other complex terrain will present a greater challenge than in more open ground. These realities will influence how future Army formations apply the two concepts in any given engagement, but without diminishing their relative advantage over traditional close combat methods.

Married to combat platforms with enhanced on- and off-road mobility and improved active and passive protection, dominant situational awareness and cooperative engagement from beyond line-of-sight can diminish dependence on weight of armor for force protection, and thus facilitate achieving the strategic, operational and tactical agility required of tomorrow's Army forces.

Tactical Maneuver. The same design qualities of stealth, speed, knowledge and lethality that underwrite decisive overmatch in "red zone" engagements also will affect the tactical maneuver of forces to secure positional advantage in those engagements. Two changes in particular will distinguish future tactical maneuver from traditional practice: movement from knowledge rather than contact, and the massing of effects rather than forces.

The first requirement confronting any tactical formation seeking to engage the enemy is finding him and determining his strength and arrangement on the ground. The classic means of doing so is through a movement to contact, in which friendly forces advance on their objective until the enemy is detected, then maneuver to define his position or array. At best, this process forfeits surprise, exposes friendly forces to fire, and gives the enemy time to react. At worst, it can subject the friendly force to countermaneuver when it is least prepared to deal with it.

To the extent they enjoy dominant situational awareness, future Army formations can dispense with this procedure and the penalties it incurs. Direct access by even small units to real-time, all-source information can furnish early warning of the approach of moving enemy formations, and increasingly may permit detection and diagnosis even of static forces in prepared positions. Tactical units will supplement this information using organic robotic ground platforms inherently smaller and less detectable than manned systems.

In the best of circumstances, these capabilities will allow the friendly force to pattern the enemy formation or position undetected and thus begin the engagement without warning. In the worst of circumstances, they will allow it to develop the tactical situation more rapidly and with less friendly exposure.

Both likewise will be facilitated by the ability of combat units to achieve a decisive tactical overmatch by massing effects rather than forces. Tactical maneuver by Army formations must replace the characteristic movement of contiguous columns or lines of soldiers and fighting vehicles with dispersed movement by small elements maneuvering autonomously without loss of synchronization and taking full advantage of the terrain.

Historically, the major obstacles to such dispersed and autonomous maneuver have been loss of tactical control and mutual support, the risk of fratricide, difficulty in synchronizing organic and supporting fires, and the danger of enemy infiltration into the empty spaces among maneuvering friendly elements. All are aggravated in complex terrain, at night, and in other conditions of reduced visibility.

But massing to overcome these obstacles also incurs penalties. For one thing, maneuver by contiguous formations increases the risk of early detection and attack. Massed formations are inherently less able to exploit the terrain, and their very concentration increases both their exposure to fire and its lethality. Maneuver by massed formations invariably sacrifices tactical agility and flexibility for control. And perhaps most important, in urban and other very complex terrain, it is at best painfully slow and at worst physically infeasible.

None of these penalties is new. But in the operational environment described earlier in this paper, they are becoming increasingly severe. Future tactical maneuver must achieve the effects of concentration without its liabilities. Dominant situational awareness shared by internetworked platforms will allow independent maneuver within a coherent tactical framework, supported by continuous real-time knowledge of friendly and enemy locations and movement. The latter also will protect against both fratricide and infiltration, while the ability to electronically synchronize their own and supporting sensors and attack systems will allow units to concentrate effects simultaneously from widely separated locations.

The principal challenges associated with executing this more fluid and flexible method of maneuver are in the areas of command-and-control, sustainment, and soldier and leader conditioning. Reliable, jam-resistant, high-bandwidth communications, easily digestible information displays, and advanced tactical decision aids clearly are vital. The need to resupply widely separated small units and assure rapid casualty treatment and evacuation will require both greater tactical unit self-sufficiency and a more responsive and adaptable external sustainment system.

Most important, dispersed, autonomous tactical maneuver increases the physical and psychological demands on soldiers and small-unit leaders. Lacking the inherent robustness provided by mass, future Army tactical operations instead must provide for the routine cycling of units into and out of action, and this has implications both for the way such operations are planned and the way the units that conduct them must be organized.

Operational Maneuver. While successful tactical maneuver insures engagements take place in the most favorable conditions, operational maneuver seeks to insure those engagements are sequenced in time, space and purpose to achieve a decisive military result. Operational maneuver inherently is a joint activity, and its success will depend to a large extent on how effectively the components of the joint force work together.

From an Army perspective, operational maneuver requires the near-simultaneous movement and support of multiple tactical formations from separate mission staging areas to

locations in depth from which their combat power can be focused against critical enemy forces and facilities, and the process repeated in rapid succession until the enemy's system of defense is destroyed beyond recovery.

Even in this narrow sense, operational maneuver by Army formations will differ markedly from the pattern of the Normandy breakout in 1944 or Operation Desert Storm in 1991. For one thing, given the tactical capabilities and methods described earlier, it likely will involve smaller though more capable tactical units. It will be mounted with less lengthy preparation and is likely to conclude much more quickly. Especially to the extent that it relies on vertical envelopment, it may traverse much greater distances—indeed, as noted earlier, it must be conducted initially from strategic distances. Its successive objectives may well not be contiguous. Finally, it must be capable of reorientation against follow-on objectives, and thus be able to reconfigure and reconstitute for that purpose, with minimum delay.

Operational maneuver in these nonlinear, high-tempo conditions will require redefining the nature of and organizational relationships among successive tactical and operational echelons. At a minimum, close combat formations will need greater cohesion and tactical self-sufficiency, while the higher tactical organizations that employ them will require easier and more rapid retoolability.

Future operational maneuver clearly implies discontinuous logistical operations. Maintaining secure ground lines of communications to committed tactical formations often will not be practical. Instead, organizational design and operational planning must provide for cyclic logistical replenishment and reconstitution. In turn, that will require that tactical formations be designed from the outset with enough subordinate units to rotate them regularly into and out of action without diminishing engagement tempo and intensity.

The sustainment system itself will have to support across greater distances, and must be able to refocus the weight of the sustainment effort smoothly and rapidly from one discontinuous line of operations to another. Sustainment planning therefore must be anticipatory, and maintenance, supply, transportation and medical support must be packaged to accommodate rapid shifts in sustainment priority, maximize direct throughput to engaged tactical formations, and avoid the need to stockpile consumables.

Given its discontinuous character, future operational maneuver will require the deliberate protection of combat support and sustainment organizations that traditionally have relied for security on rearward positioning, collocation with combat units, or both. In the operational conditions described in this paper, rearward positioning would offer no guarantee of safety, while the routine collocation of combat and support units, especially in the early days of a campaign, would unacceptably drain offensive momentum.

Instead, every combat support unit and sustainment facility, including those associated with reception of follow-on forces into the theater, must be furnished enough local assets to protect against air, missile and unconventional threats, and in some cases, conventional ground attack. Given the likely distances among such support facilities and activities, it rarely will suffice to rely for that protection solely on external “stovepipe” organizations.

That said, in a broader sense, future operational maneuver will depend far more heavily than in the past on the ability of the entire joint force, not merely its Army component, to refocus combat support and sustainment rapidly throughout the theater battlespace. In areas

from information operations to standoff fire support, air and missile defense, intratheater mobility and replenishment, successful operational maneuver presumes that the agility of joint enablers matches that of combat formations. That implies a level of routine joint interoperability far greater than the military services have heretofore achieved. And it implies a level of mutual trust enabling every element of the joint force to rely confidently on the timeliness and effectiveness of capabilities they neither own nor control.

Stability and Support. The tactical and operational concepts just described promise to produce an extremely fluid and nonlinear pattern of theater operations. Major combat operations will take place simultaneously and sequentially at widely separated locations. Intervening territory will not routinely be secured until late in the campaign, if at all. Enemy forces in this intervening territory will be engaged only to the extent necessary to prevent them from interfering with the conduct of major operations or to satisfy specific political requirements such as the protection or liberation of an urban area. In many ways, therefore, the theater will resemble that of the Vietnam conflict more than those of the Korean or Persian Gulf Wars, hence the earlier argued convergence between stability and support operations in major theater war and those associated with smaller-scale contingencies.

In both cases, stability and support operations, such as those that were required in Afghanistan almost immediately after combat operations began, will be conducted in an operational area characterized by widely separated expeditionary units and limited or attrited host nation capabilities. In both cases, security and civil support requirements from protection of vital facilities to the maintenance of civil order and humanitarian services may arise with little warning and at widely separated locations throughout the theater. And in both cases, the faster and more effectively U.S. and allied forces respond to these challenges, the less effort will be required to cope with them, and the less likely that they will escalate to an intensity threatening the political and/or military integrity of overall theater operations.

The functional similarity of these requirements suggests that Army forces properly organized, equipped and trained for major theater war also can be properly configured to conduct stability and support operations in small-scale contingencies. Indeed, the Army clearly has asserted that operational versatility as a central transformation objective.

To achieve it, Army units engaged in stability and support operations, like those engaged in conventional operations, must exploit dominant situational awareness to detect, identify and track unconventional threats and provide early warning of civil disturbance or requirements for humanitarian assistance. U.S. and allied special operating forces and civil affairs units will be essential to this effort, and where not already present in the theater through regional engagement programs, must be among the earliest forces deployed.

Similarly, Army units responding to stability and support requirements must capitalize on the same tactical unit agility and modularity, and the same distributed sustainment system, that underwrite combat operations. As with the latter, stability and support operations must be anticipatory, and require the same ability to refocus security and support assets rapidly from one geographic location to another.

The principal difference between these operations and conventional combat operations will be in terms of geographic responsibility. In classic linear warfare, geographic responsibility for stability and support in the combat zone coincides with the areas of operation of major tactical

formations. In future operations, that rarely will be possible or desirable. For all practical purposes, there no longer will be any distinction between communications and combat zones. Assigning stability and support responsibilities routinely to major tactical formations effectively would tie them to geography, forfeiting operational agility.

Instead, routine responsibility for stability and support must be assigned on an area basis to security organizations specifically designed and resource-tailored for the purpose. And while the latter may be reinforced at need by major tactical formations operating within their zones of responsibility, they should routinely be assigned sufficient combat, combat support and sustainment capability to minimize that necessity.

Indeed, in such contingencies as peacekeeping, in which combat operations are unlikely or infrequent, stability and support may be the predominant operational mission, and the organizations conducting them may well control the majority of theater assets. In a major conflict, in contrast, stability and support operations inevitable will compete for resources with combat operations, and prioritizing these competing needs in terms of deployment and theater resource apportionment will be a recurring operational requirement.

How Army Forces Will Deploy and Sustain

The concepts just described primarily reflect the need to realign operational and tactical methods with emerging battlefield requirements and technologies. But they also reflect the challenge associated with projecting decisive land combat forces from strategic distances, and have important implications for the way those forces must be deployed and sustained.

Force Packaging. Perhaps the clearest such implication is the need for a new approach to packaging Army forces for deployment. Operational maneuver from strategic distances implies building a coherent, balanced and self-sufficient fighting force hour by hour and day by day. At the same time, while expeditionary ground forces need a wider range of organic capabilities than stationed forces, what those arriving earliest in the theater will require may well be very different from what is required by those deploying later.

Meanwhile, competition for strategic lift likely will be heaviest in the earliest stages of deployment, not only among the several components of the joint force, but also among the combat, combat support and sustainment components of the ground force itself. The more that competition can be diminished by prepackaging, the faster and smoother the initial commitment will be, and the greater its likely deterrent and warfighting impact.

Future Army organizations therefore must meet three interrelated tests. First, the smallest Army force likely to be committed independently must have enough inherent self-sufficiency to conduct initial tactical operations without augmentation, and the organic ability to exploit the full range of joint enablers from information to standoff fires. Moreover, since it may be committed to operations virtually on arrival, it must be organized and equipped for deployment in a single, uninterrupted lift.

Second, from the arrival of the first such unit of action, the operational umbrella beneath which both initial and follow-on forces will fight must be in place. Its size and durability may grow as the geographic scale and operational scope of its responsibilities expand, and as additional combat and support formations become available to meet them. But a full suite of the essential functional capabilities required to command, control and sustain combat operations,

however initially austere, must be in place from the outset. Army units of operational employment therefore must be modular by design. And, as with the smallest independently committed tactical unit, they must be capable initially of deploying in a single, uninterrupted lift.

Finally, to permit both a balanced accretion of combat, combat support and combat service support capabilities as deployment continues, and the ability to adjust the elements of that balance in progress in response to changes in theater conditions and requirements, deployed Army forces will require rapidly tailorable tactical units of employment, able to easily and repeatedly absorb, direct and release a varying number and type of combat and support units of action. Typically, the need for such intermediate tactical headquarters will increase as the size and complexity of the deployed force increases, and their number therefore may be fewer earlier in a campaign than later. But even in the earliest stages of any but the smallest deployment, a few such echelons are likely to be needed.

Satisfying these requirements clearly will require redesign of combined-arms formations, and that process already is underway. But even larger rewards are likely to accrue from the redesign of combat support and sustainment formations, in which increased modularity not only is easier to achieve, but also will have greater impact on both strategic deployability and operational agility.

Far more than for combat units, requirements for combat support and sustainment will vary radically with the character and duration of the commitment, quite apart from the number of combat formations engaged. Today, such functions tend to be over-structured to hedge against the most demanding case. In the future, improved situational awareness will allow adjusting functional and sustainment capabilities more precisely to theater requirements, and the need to optimize the use of strategic lift will demand it.

Lift Optimization. Strictly speaking, optimizing strategic lift is a joint problem and not the sole concern of the Army. But the operations of any expeditionary force are so heavily conditioned by the means through which it reaches the theater that the former cannot sensibly be addressed without also addressing the latter.

Strategic lift always has been a scarce asset in relation to the need, and that is unlikely to change. Even if future lift capabilities expand in recognition of growing force projection requirements—as they should—there never will be enough lift to go around, especially in the early stages of a crisis. For the Army as for its sister services, therefore, the crucial challenge is how to make the most efficient use of the strategic lift it is allocated.

Three considerations already discussed in this paper bear directly on that challenge. The first is the growing anti-access threat to developed arrival ports and airfields. The second is the need to assure that the initial commitment of ground combat forces reaches the theater in a coherent package prepared for immediate engagement. And the last is the importance of maintaining uninterrupted deployment momentum once commitment begins to avoid a deployment-driven pause in theater operations.

For the Army, the first consideration argues for maximum early reliance on strategic mobility assets capable of delivering forces at unimproved points of entry over the shore or at undeveloped inland aerial ports of debarkation. In contrast, use of developed ports and airfields should be deferred until their air and missile defense and security from conventional and unconventional ground threats can be assured.

Today, that would pose a dilemma. Vessels capable of delivering forces over the shore are in short supply and travel slowly. Strategic airlifters travel quickly but have limited ability to use unimproved fields, and the larger their size and weight, the fewer the sorties any such unimproved arrival site will tolerate.

In the next decade or so, both of these conditions are likely to change. Marine technology is beginning to produce shallow-draft vessels capable of unprecedented transit speeds, and new airlift technologies may free strategic airlift from routine reliance on concrete runways and extensive ground support facilities. The Army has a vested interest in such technologies, and encouraging their development should be a transformation imperative.

The second consideration only magnifies that requirement, especially for shallow-draft, high-speed sealift. Deploying a coherent force capable of immediate engagement, whether a brigade combat team or a multibrigade corps, implies near-simultaneous arrival of its key constituents without prolonged and vulnerable staging on arrival. Only sealift or a very considerable share of available airlift assures that. Since strategic airlift is equally vital to theater air deployment, its early availability to support ground force deployment at best is problematic. That, and the enormous advantage of moving ground forces in complete unit sets, urges maximum feasible reliance on fast sealift in the early stages of commitment.

At the same time, paradoxically, the need to maintain deployment momentum argues for increased reliance on airlift in the later stages of deployment, exactly the opposite of the traditional deployment pattern. As the theater develops, so too will the security of arrival airfields, while generation of Civil Reserve Air Fleet assets will diminish competition for airframes. Provided Army equipment is configured to exploit such commercial airframes, the latter can help assure a deployment continuity that reliance on deep-draft sealift alone cannot guarantee.

To maintain deployment balance, many of those follow-on deployments will be combat support and sustainment forces. Hence enhancing the future air deployability of such capabilities is every bit as essential as for the Army's combined arms formations.

Sustainment. Simply as a matter of force protection, continuity of sustainment may be even more important than deployment momentum. In the worst event, an interruption in force flow might delay or arrest offensive operations. A major interruption in sustainment could endanger the deployed force whatever its operational posture. That is the more true in a future operational environment in which theater stockpiling is likely to be infeasible before initial commitment and would be undesirable even thereafter.

Instead, future ground combat operations will require a sustainment system that assures both continuity of distribution and the ability to rapidly redirect that distribution to conform with changing operational requirements. As with force flow, both will require increased reliance on airlift, not only from supply source to theater but also within the theater itself. Even where strategic sustainment relies on sealift, as it must in any but the smallest contingency, intratheater air distribution will remain vital, and the sustainment system therefore must permit smooth sea-to-air transshipment without prior establishment of large and vulnerable in-theater logistical staging and transshipment facilities.

At the same time, reliance on direct distribution in lieu of forward stockage implies that reorientation of the sustainment flow to accommodate shifting operational locations and

priorities must occur earlier and closer to the supply source. In turn, that implies much closer integration of sustainment with combat operations and the logistical command, control and communications capabilities to support it.

Needless to say, both will be easier to the extent that increased equipment commonality, higher fuel efficiency, enhanced power generation, more reliable systems prognostics, and precision munitions enable Army forces to reduce consumption and simplify maintenance and repair.

Even so, demand ultimately may be dictated by the enemy, and demand reduction alone therefore cannot assure continuity of sustainment. Hence Transformation will require parallel improvement of the distribution system, including new ways of packaging permitting multimode transport from source to recipient with minimum load breakdown and materiel handling, casualty and equipment evacuation mechanisms that minimize the need for extensive in-theater medical treatment and equipment repair facilities, and a forward maintenance concept that effectively balances component replacement with forward component repair.

Finally, like force deployment, sustainment must reconcile speed with momentum. The larger the contingency, the more likely that sustainment will regulate the pace of operations as much as the latter regulate the sustainment flow. This is not a weakness, but simply an intrinsic requirement of effective campaign design. Logistical considerations thus must influence operational planning from the outset, and require as complete an intelligence preparation of the battlefield as the operations they support.

Organizing Future Army Forces

An army's organizations are the lenses through which the energies of its soldiers, leaders and weapons are focused. Clever organization cannot substitute for initiative, skill and determination, but careless organization easily can nullify all of these. Organization thus is the touchstone of an army's operational concept.

Echelonment. Armies echelon for several purposes. The obvious is to assure a manageable span of control by any single headquarters. Echelonment also reconciles the inherent organizational tension between size and agility. Finally, echelonment reflects the reality that it is neither economical nor efficient to furnish every formation every functional capability. Rather, the more varied and complex military activities have become, the more necessary it has become to pool functional responsibilities and the ability to perform them at certain levels of command.

Generally, the fewer the consecutive echelons required to translate intention into action, the more rapid and less vulnerable to friction that translation will be. There are limits to that equation, however, and beyond a certain point, flattening organizations so enlarges their span of control and places so many functional burdens on subordinate units that it increases rather than diminishes organizational sluggishness and operational risk.

Moreover, the way in which successive echelons are constituted is as important as their number. Formations designed with a high level of organic self-sufficiency are by that very quality less easy to reconfigure, whereas formations with little organic structure require augmentation for robustness and durability, but are retailored rapidly and with ease.

Future Army organizations will need to reflect these considerations in relation to the operational conditions and methods described earlier. Organizational design must locate self-sufficiency and retailability respectively at the echelons where they are most essential. It must capitalize on new information technologies to streamline decision-making and coordination without overloading commanders and staffs, and provide for the routine cycling of combat and support units into and out of action. Finally, tactical units must be able routinely to focus joint capabilities effectively at much lower echelons of command than in the past.

The Combined Arms Brigade. To satisfy these requirements, the centerpiece of the system of echelonment should become the combined arms brigade, replacing the division as the Army's principal echelon of tactical maneuver. With organic close combat, combat support and combat service support capabilities, the brigade becomes the modular building block of larger combat formations, and also will be able with appropriate functional augmentation to operate independently in smaller-scale contingencies as the Army component of a joint task force. Regardless of the contingency, the brigade thus should be the smallest Army formation normally assigned an independent operational task.

Although future combined arms brigades should be designed for employment across the spectrum of Army missions, it may be wise to retain some degree of tactical specialization. For some time to come, such specialization will result automatically from the mix of Legacy, Interim and Objective Force organizations. Even as Legacy and Interim forces are replaced, however, the Army may need to reconsider whether a single brigade design realistically can combine all the capabilities of today's light infantry, mechanized infantry, armor and cavalry formations, or whether it might not be preferable to retain some differentiation of capabilities to allow closer tailoring to the requirements of particular contingencies. In any case, the technologies that might allow reliance on a single common tactical design are unlikely to be available for another generation.

Whatever their ultimate composition, future combined-arms brigades must have three essential attributes. First, those designated for early commitment should be able to deploy within 96 hours anywhere in the world, and should be able immediately on arrival in theater to perform a full range of tasks from maneuver and close combat to stability and support. Second, once deployed, they must be able to maneuver operationally by both air and ground, and to sustain themselves without external replenishment for a definable period. Finally, each brigade must be able to bring to bear effectively not only its own organic sensors and fires, but also those of the entire joint force in which it is imbedded.

The Army Corps. In a streamlined Army, the Army corps should become the standard operational echelon of employment in larger small-scale contingencies and major theater warfare, performing all the responsibilities once associated with a field army. While varying in size and composition according to the contingency, each corps should be able to manage a full spectrum of operations from limited-duration contingencies to prolonged joint campaigns, and each should be able to serve as the Army component and/or land component of a joint task force (JTF). In smaller-scale contingencies, the corps also should be able at need to serve as a JTF headquarters with appropriate sister-service augmentation.

In its own right, corps plans and executes the major ground operations of a joint campaign. It sequences the arrival of initial and follow-on combat and support forces into the theater; shapes the corps battlespace through its own and joint intelligence, fires, information and

sustainment operations; conducts operational maneuver; defeats major enemy formations; and secures politically or operationally significant territorial objectives. As the major Army combat formation of the joint force, it supports the deployment, employment and sustainment of other service and, as required, allied forces, participates in the development of joint operational plans, and plays a principal role in assuring effective integration of ground operations in the multidimensional campaign.

To accomplish these tasks efficiently, the corps should be organized on a standard base comprising the corps headquarters, several functional combat support commands and a sustainment command. In addition to the corps command staff, the headquarters should include intelligence, communications, civil affairs and information operations, together with sufficient sustainment and security assets to support and protect the headquarters. All headquarters elements including the command staff should be modular, able to deploy in various configurations consistent with the contingency.

Essential organic combat support commands comprise long-range reconnaissance and surveillance, communications, lift and attack aviation, long-range fire support, air and missile defense, engineering and civil affairs commands, and an area security command for infrastructure protection, which may be (and in large-scale contingencies, typically will be) augmented with dedicated combined-arms formations. As with the corps staff, the size of these commands must be tailorable to specific contingencies, but all eight functions must be present in every corps base.

In all but the smallest contingencies, corps will be the principal Army link between the strategic logistical base and the logistical support of tactical formations. It should sustain assigned and attached formations and, as required, joint and combined forces, through an expeditionary logistical command tailored for its specific mission and the conditions of the theater. These invariably will include air and ground transportation, supply, maintenance, personnel services and medical units. All must be modular.

The bulk of the combat power of the corps will reside in its combined-arms brigades, whose number will vary with the nature and scale of the contingency, its duration, and the maturity of the campaign. In small-scale contingencies, a corps might deploy with only a few brigades. In the later stages of a major theater conflict, in contrast, it might dispose of many, subordinated as required for tactical employment to division task forces described in more detail below. As its brigade strength grows or shrinks, the functional capabilities of the corps base must adjust accordingly, hence the requirement that corps combat support and sustainment organizations be modular.

The overriding responsibility of the corps is to achieve and maintain operational momentum from the initial engagement of the first arriving brigade through attainment of the theater military objective. It accomplishes this by committing brigades and supporting capabilities in simultaneous and sequential major operations against enemy forces and facilities whose destruction, neutralization or surrender will destroy the enemy's operational coherence and break his will to fight.

In small-scale contingencies, such objectives are likely to be limited in number and scope, permitting simultaneous or near-simultaneous engagement. In major theater conflict and in prolonged low-intensity contingencies such as peace enforcement, sequential operations are

more likely, and the corps must be able rapidly to shift the weight of its combat power from one operational and geographic orientation to another without loss of momentum. It achieves this agility by reorienting and reconfiguring division task forces, combining ground maneuver with vertical envelopment, shifting the weight of organic and joint standoff fires and information operations, and redirecting the corps sustainment flow. It employs similar means to cycle tactical formations from operations to recovery and back into action.

In an important sense, then, while corps monitors and supports current tactical operations, its vital focus is on future operations. Corps planning inherently is anticipatory, the more so in that corps operations invariably will require comprehensive prior coordination of joint and combined supporting activities from air support to civil affairs.

The Division Task Force. Design of the combined-arms brigade as the Army's basic tactical unit of action would allow transformation of divisions into rapidly retailorable echelons of tactical employment, employed to diminish corps' span of control and enhance its ability to tailor ground forces to simultaneous and successive objectives. For that purpose, a division headquarters should be able at any given time to control a varying mix of combined-arms brigades and corps combat support formations in accordance with the maturity of the theater and its mission profile. It must be able to absorb and release any or all of these formations to other division task forces or to corps' direct control on short notice and without delay.

For convenience, brigades and combat support units habitually will be associated with divisions for administration and training. However, that association should have no operational significance. On the contrary, divisions should expect routinely to deploy with subordinate formations they do not control in garrison, and once committed, their size and unit composition may and typically will change frequently and sometimes abruptly.

To accommodate that rapid retailoring, future divisions should be organized on a deliberately austere base comprising only the headquarters and the minimum combat support and service support necessary to sustain it. It is this very structural austerity that underwrites the division task force's flexibility, permitting it to be reconfigured rapidly as operational circumstances and missions require.

Functionally, the headquarters staff should resemble that of the corps on a smaller scale. However, because functions such as civil affairs, territorial security and psychological operations normally will be managed by corps on an area basis, organic division capabilities in these areas should be limited, and augmentation should be routine in the rare case when a division task force operates independently.

In the more typical case, both combined-arms brigades and combat support organizations should be attached to the division task force from corps consistent with the task force mission. By and large, as the division's brigade count rises, so also must its combat support augmentation. But this relationship is by no means linear, and the division's required combat support may be influenced as much by the conditions in which it is operating and its anticipated future missions as by the number of combined-arms brigades it momentarily controls.

Operationally, the division task force serves as the corps' primary means of focusing combat power against a major objective. When tasked for early commitment, it must be able to rapidly assume control of designated combined-arms brigades and support units, deploy in less than 120 hours, and engage immediately on arrival. Thereafter, it must be able to plan and

conduct both ground and air maneuver across operational distances, achieve dominant situational awareness, shape the task force battlespace with supporting fires, mobility/countermobility operations and information operations, and synchronize the operations of its attached combined-arms brigades with supporting fires, attack aviation and close air support.

Because task force operating areas are unlikely to be contiguous even when more than one division task force is committed against the same objective, divisional reconnaissance and surveillance must maintain situational awareness over an area of influence considerably larger than the designated task force area of operations. Task forces normally will not be responsible for attacking targets in these interstices or for their territorial security. But they must track enemy activities and movement in such areas, provide that information to the joint common operating picture, and be prepared to react if interstitial enemy activities threaten task force operations.

Finally, sustainment responsibilities will change radically from those associated with today's divisions. While the division base retains some modest residual logistical capabilities, primary responsibility for logistical support of the division's attached combined-arms brigades and combat support units migrates to the corps, allowing the division task force to shift rapidly from one line of operations to another without responsibility for rearranging the sustainment flow.

Corps will furnish that support through a corps expeditionary logistical organization combining both unit support of major operations and area support of the corps area of operations as a whole. Division task force operations will be weighted by augmenting its corps sustainment modules and by prioritization of throughput from the supply source, whether the continental United States or a theater-managed regional supply center.

Command-and-Control. Like any military force—or successful business, for that matter—Army organizations operate within a hierarchical framework. Some hierarchy is essential to assure common purpose, match authority with responsibility, and distribute the decisionmaking burden consistent with information, experience and resources. At the same time, to conduct high-tempo operations against an adaptive enemy, the command-and-control framework must balance predictability with opportunism and synchronization with agility, and its mechanisms therefore must enable decisions to be made at the lowest organizational level consistent with achievement of the commanders' intent.

Three organizational characteristics will help satisfy that objective, each dependent partly on technology and partly on the way it is employed: a horizontally and vertically integrated information system to assure shared situational understanding throughout the organization; a decisionmaking system that combines anticipatory planning with adaptive execution; and to support both, a reliable, high-speed, wide-bandwidth communications system.

The first is designed to assure a common relevant operating picture of the battle. It will require hands-off self-reporting of friendly locations and status information, internetting of Army, joint and national surveillance and reconnaissance sensors, the ability to rapidly combine and reconcile their products, and the timely distribution of both raw and evaluated information in relation to user-specific requirements. Finally, it must routinely alert users to perishable information that may be especially critical to current operations.

The common relevant operating picture will enable planning staffs supported by advanced decision aids to develop alternative courses of action more rapidly, establish in advance the conditions that would trigger selection of one or another, and distribute multi-option plans to executing units. The objective is to compress significantly the normal planning–orders–execution cycle. Meanwhile, subordinate units’ access to the larger situation in which their operations are imbedded will enable them to anticipate changes and exploit opportunities, whether the result of enemy activity or the operations of other friendly formations.

The prerequisite for both a common operating picture and adaptive, information-driven operations is a system of robust, reliable, jam-resistant communications supporting voice, text, data and graphics exchange. In an operational environment characterized by widely separated engagements, rapid force movement and the need to synchronize a plethora of Army and joint enablers from sustainment to standoff fires, connectivity potentially is the weakest link in the command-and-control chain. Future Army organizations of course must operate effectively even in a communications-degraded environment, but the less often they are compelled do so, the better.

Finally, all the advanced technology in the world will not produce effective command-and-control if staffs are too large and unwieldy, planning and coordination procedures are too rigid and formalistic, or control is exerted too tightly over subordinate unit decisions and actions. Future tactical staffs should be relatively small, cohesive teams of highly trained generalists. They should be able to access functional expertise electronically as required. Broad functional specialization should be reserved for supporting formations and for the operational unit of employment.

Conclusion

The preceding discussion at best provides an intellectual framework for Army adaptation to future multidimensional operations. The details of that adaptation, and the means of effecting it in a world of constrained resources, remain to be developed. What is proposed here is only a starting point.

As the history of military adaptation demonstrates, however, the starting point matters a great deal. In a recent analysis of past military transformations, historian Williamson Murray and his coauthors comment that “in sustained periods of peace, military institutions build up a picture of what they think the next war will look like. In that process they almost invariably get much of the next conflict wrong. . . . What appears to separate the small number of successful applications . . . from the great majority of military campaigns is a willingness to estimate, test and assess actions and effects against a realistic and tough calculus—a process that begins in prewar planning and continues throughout the conduct of operations.”³

The Army operational and organizational changes visualized here reflect the authors’ best estimate of the military challenges America is likely to face in the years ahead, based on the insights of more than seven years of active participation in Army and related studies, analyses and wargaming. Even so, those estimates almost certainly are imperfect and incomplete.

The more important question is whether the operational and organizational concepts outlined in this paper are adaptable enough to surmount those imperfections, as Murray *et al.* warn they must be. We believe they are, and that our best assurance of getting Army

Transformation right is to encourage their further development and refinement by those who ultimately must take America's Army to war.

Endnotes

1. Colonel David A. Fastabend, "That Elusive Operational Concept," *ARMY*, June 2001, p. 44.
2. Carl von Clausewitz, *On War*, ed. & trans. by Michael Howard and Peter Paret (Princeton, N.J.: Princeton University Press, 1976), p. 95.
3. Williamson Murray, with Thomas O'Leary, Joel Resnick, Dennis Gleason and Gwen Linde, "An Historical Perspective on Effects-Based Operations," Institute for Defense Analyses, May 2001.