Department of the Army Historical Summary

Fiscal Year 1989

CENTER OF MILITARY HISTORY
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Introduction

The Army of the 1980s

Emerging from the Vietnam War with its manpower and materiel base sorely in need of revitalization and with the psychological scars of an unpopular war still fresh, the Army of the mid-1970s was hard pressed to carry out its strategic missions. Most of the Army's strategic reserve was depleted during operations in Southeast Asia and had to be reconstituted. Frontline units in Korea and Europe had suffered a decade of neglect because they also had been used as a reservoir of combat leaders, specialists, and equipment for operations in Vietnam. In addition to its ravaged force structure, the Army had deferred modernization of weapons and equipment to help defray the costs of the extended conflict in Vietnam. The austere military budgets of the post-Vietnam period exacerbated these conditions and compelled the Army to reduce its strength and curtail training. The turbulence engendered by declining manpower requirements and adjustments in force structure, combined with what many in the Army perceived as a crisis in professionalism and morale, contributed to the loss of many seasoned noncommissioned officers (NCOs) and officers. The service's concomitant transition to an all-volunteer force heightened the concern of the Army leadership regarding the quality of the force. Nearly one of every two volunteers who joined the All-Volunteer Army was either a high school dropout or scored in the lowest acceptable category of the Armed Forces Qualification Test (AFQT). Laboring under the unflattering sobriquet of a "hollow Army," Army leaders set their sights on rebuilding the Army during the 1980s.

That decade witnessed the revitalization of nearly every aspect of the Army. Beginning in the late 1970s the Army entered a period of ferment in the evolution of doctrine, highlighted by its espousal of AirLand Battle doctrine. It was a period in which the Army adopted the "Army of Excellence" force design, with its mix of heavy and light divisions and special operations forces. Spurred by the growth of Soviet land forces and advances in arms technology, the Army began ambitious weapons and equipment modernization programs as funds for research and development and procurement were increased during the Reagan administration. The fruits of these efforts became apparent by the late 1980s as several major items of equipment—the M1 Abrams main battle tank, the Bradley infantry fighting vehicle, new attack and utility helicopters and rocket launching systems, and improved air defense and antitank weaponry—entered the force.

At the same time, the Army began reconstituting badly depleted war reserve stocks. It enlarged and improved training sites and programs and established combat training centers where maneuver units could engage in realistic force-on-force training. Significant strides were made in applying new technologies related to computer simulation and lasers to support training and enhance information management, communication, and command and control functions. As Army leaders stressed leadership and professionalism, and as an Army career became more attractive, the caliber of manpower improved. This change was reflected in the sharp decrease in the percentage of recruits that comprised the lowest acceptable category of enlistees, from 57 percent in 1980 to 6 percent in 1988, and a rise in the percentage of high school graduates among volunteers, from 54 to 93 percent. Throughout the decade, Army leaders also displayed a greater interest in the quality of life for service members and their families and for retirees.

The qualitative improvements of the 1980s, however, were achieved at the expense of gains in the strength of the active component. While its strength increased during the late 1970s, it declined from 781,000 in 1980 to 772,000 at the start of FY 1989. The Army sought to preserve the strength of forward-deployed combat forces and combat-ready forces in the United States. As the Army forces designated first to fight, they were also the first to modernize. At the same time, the service restructured its heavy divisions to reduce their size, but not their lethality. The Army also enhanced its capacity for rapid deployment of striking forces by organizing several light divisions and enlarging its special operations forces.

Commensurate with changes in the size and structure of the active component, a significant transformation occurred in the roles and strength of the Army's reserve components, the U.S. Army Reserve (USAR) and the Army National Guard (ARNG). Their strengths increased; the USAR grew from 225,000 to 321,000, and the Guard from 389,000 to 457,000. Under the Army's Total Force Concept many combat support and combat service support missions that could not be fulfilled by active forces because of strength limitations were shifted to the reserves. The reserve components assumed an even more meaningful place in the Army's readiness and mobilization posture as certain reserve combat units were selected to "round out" active divisions with brigades or battalions. A variety of programs that affiliated reserve units with the active component gave tangible meaning to the idea of a Total Force.

Congressionally imposed strength ceilings on active forces, a leveling off and then decline in defense spending in the mid- and late 1980s, and the tempering of modernization programs for economic reasons prevented the Army from realizing its manpower and modernization goals. Nevertheless, on the eve of FY 1989 the Army was a profoundly different institution from what it had been a decade earlier. Judged by the quality of its enlistees, its favorable recruiting and retention rates, and vast improvements in training, the Army was a well-trained, ready, and motivated force. Its combat potential, compared with Soviet ground forces by the Force Evaluation (FORCE) Study, 1988/1989 (formerly MICAF, Measuring Improved Capability of Army Forces), also had experienced substantial gains during the 1980s.

The great complexity of such comparisons required consideration of readiness, mobilization capacity, training, command and control, cohesion, and other factors. The FORCE study suggested that between 1985 and 1988 the combat potential of the active component (18 divisions including roundout units, 5 separate brigades, and 3 armored cavalry regiments) improved 37 percent. The combat potential of the reserve components (10 divisions, 16 separate brigades, and 4 armored cavalry regiments) rose 45 percent. For the Total Army the increase was 39 percent. The increases were attributed to modernization of weapons and equipment with items such as the M1A1 tank, the 155-mm. self-propelled howitzer, the Multiple Launch Rocket System, the M2/3 Bradley infantry fighting vehicle, the AH–64 Apache attack helicopter, new dry cargo and tanker trucks, and a variety of improved combat support (CS) and combat service support (CSS) equipment. Other comparisons suggested that American forces, at best, were staying even with the previously stronger Soviet forces.

The changes that occurred in the Army in the 1980s also had troublesome aspects. Rapidly changing doctrine and operational concepts raised several issues: How well prepared was the Army for low-intensity conflict? What was the future of light infantry forces and the motorized division? Could heavy and light forces operate in tandem, and how should they be organized for combined arms operations? Other concerns centered on such perennial issues as the readiness of the reserve components and the adequacy of close air support.

The quickened pace of modernization and the introduction of technologically sophisticated and complex weapons prompted questions about the average soldier's ability to operate and maintain such weapons effectively, thus frustrating advances in doctrine and tactics. These advanced weapons, in the view of some, dramatically increased operating, maintenance, and training costs and siphoned off resources from other areas. Equipping battalions with the Bradley infantry fighting vehicle, according to one study, increased operating and support costs 45 percent, and those costs for battalions armed with the M1 tank rose 69 percent. The cost per flying hour for the Apache helicopter was twice that of the older Cobra, while that of the Black Hawk was four times the Hueys. Operation and maintenance funds, moreover, had not kept pace with the rate of inflation since 1985 and were reduced by 5 percent in FY 1988.

While the Army succeeded in modernizing its force structure, it began to feel the pinch of more austere defense budgets in FY 1989. Despite recent reforms in the development and acquisition processes, modernization was still costly and occasionally faltered. Once promising weapons systems such as the Aquila remotely piloted vehicle (RPV), the Roland air defense system, and the York divisional air defense gun (DIVAD) were programs gone sour. As the Army's developmental programs came under increasing scrutiny by officials of the Department of Defense (DOD) and Congress, questions of cost and priorities assumed a new urgency. Had the Army, some analysts asked, committed itself to excessive high-cost programs that it could not afford? For many developmental projects in FY 1989, the Army faced a choice of scaling down programs, settling for fewer enhancements, acquiring fewer items, or stretching out the developmental process. All of those courses had implications for doctrine, force structure, and readiness. Underlying those options, however, was a question of yet greater import: the priority that the Army should accord to modernization in relation to preserving its force structure.

In FY 1989 the Army faced a predicament common to armed forces in peacetime—a widening gulf between strategic commitments and resources. The Army's strategic missions, which derived from Title 10 U.S. Code, Section 3062, were undiminished in FY 1989. Statutory provisions stipulated that the Army "be organized, trained, and equipped primarily for prompt and sustained land combat operations" and was "responsible for the preparation of land forces necessary for the effective prosecution of war." Specific strategic missions support American national interests and national security policy and strategy. As the Army entered FY 1989 its missions were to deter and, if necessary, defeat a Warsaw Pact attack on the nations of the North Atlantic Treaty Organization (NATO) and otherwise maintain NATO's territorial integrity and security; to deny Soviet or hostile control of the Persian Gulf and associated oil resources; to defend vital U.S. interests in the Pacific; to support allies in Asia, Latin America, and Africa; to maintain a strategic reserve capable of countering threats in the Western Hemisphere; and to respond to other threats to American interests anywhere in the world.

Surveying the Army's role on the eve of FY 1989, General Carl E. Vuono, the Army Chief of Staff, took satisfaction that in the past year the Army had demonstrated clearly its unique strategic role in national security. The readiness and capabilities of conventional and nonstrategic nuclear Army forces committed to NATO's forward defense, he noted, had contributed significantly to achieving nuclear strategic force reductions with the Soviet Union. The participation of Army aviation and air defense elements in operations in the Persian Gulf to protect allied shipping and also the emergency deployment of troops to Honduras at the latter government's request, General Vuono observed, confirmed the Army's readiness to support regional contingency operations and its capacity to engage in low-intensity conflict.

The Army leadership, in General Vuono's view, faced several major challenges in FY 1989. It was imperative to maintain a focus on the Army's warfighting capabilities, to include its strategic reserve forces. The Army, he stressed, must show that it was ready to execute national strategy at a reasonable level of risk and convincingly justify its requirements. The Army of FY 1989 was a dynamic force trained and ready to fight and win anywhere in the world while adapting, as a strategic force, for the next century.

In no small part this effort entailed promoting a fully accurate image of the Army's current trained and ready status and its confidence in its future. To promote a favorable image of itself, the Army resorted to several forums. The U.S. Army War College (USAWC) Current Affairs Panel consisted of a team of USAWC students who visited thirty to thirty-five academic institutions annually. Notable among publications intended to improve the Army's profile was *Army Focus*, a semiannual publication inaugurated in FY 1989 at General Vuono's direction. The Chief of Staff envisioned *Army Focus* as a forum to air key issues that faced the Army and as a means of keeping Army leaders abreast of those issues to help them tell the Army's story and safeguard its position as a vital strategic force.

General Vuono set the Army's agenda for FY 1989 in a widely distributed paper, "A Strategic Force for the 1990s and Beyond." The Army, he contended, had unique and irreplaceable roles in national strategy and constituted the "cornerstone of our national military strategy." General Vuono noted that all of the nation's potential adversaries had large armies that could dominate terrain and assets vital to the United States. The Army's strategic mandate, the Chief of Staff stated, stemmed from an appreciation of this threat and from the assumption that the requirement to meet the land force threat could be met only by the United States Army. From this strategic verity, General Vuono called for an Army, regardless of its size, that was versatile, deployable, and lethal. That Army must be prepared to fight and win in any theater and across the entire spectrum of conflict if deterrence failed. This concept, General Vuono observed, lay at the very heart of our national survival.

The realization of this mandate, General Vuono believed, was fraught with uncertainties. The Army's most substantial recent accomplishment had been improving the quality of the force, an achievement that required continued support. Likewise, the Army's force structure was "perilously small" relative to the Army's commitments. Entering the fifth straight year of budgetary decline, the prospect of an even smaller Army, compounded by a diminishing reservoir of potential recruits, posed a formidable challenge to Army leaders. They sought to maintain the quality and versatility of the Army's personnel, sustain the forward momentum of modernization, and avert the diminution of future combat capabilities by short-sighted economies. The Army's ability to fulfill its strategic mandate was complicated by the rapidity with which the strategic balance was changing through arms control and arms reduction measures. Army leaders wholeheartedly supported these measures in FY 1989, but they cautioned that such measures should be part of an integrated national security strategy that did not inadvertently reduce the Army's ability to carry out its strategic missions.

To guide the Army through FY 1989 and into the next decade, General Vuono enunciated "six imperatives" that Secretary of the Army Michael P. W. Stone previously had outlined. The imperatives reflected a corporate vision of the Army by its senior military and civilian leaders. First in importance was the imperative to maintain a high-quality force by recruiting and retaining educated, highly motivated, and ambitious men and women who possessed leadership potential. This required not only tangible incentives to attract and retain the best people but a professional environment that induced a desire to serve in the Army. To maintain dynamic, realistic doctrine, the second imperative was to ensure that doctrine, while appropriate for contemporary warfighting requirements, was reformulated for the battlefield of the future. General Vuono's third imperative, to maintain a force mix in the Army compatible with requirements of national security, was closely related to the evolution of doctrine. An Army of heavy, light, and special operations forces had to be configured into combat packages appropriate to the threats that the nation faced. Adjusting structure, design, and mix, the Chief of Staff added, must always be based on the demands of national security, not on domestic budget pressures.

The conduct of tough, realistic, mission-oriented training was the fourth imperative. General Vuono deemed it the cornerstone of readiness and the basis for perpetuating the Army as a credible strategic force. Likewise the continued modernization of the Army, the fifth imperative, was to be carried out to improve our warfighting capability in response to the modernization of potential adversaries. Although highly susceptible to fiscal constraints, modernization was all-embracing and pertained to acquisition of major systems and the entire range of personnel, organizational, training, and doctrinal requirements needed to create an effective fighting force. While modernization plans would require adjustment in the future to get the most warfighting value for each dollar invested, General Vuono believed that these plans were a comprehensive road map to harness technology as a significant force multiplier. The development of competent and confident leaders throughout the Army, the sixth and final imperative, closed the loop with the first of General Vuono's tenets. Such leaders were critical for the Army of FY 1989 and would become our legacy to the next generation.

The Chief of Staff's vision of the Army and his six imperatives underlie a large portion of this historical summary. Much of its substance is clustered in chapters that detail the issues involved in General Vuono's six imperatives. Doctrine, force structure, modernization, manpower, training, and quality of life issues are accorded extensive coverage. Other chapters deal with related subjects. In large measure, but not exclusively, the vantage point of this historical summary is Headquarters, Department of the Army (HQDA). Policies, decisions, and actions that derive from HQDA or that emanate from elsewhere but, of necessity, must be addressed by the Army leadership are major topics of discussion. This summary seeks to convey in a broad canvas the condition of the Army in FY 1989, but it also views some subjects from the perspective of the field.

What is presented is largely a historical portrait. History, however, is process and change. The Army is a dynamic institution, and this summary seeks to convey the processes of change as they pertain to the Army. The summary touches on the origins and impetus for change, both internal and external to the Army, and places the service in the context of an uncertain and changing security environment, rapid technological advances, and changes in the larger society in which it served.

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The Army and National Security Strategy

Introduction

The national security strategy of the United States is global in dimension but regional in its priorities. It harnesses all elements of national power—economic, military, and diplomatic—to protect and advance enduring national interests. These interests are the survival of the United States as a free and independent nation with its fundamental values and institutions intact; the existence of a healthy and growing U.S. economy maintained and strengthened by a robust industrial, agricultural, and technological base and by access to foreign markets and resources; the preservation of a stable and secure world free of major threats to U.S. interests and allies; the growth of human freedom, democratic institutions, and free market economies throughout the world linked by a fair and open international trading system; and the development and sustenance of healthy and vigorous alliances.

The fundamental elements of the United States' national military strategy, which define national security objectives and give direction to American defense policies, are derived from these broad objectives. The strategic concepts of deterrence and containment are the key elements of American national military strategy. This strategy entails the protection of our national security distant from North America by using forward-deployed U.S. forces. The principal tenets of U.S. military strategy in FY 1989 were: (1) to safeguard the United States and its armed forces, allies, and interests by deterring aggression and coercion and, should deterrence fail, to defeat armed aggression and terminate conflicts at the lowest possible level of hostilities on terms favorable to the United States and its allies; (2) to encourage and assist allies and friends, through collective defense arrangements, to defend themselves against aggression, coercion, subversion, insurgencies, and terrorism and to expand deterrence of aggression by the extension of American military power; (3) to reduce the Soviet presence throughout the world where possible by increasing the costs of Soviet use of subversive forces and to foster changes in the Soviet Bloc that will lead to a more peaceful world order; (4) to prevent the transfer of militarily critical technology to the Soviet Bloc; and (5) to pursue equitable and verifiable arms reduction agreements.

Since the late 1940s, the goals and key principles of national security and military strategy, based on containment and deterrence, have been constant. They apply to conventional and nuclear threats to American security and interests. Deterrence, whether it addresses a nuclear or conventional threat, rests on the ability of the United States to make clear that it possesses both the ability and the will to respond effectively to any military aggression. Forward-deployed Army forces in critical areas such as Europe and South Korea are manifest evidence of American military resolve to deter aggression.

The Army has contended that conventional military power, and land combat power in particular, is an indispensable component of national military strategy. While vital in long-standing forward-deployed defensive positions in Germany and South Korea, conventional land forces also have provided American leaders the flexibility to meet diverse threats and aggression. Conventional and special operations forces offer national decision makers options for military responses that facilitate conflict management and the conduct of foreign policy. The measured use of land combat forces could help circumscribe the scope and intensity of war by confining it to a conventional mode, thus minimizing the risk of nuclear warfare. While the other U.S. armed services can deny and destroy military objectives, ground forces alone can secure and control them, and thus render a unique strategic function with regard to conflict termination and the attainment of postwar political objectives. During FY 1989 the Army's mission continued to be organizing, training, and equipping forces prepared to conduct prompt and sustained land combat operations by availing such forces to the commanders in chief (CINCs) of the unified and specified commands (the warfighting CINCs) as called for in existing operations plans or as directed by the Joint Chiefs of Staff (JCS).

While deterrence during the past several decades was closely associated with continental defense against the threat of nuclear attack by intercontinental missiles and the preservation of the status quo in Europe and the Korean peninsula, U.S. national security has been historically linked to hemispheric security. Sensitive to foreign encroachments, American leaders have long sought to deter or cope with hemispheric threats both unilaterally and through collective security arrangements with Latin American nations. In the recent past, threats to hemispheric security have been more subtle than a potential enemy's nuclear prowess or massed ground forces. Political and military subversion, terrorism, insurgency, and illicit drug activities and narcoterrorism have been the concerns of American leaders. Using various forms of civil and military assistance as well as conventional military power, the United States has sought to promote political stability, to nurture democratic institutions, to foster economic and social betterment, and to help indigenous military forces to cope with destabilizing internal subversive and terrorist elements. The Army has participated in this strategy of nation building through security assistance programs and other low-intensity operations. Instead of heavy combat divisions and massed firepower, the Army has most often been represented by advisers, mobile training teams, civic action and civil affairs elements, and other light and special operations assets.

The Army as a Strategic Force in NATO

The perception of Soviet threats against Western Europe and North America led to establishment of the North Atlantic Treaty Organization (NATO), the rearmament of former foes and allies in Europe, and the sustained commitment of American combat forces to Europe both to contain and to defend Western Europe against Soviet aggression. The overriding concern for the security of Western Europe molded the Army's strategy and doctrine, operational concepts and tactics, force structure and design, and equipment and weaponry—in fact, nearly every facet of the service. This concern has given impetus to the Army's definition and vision of itself as a strategic force. As a founder and member of the North Atlantic Alliance and NATO, the United States has been committed to the forward defense of Western Europe for the past forty years. The Army has shared this commitment.

Since the founding of NATO the U.S. Army and allied ground forces have faced the numerically superior conventional ground forces of the opposing Soviet and East European armies, who formed their own alliance, the Warsaw Pact, in 1955. During NATO's formative years, when the United States enjoyed nuclear superiority, NATO's military strategy centered on the threat of massive nuclear retaliation against aggression by the Soviet Union. The numerically inferior allied ground forces were relegated to a delaying force or a trip wire that would quickly summon massive nuclear retaliation. Once the two superpowers achieved nuclear parity, massive retaliation became a problematic strategy. In the late 1950s NATO introduced theater or tactical nuclear weapons as the U.S. Army's first generation of atomic artillery, and tactical missiles were designed to compensate for shortcomings in conventional ground strength. These weapons also provided new military options short of the strategic nuclear threshold. The flexible response that they furnished was amplified by advances in air mobility and communications, which gave Army ground forces greater facility to contain or delay any trespass by Warsaw Pact forces. The ensuing buildup of American short- and intermediate-range nuclear missiles and artillery was eventually matched, and in some categories exceeded, by Warsaw Pact forces. Their use, some strategists contended, would lead inexorably to employment of strategic nuclear weapons, while others held that tactical nuclear parity created effective mutual deterrence.

After the end of the Vietnam War, the Army strengthened its forces in Europe. It modified its tactical doctrine, capitalized on technological advances to modernize its forces, and proceeded with force structure changes best suited to defeat quickly an initial ground attack in NATO's Central Front. The Army's adoption of AirLand Battle doctrine, its restructuring of forces under the Army of Excellence concept, and its studied modernization of major weapons are significant facets of this ongoing effort. At the start of FY 1989, 4.5 Army divisions were stationed in West Germany. Since FY 1983, however, American military forces in Europe have operated under a congressionally mandated strength ceiling of 326,400. The JCS approved the Army's share of this ceiling in FY 1989 at 216,779. Army plans envisioned the early reinforcement of NATO by as many as ten stateside divisions in as many days.

Appearing before Congress in February 1989, General John R. Galvin, the Commander in Chief of the European Command (CINCEUR), suggested how, within the context of AirLand Battle doctrine, the traditional strategies of forward defense and flexible response that applied to American ground forces in Europe might be accommodated to the prospects of declining U.S. Army force levels. He envisioned a strategy that traded space for time by allowing assaulting enemy forces to attack deep and reveal their objectives. Highly mobile American forces would concentrate to contain the invading forces and frustrate the enemy's strategy. With the enemy's penetration forestalled, allied forces would mount counteroffensive operations that included operations in the enemy's rear, or the deep battle. Deep operations would seek to prevent the enemy from reinforcing his initial assault forces and to disrupt his command and control and logistical operations, thereby isolating the invasion forces and facilitating their destruction in the close battle. Success in the initial defense and counterattack, or the first battle, according to Galvin, was critical since Army forces depended on organic and theater sustainment during those initial engagements until reinforcements arrived.

Admiral William J. Crowe, Jr., Chairman of the Joint Chiefs of Staff, in April 1989 questioned NATO's ability to mount and sustain an effective conventional defense against a determined Warsaw Pact campaign. NATO's Central Region, Admiral Crowe observed, lacked the number of troops and weapons and inventories of preferred and common munitions needed to prevail in a high-intensity conflict of several months or more with the Warsaw Pact. The most glaring weakness in our global posture, Crowe observed, was NATO's inadequate conventional defense of Western

Europe, particularly the military risks on NATO's Central Front, which were higher than the Joint Chiefs would prefer.

Other factors also impinged on American military strategy in NATO in FY 1989 and on the Army's strategic role in that theater. The most far-reaching factors were the two superpowers' conventional arms control and arms reduction initiatives. In response to Mikhail Gorbachev's announcement on 7 December 1988 that he planned to reduce Soviet forces in Eastern Europe by 500,000, the North Atlantic Council (NAC), NATO's political arm in the North Atlantic Alliance, on the following day called for force reductions that would eliminate asymmetries in tanks, field artillery, and armored troop carriers. The NAC also proposed the start of Conventional Stability Talks (CST) in early 1989.

The military implications of the Soviet Union's unilateral force reductions were ambiguous, and verification was a vexing issue. The United States hoped to clarify Soviet intentions at the Conventional Forces in Europe (CFE) talks, which opened in Vienna in March 1989. The CFE talks succeeded the inconclusive Mutual and Balanced Force Reduction (MBFR) negotiations that had lingered inconclusively for sixteen years and formally ended on 2 February 1989. Near the end of May 1989, President George Bush and NATO allies proposed that NATO and the Warsaw Pact cooperate to achieve parity in conventional forces. NATO proposed reductions in armored forces that limited each side to 20,000 tanks. To achieve this goal, the Warsaw Pact would eliminate 5,000 more tanks than proposed by Gorbachev, while NATO would reduce its tank inventory by about 2,200. President Bush proposed a withdrawal from Central Europe of 30,000 American military personnel, nearly 26,000 of whom would be Army troops. Chief of Staff Vuono noted that the Army participated fully in developing the American initiative. What made the President's counterproposal possible, General Vuono suggested, was the Army's high state of readiness in Europe.

The proposals, however, introduced new factors for the Army's consideration regarding its strategic role in Europe. General Vuono advocated that the military objective of the CFE negotiations should be "parity of capabilities" rather than merely reduction of the number of tanks, artillery, and infantry fighting vehicles. Cuts in specific weapon systems, he felt, should go hand-in-hand with reducing manpower but should also allow for the modernization of remaining weapons, prenotification of major force adjustments, and verification. Underlying the notion of "parity of capabilities" was the assumption that reducing the numbers of weapons alone was not as significant for achievement of a balance of power as consideration for the placement and configuration of weapon systems.

The prospective talks and various proposals also raised a host of questions during FY 1989. The two sides, for instance, differed with regard to the number of men and weapons in each other's armed forces. Differences also existed regarding the interpretation of the weapons to be included in each category. The Soviet Union, unlike NATO, considered mortars and antitank guns as artillery. Another problematic area was the status of reserve stocks. The Russians sought to include stored equipment in the overall totals, which would limit NATO's capacity for rapid reinforcement.

Reducing the American military contingent in Europe by 30,000, as the President proposed, raised the prospect of saving about $2.1 billion in annual costs, according to the Congressional Budget Office. The amount saved, however, could not be determined prior to decisions about the process of force reduction. The Army considered various options during FY 1989: Would entire units be withdrawn or personnel reduced by a specific total number? Would the reductions concentrate on combat power or support capacity? Would units withdrawn from Europe remain in the active component or be transferred to the reserves? What priority should be given to withdrawing the forward-deployed brigades of the two continental United States (CONUS) divisions, the 2d Armored Division and the 1st Infantry Division?

The elimination of intermediate-range ballistic missiles, such as the Army's Pershing missiles, agreed upon by the United States and the Soviet Union in FY 1987, was well under way by FY 1989. The elimination of an entire class of weapons affected Army doctrine and force structure and raised questions regarding the Army's strategic role in Europe, especially the deep battle. The elimination of Pershing missiles spurred efforts by the Army to extend the ranges of short-range missiles and artillery. It also stimulated pressures to reduce other categories of missiles and raised anew the role of tactical nuclear weapons. President Bush indicated that he would not enter arms control negotiations on theater nuclear weapons unless reductions were tied to conventional arms reductions.

Although they were apprehensive that parity between opposing conventional forces and the elimination of intermediate-range missiles might engender pressures to eliminate short-range tactical nuclear weapons, Army leaders staunchly defended the role of tactical nuclear weapons in NATO's politico-military strategy. The Army subscribed to NATO's Comprehensive Concept of Arms Control and Disarmament, adopted in May 1989, which stressed that the fundamental purpose of nuclear weapons in the alliance was political. Conventional and nuclear forces, according to NATO's policy, performed different but complementary and necessary roles. Tactical nuclear forces had an essential political role as a deterrent, and they also furnished the link between conventional and strategic forces.

Another complication in the Army's strategic role in the defense of Europe was the politically charged issue of burden sharing. The question of the European allies' sharing a larger burden of the cost of maintaining

U.S. forces in NATO threatened to become a political flashpoint. Members of the Defense Burdensharing Panel of the House Armed Services Committee believed that the United States paid a disproportionate share of the cost to defend Western Europe. While burden sharing went to the heart of coalition warfare and collective defense as elements of American defense policy, it also generated congressional sentiment for some reduction of American forces in Europe. Burden sharing was especially important for the Army, which depended on the services and infrastructure provided by European allies for the reception and movement of reinforcing forces and for other types of host-nation support in peace and war. Growing frustration in Congress over burden sharing raised the possibility of further withdrawals of Army forces to reduce costs, a measure that could lessen NATO's military capacity, compromise the credibility of deterrence, and weaken the West's bargaining position in conventional force negotiations.

A long-standing shortage of American strategic airlift and sealift was yet another impingement on the Army's ability to execute its strategic role in NATO. The disparity between existing lift capacity and projected requirements influenced the total strategic mobility system, a triad composed of airlift, sealift, and pre-positioned supplies and equipment. The mobility deficit affected both the Army's plans for a conventional defense of NATO and the service's ability to project credible military ground combat power into other regions. Admiral Crowe advised Congress in April 1989 that, in contrast with the advantages of distance and rail and road nets enjoyed by Soviet forces in Eastern Europe, the United States would have difficulty mustering the ships it needed to reinforce Western Europe. Maj. Gen. John R. Piatak, Director of Plans and Resources of the U.S. Transportation Command (TRANSCOM), echoed Crowe's views in testimony before Congress on 2 March 1989. TRANSCOM's activation in 1987, and its mandate to coordinate military air, land, and sea transport and especially to forge a satisfactory national sealift capability for a war in Europe, reflected this weakness. General Piatak was more optimistic about overcoming shortfalls in air than sealift. DOD planned to acquire ten new container ships for Army sealift, but the Army differed with the Navy as to the priority of fast sealift development. In FY 1989 Congress directed the Navy to proceed with research and development of fast sealift and authorized $5 million. Navy officials, contending that existing conventional thirty-knot monohull vessels were best for sealift, recommended sharp reductions in funds for fast sealift research and more money for other Navy programs. The Army, early in FY 1989, appealed to the Office of the Secretary of Defense to reconsider the Navy's proposal.

The Air Force was slated to receive its first C–17 airlift transports, which were specifically designed to carry Army personnel and weapons, in 1991. Able to airdrop as many as 102 paratroopers or to carry 60,000 pounds of cargo, the C–17 was also designed to haul oversized equipment. Besides possessing an intercontinental range equal to that of the Air Force C–5A transport, the C–17 also had the capability to use small, unimproved airfields usually restricted to the C–130 tactical air transport. Even though the probability of war in Europe was decreasing, the C–17 was needed, in the Army's view, to carry out the Army's global strategic mission. Concerned that DOD had only somewhat more than 20 percent of the total planned airlift and sealift requirements, Army leaders gave their highest priority to keeping DOD and Congress apprised of this discrepancy. The Army also supported proposals to modify the Civil Reserve Air Fleet (CRAF) program and to expand ready reserve lift forces. By the end of FY 1989, however, prospects for early acquisition of the C–17 dimmed. Spiraling procurement costs required either reducing the number of aircraft that the Air Force would purchase or trimming the C–17's operational capabilities in order to reduce unit costs.

Lessened tensions between Eastern and Western Europe along with economic pressures and other factors in FY 1989 induced discussions concerning a possible restructuring of NATO and a consequent change in American military strategy. A reduced American military presence in Europe implied greater reliance on reinforcing and strategic lift capabilities in order for the United States to meet its NATO obligations. The imbalances between strategy and resources entailed higher levels of risk to national security and changes in strategic priorities.

As FY 1989 drew to a close, Army leaders were well aware of the prospects for change in NATO. General Vuono viewed the task facing the Army leadership as one of anticipating changes, rather than merely reacting to them. The Training and Doctrine Command (TRADOC) was reevaluating the Army's role in NATO's defense, and General John M. Foss, TRADOC Commander, foresaw the Army's adhering to its traditional strategic roles. As the centerpiece of NATO's conventional defense, it would continue to serve the American strategies of flexible response, forward defense, and coalition warfare. General Foss envisioned an expansion of the Army's role in addressing regional aggression outside NATO. He maintained that the Army's credibility as a strategic force required that it avoid reducing its force structure to a few large organizations but instead create more, smaller units that possessed inherently greater flexibility.

The Strategic Environment and the Soviet Threat

Army planners in FY 1989 highlighted several discernible long-term trends likely to influence the security environment in which the Army would operate in the future. Cautious about the seemingly favorable trends in Soviet defense policy, Army planners believed that Soviet strategic forces would continue to constitute a serious strategic military threat to American security despite nuclear parity. Also, the Soviet Union was likely to expand its capabilities to project its military power and influence. The most volatile military problems, the Army Staff predicted, would occur in the Third World. Such conflicts had the potential of involving the United States directly in order to preserve regional stability, honor treaty obligations, or protect vital national interests. The diffusion of advanced and highly destructive weapons throughout the Third World suggested that even regional and local conflicts were likely to be highly lethal, while the use of American military resources to combat terrorism and illicit drug trafficking would likely increase.

Assessing the import of General Secretary Mikhail Gorbachev's reforms on Soviet military policy and the capabilities of Soviet forces presented a problem to the strategic equation in FY 1989. Gorbachev seemed committed to rejuvenating and restructuring the Soviet economy. His eagerness to eliminate or reduce certain nuclear and conventional arms, his unilateral proposals to reduce Soviet conventional forces, and his encouragement of new thinking in military doctrine, strategy, and foreign affairs appeared to buttress his long-term social and economic reforms. On the other hand, while promising large increases in the production of civilian goods by 1995, Gorbachev continued to countenance large expenditures for defense and its modernization. Soviet conventional forces, which consisted of 200 active ground force divisions with 1.9 million soldiers, more than 53,000 tanks, an estimated 60,000 armored personnel carriers and infantry fighting vehicles, and 1,600 surface-to-air missiles, consumed the lion's share of Moscow's defense budget.

Throughout the post–World War II period, the concept of the offensive, which required attaining superiority through the massing of military forces, dominated Soviet military doctrine. In the view of American analysts, recent improvements in Soviet armored and artillery forces were intended to further Soviet capability to conduct fast-paced, large-scale conventional offensive operations. However, recent statements by Gorbachev and Soviet military leaders suggested that Soviet doctrine and strategy might be in a state of flux. Gorbachev's renunciation of the first use of nuclear weapons seemed to acknowledge openly that a condition of nuclear parity existed between the two superpowers and that neither could win a nuclear war. In other statements by Soviet military officials, Soviet doctrine appeared to be shifting to nonpreemptive strategies at all levels of conflict. Soviet officials, in addition, began to expound a defensive military doctrine based on the idea of nonprovocative defense and reasonable sufficiency. Other Soviet writings on the nature of future war that reflected the modernization of conventional arms continued to suggest that

Soviet doctrine and strategy were geared to fighting and winning a conventional war in Europe.

As a tangible initiative indicating a new direction in Soviet military policy, in a speech before the General Assembly of the United Nations on 7 December 1988, Gorbachev offered to reduce Soviet ground forces. From Soviet forces opposite NATO, Gorbachev planned to disband six tank divisions of 5,000 tanks and 50,000 men by 1991. The withdrawal would be accompanied by a reorganization into a defensive posture of Soviet divisions remaining in forward areas. Gorbachev planned additional reductions for Soviet forces to eliminate 5,000 tanks, 8,500 artillery pieces, an unspecified number of assault crossing units in forward areas, 800 combat aircraft, and about 450,000 troops. The force reduction would total 500,000, or about 10 percent of the Soviet combined active and reserve military strength of five million. The general secretary, however, did not specify the types of tanks or artillery that would be withdrawn, nor did he reveal their eventual disposition.

Gorbachev's initiative was followed by similar announcements by the other members of the Warsaw Pact, except Romania. Collectively, they planned to eliminate 1,900 tanks and 130 aircraft and downgrade seven divisions and numerous smaller units. The total Warsaw Pact decrease in forces in Eastern Europe constituted reductions of 29 percent in tanks and 20 percent in active divisions. By the summer of 1989 the Soviet Union began withdrawing some divisional forces from the *Group of Soviet Forces, Germany* (*GSFG*). Near the end of FY 1989 Soviet officials claimed that approximately 32,000 troops, 3,100 tanks, nearly 700 field artillery pieces, and 120 aircraft had been withdrawn. Some of the equipment was destined for destruction or placement in stockpiles. Forces remaining in East Germany slated for restructuring and upgrading received equipment left behind by the redeploying divisions and were also augmented with additional antitank, air defense, engineer, and attack helicopter capabilities. Soviet military leaders, however, also indicated that some of the Soviet divisions facing NATO would be reorganized to enhance their versatility for combined arms operations for deep operations against NATO defenses. According to Army intelligence analysts, the aim of Soviet force development and deployment was to enhance a theater strategic operation, which in Central Europe called for continuous offensive operations on several fronts to seize objectives up to 1,200 kilometers in less than thirty days without resorting to nuclear weapons.

The capabilities of Soviet ground forces, underscored by their restructuring and modernization, continued to pose a significant threat to NATO. Despite a proposed reduction of 500,000 men, the Soviet Union would still have 4.6 million men in its military forces and the world's largest inventory of military hardware. In Eastern Europe alone Soviet forces would number 2.15 million. As a gauge of the comparative capabilities of Warsaw Pact and NATO forces, the JCS' 1989 Joint Military Net Assessment gave the former an advantage of 2.8:1 in tanks; 2.0:1 in armored personnel carriers and infantry fighting vehicles; and 3.2:1 in artillery. For Multiple Launch Rocket Systems, the Warsaw Pact had a 15:1 advantage. Moreover, technological advances in Soviet weaponry steadily closed the gap that qualitatively superior Western weapons enjoyed in compensating for the quantitative superiority of the Warsaw Pact's armaments. Americans considered the Soviet forces to be equal qualitatively with those of the United States, particularly with respect to surface-to-air missiles, antitank guided missiles, tactical ballistic missiles, communications, and electronics countermeasures. In the areas of anti-satellite systems, chemical weapons and mines, and artillery, the Soviets were given the edge, with a major asymmetry favorable to them in existing short-range missiles in Europe.

Soviet modernization continued unabated in FY 1989 and improved both strategic and conventional forces. As the Soviets withdrew from East Germany in FY 1989, they kept obsolete armored and artillery weapons and left newer tanks like the T–64B, T–72M, and T–80 and a recently introduced self-propelled artillery system for the restructured Soviet divisions, a contradiction of Gorbachev's announced plans. Armor forces, nevertheless, remained the centerpiece of Soviet ground forces. Western analysts detected no decrease in tank production, and U.S. Army analysts noted that the Soviet Union was modernizing its inventory of more than 50,000 tanks by upgrading and extending the useful life of the T–55 and T–62 tanks. In addition, the Soviet Union was fielding variants of newer tanks, the T–64, T–72, and T–80, equipped with more lethal guns, sophisticated antiarmor systems, and improved electronic systems.

The huge disparity in opposing artillery reflected the high value Soviet doctrine accorded this combat arm. Compared with nearly 13,700 artillery pieces in NATO, Warsaw Pact forces had 46,500, according to one 1988 estimate. The Soviet Union fielded new fire support systems at a rate five times that of the United States. Additionally, Soviet modernization efforts extended to the introduction of high-explosive artillery rounds, bomblets, and fuel-air munitions and more accurate guns. Soviet artillery relied increasingly on self-propelled models in place of towed guns, and they augmented conventional artillery with large- caliber multiple-rocket launchers, principally the BM–27 220-mm. system. The deep attack capabilities of Soviet forces facing NATO were also enhanced by the fielding of highly accurate short-range ballistic missiles such as the SS–21 with a range of about one hundred kilometers.

By the end of FY 1989 Gorbachev had charted a course that could lead to major changes in the Soviet Union's national security policy and security relationships with NATO and the United States. The hallmarks of his new approach were greater emphasis on political solutions to conflicts, a more forthcoming attitude toward arms control and reduction, and cooperation with the West in the exchange and verification of military data. At best, however, the Secretary General's military reforms were only a beginning effort to alter Soviet military spending and to contribute to the promised restructuring of the Soviet economy. If for some analysts Gorbachev's espousal of *perestroika* in the military context suggested modernization rather than reform, the start of Moscow's disengagement from the insurgency in Afghanistan and its conciliatory stance toward the Socialist Republic of Vietnam's (SRV) withdrawal from Cambodia were regarded with some optimism. Nevertheless, the Soviet Union continued to transfer arms to the Third World. Testifying before Congress in April 1989, Secretary of Defense Richard Cheney believed Gorbachev's promised reforms might yet lead to a less threatening Soviet Union, but he was skeptical whether Gorbachev would succeed or whether his reforms would outlast his tenure in office. The Soviet Union's enormous nuclear and conventional arsenals, Cheney noted, did not agree with the perception of a waning Soviet military threat.

Army Chief of Staff General Vuono shared this view when speaking at the annual division and corps commanders' conferences in early FY 1989. Noting that Gorbachev's initiatives might eventually reduce the threat, General Vuono stated his belief that the Soviet Union remained the Army's principal potential adversary. "We must deal," he said, "with its capabilities, not its rhetoric." Keeping abreast of changes in Soviet military policies and assessing their ramifications on the capabilities of Soviet ground forces had a high priority in the Army in FY 1989. Throughout FY 1989 Army leaders took a keen interest in devising ways to understand and evaluate more quickly the metamorphosis of Soviet doctrine, strategy, and capabilities under Gorbachev and its implications for the Army. While utilizing Soviet analysts in government and private circles, the Army maintained its own aggressive intelligence efforts. A three-man team dispatched to Afghanistan in January 1989 gleaned applicable lessons from the Soviet experience in that region.

The ongoing Soviet Artillery Effects Project continued to assess the offensive and defensive capabilities of Soviet artillery and its effectiveness against U.S. Army personnel and equipment. Firing tests conducted during the summer of 1989 at Fort Sill, Oklahoma, indicated that the lethality of modern Soviet armor against selected Army artillery pieces and vehicles was higher than anticipated. The information gathered through these and other assessments of changing Soviet doctrine and capabilities was also assimilated into Army training programs and was reflected in the operational concepts used by opposing forces at the Army's national training centers. It was also disseminated throughout the Army by the pamphlet *How They Fight*, published quarterly by the U.S. Army Intelligence and Threat Analysis Center.

Regional Threats

While regional conflicts outside of Europe did not involve direct confrontation between the two superpowers, the Army had to possess the capability to respond to a broad range of regional and low-intensity conflicts. Such conflicts often involve surrogates closely associated with one of the superpowers through security assistance programs or formal alliances. The Soviet Union, for example, furnished military assistance, technical advice, and in some cases direct operational support to forty-two Third World countries. These efforts afforded the Soviet Union access to military facilities in such countries as Cuba, Vietnam, and Ethiopia, which increased its force projection capabilities and heightened the possibility of direct confrontation between American and Soviet or Soviet-sponsored forces.

The world map in FY 1989 was replete with hostilities and simmering conflicts that illustrated the pervasive use of military force in the Third World to achieve political, economic, and social change. Severe socioeconomic problems, political instability, radical secular and religious movements, ethnic discontent, and a continuing buildup of arms sharpened the possibility of threats to American interests and armed forces in those areas. Many regional powers had amassed substantial stockpiles of sophisticated arms that included chemical weapons, ballistic missiles, and potent air defense systems in addition to large standing armies. While the nature of the threat varied within and between regions—from terrorism, subversion, and insurgency to mid-intensity combat—the threats overwhelmingly involved land warfare. The acquisition by more than a dozen developing nations of a thousand or more main battle tanks underscored this prospect. American involvement and concern ranged from a long-standing commitment to defend the Republic of Korea to sponsoring security assistance to friendly Latin American nations besieged by destabilizing insurgency and subversion.

The presence of the Army's 2d Infantry Division in forward defensive positions in South Korea near the Demilitarized Zone (DMZ) was tangible evidence of the potential involvement of American ground forces in another regional conflict during FY 1989. Although a quiescent military situation, occasionally punctuated by North Korean incursions into the DMZ, prevailed between North and South Korea, North Korean ground forces enjoyed a 3:2 numerical superiority over South Korean and American ground forces. Opposing the North's 930,000-man army were

550,000 South Korean and 31,600 American ground troops. North Korea, assisted by the Soviet Union and the People's Republic of China, evinced a steady improvement of its offensive capabilities. Although small in comparison to its commitment to NATO, the presence of American ground forces in South Korea was a powerful deterrent to a renewal of hostilities by Communist forces across the DMZ.

Elsewhere in Asia, the Soviet-supported Vietnamese regime, with the third largest army in the world, posed a threat to Thailand, which had close ties with the United States. The Soviet naval presence at Cam Ranh Bay, formerly part of South Vietnam, enabled Moscow to project its military strength into the South China Sea, the Indian Ocean, and the western Pacific. The United States had major air and naval bases in the Philippines, and a virulent Communist-inspired insurgency fomented political instability and acts of terrorism against U.S. Army and other American military personnel and facilities there.

The Persian Gulf and the Middle East were strategically important to the industrialized nations of the West and to Japan because of their large oil reserves. For the same reasons, but to a lesser extent, the Soviet Union also was interested in the region. Geographical proximity, however, was the basis for the Soviet strategic concern. Many nations of the Middle East were susceptible to Moscow's influence, reinforced by their extensive purchase of Soviet arms. Conversely, the Soviet Union was wary of the influence of its Muslim neighbors because of the threat of latent nationalism that existed in the Muslim-dominated Soviet states. Throughout the region, revolutionary Islamic fundamentalism, ethnic discord, and strained interstate relations, exemplified in FY 1989 by the Iran-Iraq conflict, had the potential to spark military confrontation. The protracted Iran-Iraq war, although it ended in a cease-fire in FY 1989, reflected the rampant proliferation of weapons in this volatile region. Each side resorted to ballistic missiles and chemical warfare, and Iraq's claim of victory was tempered by its large loss of combatants and civilians. The war also heightened American concern regarding access to Persian Gulf oil. This concern prompted an American military presence both to protect international shipping and to convey U.S. interest in containing the conflict. The emergence of Iraq as the dominant power in the Persian Gulf, according to Army analysts, raised the likelihood that it might become more assertive toward smaller neighbors to its south.

Flashpoints with the potential of igniting into larger conflicts existed throughout the Middle East and Persian Gulf, from Libya to Iran. The endemic strained relations between Israel and its Arab neighbors, internecine fighting in Lebanon, and tensions between Arab factions and states had some potential of implicating the United States. Under the auspices of the United Nations, U.S. Army forces served with a peacekeeping force between Israel and Egypt in the Sinai Peninsula. Terrorist organizations in the Middle East periodically attacked American military personnel and civilians, which sometimes invited military retaliation. Regional arms buildups, in the meantime, exacerbated the more fundamental causes of instability and raised the military, economic, and political costs of American deterrence.

In the Caribbean and Central and South America, the United States faced a multitude of threats. These included destabilizing political dissidence, Communist-supported insurgencies, terrorism, and illicit drug trafficking. While none posed a direct military threat to the United States, they impinged on the larger American objectives of fostering hemispheric security, progressive democratic reforms, and social and economic development in the entire region. Illicit drug trafficking was often inextricably tied to subversive insurgency and terrorism, and ultimately had deleterious social and economic repercussions in American society. President Manuel Noriega's disregard for the democratic electoral process in Panama emerged as a major threat to the political system in that country, endangered the security of American personnel and installations, and threatened to disrupt operations of the Panama Canal, a responsibility of the U.S. Army.

Communist-inspired insurgent threats in Latin America could be viewed as a Soviet effort to divert American attention to its southern flank, which would give the Soviets an advantage in the confrontational areas of Western Europe and the Middle and Far East. Through financial, materiel, and moral support to its surrogates in Cuba and Nicaragua, Moscow abetted insurgencies elsewhere in the region. Cuba furnished arms, technical advisers, and trained guerrillas in the Americas and played a significant ground and air role in Angola. With a population of only 3.54 million and an active force of more than 80,000, Nicaragua's army dwarfed those of its neighbors. Hemispheric threats fell under the rubrics of low-intensity and unconventional contingencies. The U.S. Army's capacity to respond to them included the rapid deployment of light conventional and special operations forces and the commitment of advisers and specialized teams to assist friendly armed forces.

International Terrorism and Espionage

International terrorism was a multifaceted threat during FY 1989. Terrorists varied from those who confined their activities to a single country to those who operated internationally. Terrorist groups based in the Middle East, for example, frequently operated throughout the world. Iran, Libya, and North Korea had sponsored transnational terrorism. In other areas, the Philippines and Central and South America, for example, insurgents had employed terrorist tactics. In South Korea and other countries, political factions had conducted terrorist actions against American soldiers and bases. Terrorist activity associated with narcotics trafficking—narcoterrorism—was prevalent in several areas of Latin America and now extended to the United States.

Although it did not seriously threaten the United States or American military capabilities, terrorism was a significant national security issue. Members of the Army and their dependents stationed abroad, because of their high visibility and symbolic representation of American policy or involvement in assisting local governments to combat terrorism, were among the terrorists' favored targets. Army personnel and installations in the United States, moreover, were not immune to this threat. The Army, during the decade preceding FY 1989, had improved its ability to combat terrorism by enhancing its intelligence capabilities and by developing resources to respond quickly and successfully to terrorist threats. By FY 1989 the full panoply of deterrent, protective, and active countermeasures to cope with terrorism was being codified into a new Force Protection Doctrine.

In contrast to successful acts of terrorism whose perpetrators thrived in the publicity that resulted from their actions, espionage agents thrived on anonymity and secrecy. Unlike terrorism, espionage directed against the U.S. Army, if successful, could jeopardize national security and the Army's combat capabilities. Despite the atmosphere of detente between the superpowers, the threat of espionage remained high. Under its Subversion and Espionage Directed Against the U.S. Army (SAEDA) program, the service received approximately four hundred reports annually, of which about 10 percent had genuine espionage implications.

Conclusion

The most palpable and direct threat to American security interests in FY 1989 continued to be the Soviet military forces. The most probable threats that could result in the commitment of American military forces, however, were regional and lower intensity conflicts. If carried out, the force reductions and reorientation of Soviet forces that Gorbachev announced had the potential of decreasing the Warsaw Pact's ability to mount an unreinforced, short-warning attack against NATO in the Central Region. The regional threats for which the Army had to prepare were likely to grow. The elimination and reduction of strategic weapons suggested that the burden of deterrence would also shift from strategic to conventional forces in general and to land forces in particular. As a strategic force, the Army had to prepare to operate across the entire range of conflict in regions as diverse as the Arctic or the Sahara Desert and against potential adversaries that varied from the sophisticated ground forces of the Soviet Union to the indigenous guerrillas of an impoverished underdeveloped nation.

3

Organization and Budget

Headquarters, Department of the Army

Having been elected in November 1988 to succeed President Ronald Reagan, President George Bush did not immediately select a new Secretary of the Army. The incumbent, the Honorable John O. Marsh, Jr., remained in office until a successor was sworn in. Marsh's tenure as Secretary, having begun in January 1981, was longer than that of any preceding Secretary of the Army or Secretary of War.

In late April 1989 President Bush nominated Richard Lee Armitage, then serving as the Assistant Secretary of Defense for International Security Affairs, to replace Marsh. Citing personal reasons, Armitage withdrew his name from consideration a month later. President Bush subsequently nominated Michael P. W. Stone to be Secretary of the Army. Stone had served as Assistant Secretary of the Army (Financial Management) between May 1986 and May 1988, and as Under Secretary of the Army from May 1988 to May 1989. As Under Secretary he was also the Army Acquisition Executive. When nominated by Bush in July 1989, Stone was Acting Under Secretary of Defense for Acquisition, having been selected for that position by the new Secretary of Defense, Richard Cheney. Stone was sworn in as Secretary of the Army on 14 August 1989. The Army had been without an under secretary between May and September 1989, when the vacancy created by Stone's move to the Office of the Secretary of Defense was filled by John Shannon, who had served as Assistant Secretary of the Army for Installations and Logistics since 1984.

Stone served as Secretary of the Army for a little more than a month before the end of FY 1989. The reforms in the Army's acquisition process that he had initiated as Under Secretary continued to unfold. Important decisions regarding the formation of the military and civilian elements of the Army Acquisition Corps began to come up for Stone's review at the end of FY 1989. During his confirmation hearings, Stone articulated his vision of the Army. The service's "pressing needs," he told the Senate Armed Services Committee, "are to have a force immediately ready for war . . . with sufficient stores for a long fight." He stressed the importance of proper modern equipment, adequate battlefield sustainment, continued emphasis on recruiting high-quality soldiers, and rigorous, realistic training. With Congress, he shared concern about some readiness problems in the reserve components and pledged to enhance Army special operations forces. Stone also called for the continued modernization of heavy forces because of the Soviet Union's modernization of its armored forces and emphasized the priorities needed for both ammunition procurement and weapons systems. If budget reductions demanded retrenchment, Stone indicated he would minimize the effect on force structure, continue to modernize but at a reduced pace, and maintain both force readiness and essential sustenance.

Stone's views were similar to those espoused throughout FY 1989 by the Army's senior military leaders. During FY 1989 the service's senior military leadership was characterized by more continuity. Chief of Staff General Vuono, who assumed that office on 23 June 1987, served as chief throughout FY 1989. Foremost among the personnel changes in key Army Staff positions during FY 1989 was the appointment of a new Vice Chief of Staff. Effective 17 January 1989, Lt. Gen. Robert W. RisCassi, formerly Director of the Joint Staff, became Vice Chief of Staff, U.S. Army, succeeding General Arthur E. Brown, Jr., who retired after serving in that position since June 1987. General RisCassi's background included recent participation in the development of Army doctrine and design of the new light infantry division concept.

Major organizational elements of Headquarters, Department of the Army, in FY 1989 are depicted in the table in the appendix. During FY 1987 and FY 1988, as mandated by Title V of the Department of Defense Reorganization Act of 1986, the Army Secretariat had assumed added responsibilities for acquisition, research and development, auditing, comptroller functions (including financial management), information management, and inspector general duties within the Army. In accord with Title V of the 1986 act, the Army also continued to reduce its administrative and headquarters staffs. Effective FY 1989, Congress limited the strength of the Secretariat and the Army Staff to 3,105 military personnel and civilian employees.

By FY 1989 the pace of organizational change spurred by the 1986 act abated within the Army Secretariat, but FY 1989 saw continued centralization of civilian management of the functional areas noted above. The Under Secretary, who was also the Army Acquisition Executive, adjusted the acquisition chain of command during FY 1989 by consolidating and eliminating subordinate program executive officers. To facilitate the developmental and acquisition process, a new staff group, the Army Test and Evaluation Management Agency (TEMA), was established on 1 November 1988 as a staff support agency assigned to the Office of the

Chief of Staff, with operational control exercised by the Deputy Under Secretary of the Army (Operations Research). As the single point of contact at HQDA for test and evaluation (T&E) matters, TEMA coordinated Army T&E policy and resource actions with the Office of the Assistant Secretary of Defense (OASD) (Research, Development, and Acquisition), the Army Staff, and the other Army agencies and armed services, and developed and monitored major range and test facility funding policies.

The U.S. Army Financial Management Systems Integration Agency, located in Washington, D.C., was established as a staff support agency of the Financial Management Systems Directorate, effective 31 March 1989. As of 15 February 1989, the U.S. Army Information Systems Selection and Acquisition Activity, Alexandria, Virginia, was redesignated as the U.S. Army Information Systems Selection and Acquisition Agency and assigned as a field operating agency of the Director of Information Systems for Command, Control, Communications, and Computers. The agency continued to rely on the Commander, U.S. Army Information Systems Command, for administrative and logistic support until FY 1990.

Continuing the realignment of the organization and functions of The Adjutant General's Office, the Adjutant General Center was disestablished as a field operating agency under the jurisdiction of The Adjutant General at the start of FY 1989. Its organizational elements and functions were realigned to other Army activities, principally the Total Army Personnel Agency. The Headquarters, Armed Forces Courier Service, a derivative unit of the Adjutant General Center, was disestablished and transferred to the Defense Courier Service as a joint service and DOD activity under the command and control of the Commander in Chief, Military Airlift Command, U.S. Air Force. The Administrative Assistant to the Secretary of the Army assumed financial and administrative duties formerly carried out by The Adjutant General.

In addition, effective 1 October 1988, in accord with the U.S. Total Army Personnel Agency (USTAPA) concept plan, the U.S. Army Civilian Personnel Center (CIVPERCEN), formerly a field operating agency of the Office of the Deputy Chief of Staff for Personnel (ODCSPER), HQDA, was incorporated into USTAPA as a separate directorate. USTAPA, a provisional field operating agency of ODCSPER since FY 1988, was redesignated the U.S. Total Army Personnel Command (PERSCOM), effective 8 December 1988. PERSCOM remained a field operating agency of ODCSPER and retained proponency for the following elements: U.S. Army Central Personnel Clearance Facility, Fort Meade, Maryland; U.S. Army Central Identification Laboratory, Hawaii; U.S. Army Enlistment Eligibility Activity, St. Louis, Missouri; U.S. Army Enlisted Records and Evaluation Center, Fort Benjamin Harrison, Indiana; six U.S. Army Personnel Assistance Points at entry and debarkation sites at Charleston

(South Carolina), John F. Kennedy Airport (Jamaica, New York), Philadelphia International Airport (Pennsylvania), Seattle (Washington), St. Louis (Missouri), and Dulles International Airport (Herndon, Virginia); U.S. Army Mortuary, Oakland, California; U.S. Army Drug and Alcohol Operations Activity, Falls Church, Virginia; Personnel Security Screening Points at Fort Leonard Wood (Missouri), Fort Jackson (South Carolina), and Fort Dix (New Jersey); U.S. Army Physical Disability Agency, Walter Reed Army Medical Center, Washington, D.C., and its subordinate Physical Evaluation Boards; Office of Promotions Reserve Component and the Reserve Appointments Branch, located at PERSCOM's headquarters; and the Institute of Heraldry, Cameron Station, Alexandria, Virginia.

In a change of Army Staff proponency, the U.S. Army Center of Military History (CMH), a field operating agency of the Office of the Deputy Chief of Staff for Operations and Plans (ODCSOPS), was redesignated a field operating agency of HQDA on 1 March 1989, with proponency resting in the Management Directorate of the Director of the Army Staff (DAS), Office of the Chief of Staff, Army. The DAS shares some administrative functions regarding CMH with the Office of the Administrative Assistant to the Secretary of the Army.

During FY 1989 the Redistribution of Base Operating Information System (BASOPS)/Unit Structure Within TDA (ROBUST) Task Force completed its review of the Army's Table of Distribution and Allowances (TDA) structure of more than 600,000 spaces and nearly 3,000 units. Established in 1988, the task force had a goal to recommend a TDA structure best suited to complement the force design of Tables of Organization and Equipment (TOE) organizations adopted under the Army of Excellence program. The task force was also motivated by the need to scale down the strength of TDA organizations to protect combat force structure. Although submitted to the Army leadership early in FY 1989, the ROBUST Task Force's recommendations continued to be reviewed throughout the year.

Major Army Commands and the Unified Commands

Major Army Commands (MACOM) are also depicted in the table in the appendix. During FY 1989 changes occurred in several MACOMs. One source of change was the Army's increasing involvement with environmental issues and compliance with state and federal laws. This workload had increased dramatically in recent years as the Army exerted itself to comply with tougher standards, to contend with lengthy litigation, and to overcome adverse publicity. In some instances environmental concerns had curtailed missions. To meet better its growing environmental responsibilities and to streamline environmental management, the Army Environmental Office became an HQDA staff support agency under the Office of the Assistant Chief of Engineers, effective 1 October 1988.

At the same time, the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) was transferred from the Army Materiel Command (AMC) to the U.S. Army Corps of Engineers. The Chief of Engineers, as the environmentalist of the Army, delegated execution authority to the Assistant Chief of Engineers (ACE). USATHAMA, a field operating agency under the ACE, is responsible for centralized environmental support of the worldwide Total Army Environmental Program. To carry out its mission, USATHAMA can exploit the substantial environmental talent available through the Corps of Engineers' civil works missions in its districts and divisions. To enhance support to installation commanders in the environmental area, USATHAMA's mission expanded to encompass environmental restoration, which included the assessment and cleanup of hazardous waste disposal sites, regulatory compliance, hazardous waste reduction/minimization (HAZMIN), environmental training and awareness, and environmental technology development in support of installation restoration programs and pollution abatement.

Several organizational changes occurred in the Training and Doctrine Command (TRADOC) in FY 1989. On 14 July 1989 TRADOC inactivated the U.S. Army Training Board. Established in 1971 as an Army "think tank" devoted to training issues, it was inactivated as a result of funding cuts and reorganizations of TRADOC's training functions. Over the years many of the board's activities began to duplicate other TRADOC training activities— the Combined Arms Training Activity, the Center for Army Lessons Learned, and the combat training centers. During FY 1989 TRADOC began reorganizing its subordinate test and evaluation structure, while it concomitantly planned to realign the Army's entire test and evaluation community. The Army sought to consolidate test and evaluation activities under two centers—one for technical and the other for operational T&E. In a realignment completed in early FY 1989, TRADOC gave primary responsibility for T&E functions to the Commander, TRADOC Combined Arms Test Activity (TCATA), at Fort Hood, Texas. It entailed a realignment of TCATA, the Combat Developments Experimentation Center (CDEC), and eight TRADOC test boards under the Test and Experimentation Command (TEXCOM). Concurrent with this realignment, TEXCOM became a major subordinate command of TRADOC.

On 18 July 1989, soon after TEXCOM was reorganized, the Deputy Under Secretary of the Army (Operations Research) asked for a review of the Army's entire test and evaluation organization. He aimed to consolidate all T&E activities under one command. Three major issues were involved in the review: the consolidation of Army test and evaluation organizations;

the consolidation of Army analytic organizations; and the transfer of certain Army test centers to government-owned, contractor operated status. Of the several alternatives presented, Chief of Staff General Vuono selected a plan recommended by TRADOC and the Operational Test and Evaluation Agency (OTEA). The plan envisioned consolidation of several technical test and evaluation elements under AMC. These elements included the Army Materiel Systems Analysis Agency (AMSAA); the Test and Evaluation Command (TECOM); technical test and evaluation functions associated with the U.S. Army Aviation Systems Command's Army Engineering Flight Activity, the U.S. Army Missile Command's Test and Evaluation Directorate, and the Atmospheric Science Laboratory's meteorology teams; and certain functions of the U.S. Army Armament, Munitions, and Chemical Command and the U.S. Army Communications and Electronics Command. Under the reorganization, the entire Integrated Logistic Support (ILS) Division of the Logistics Evaluation Agency (LEA) would be transferred to AMSAA. The proposed command was tentatively designated as the Army Technical Test and Evaluation Command. Assigned to AMC, it would report directly to the Chief of Staff.

Operational test and evaluation, in turn, would be centralized under a newly created Operational Test and Evaluation Command (OTECOM) consisting of the U.S. Army Operational Test and Evaluation Agency and the U.S. Army Test and Experimentation Command. This arrangement, while it reduced personnel spaces, saved money, and streamlined operations, also responded to Congress' desire to separate technical T&E, which focused on engineering design and item performance, from operational T&E, which determined the operational effectiveness and suitability of weapons and equipment under development.

The proposed realignment was not approved during FY 1989. A general officer steering committee was chartered by the Vice Chief of Staff and the Deputy Under Secretary of the Army (Operations Research) to manage and implement the reorganization. Tentative plans envisioned a technological test and evaluation center in the Washington, D.C., area and an operational test center at Fort Hood, Texas. The latter would include the TEXCOM Experimentation Center (TEC) at Fort Ord, California; the Airborne and Special Operations Test Board at Fort Bragg, North Carolina; the Air Defense Artillery Board at Fort Bliss, Texas; and several liaison elements at various locations that would replace seven test boards (Armor, Engineer, Aviation, Communications-Electronics, Field Artillery, Infantry, and Intelligence and Security). Army planners believed this alignment would reduce intraservice conflicts between T&E organizations and save the Army more than $300 million between FY 1991 and FY 1995. Others considered that the proposed organization would reduce the Army's testing capacity, particularly by eliminating an immediately responsive branch test capability through the abolition of the seven boards.

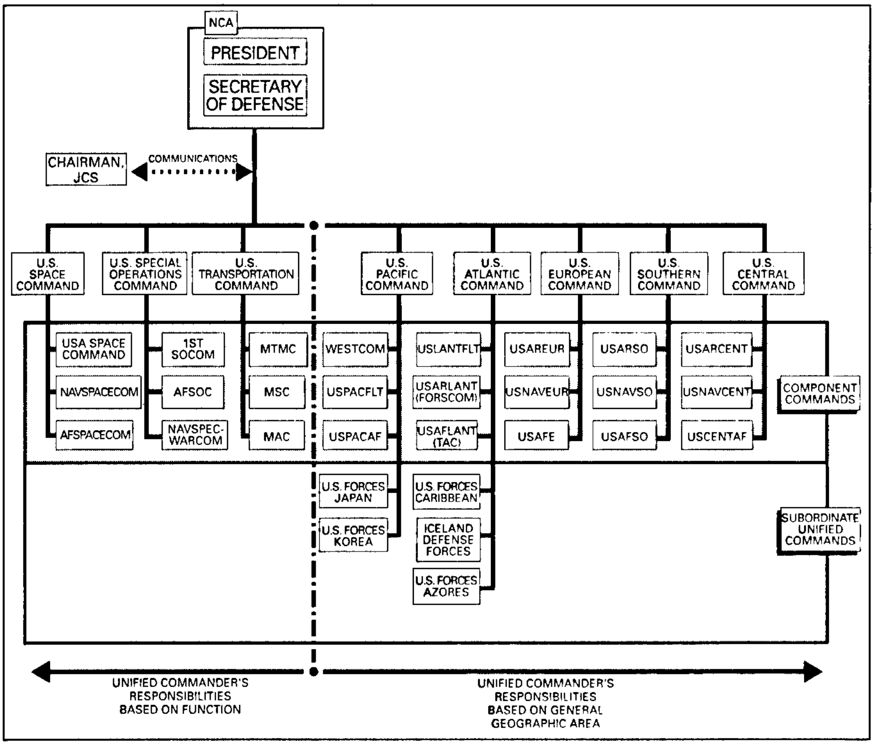
Also under TRADOC's jurisdiction, the command structure at Fort Lee, Virginia, was reorganized in FY 1989. Command of Fort Lee was transferred from the Quartermaster Center, a major general billet, to the Commanding General, U.S. Army Logistics Center, a lieutenant general billet, on 3 January 1989. The Logistics Center's mission did not change except for the additional responsibility for garrison operations. This change made Fort Lee's command structure parallel to Fort Leavenworth's, where the Commander of the Combined Arms Center was also the Commandant of the Command and General Staff College and the installation commander.

Plans to realign or close selected bases in the United States affected several TRADOC installations. The proposed closure of Fort Dix, New Jersey, a major training base, led TRADOC to study a realignment of the Army's entire training base. The possible closure of Fort Ord, California, increased pressure to relocate Headquarters, TEXCOM, to Fort Hunter Liggett, California, where the command had its mission elements. This move was delayed during FY 1989 pending the review and approval of an environmental impact statement and by other factors.

Chart 1 illustrates the relationships among Army MACOMs and the unified and specified commands subordinate to the national command authority in FY 1989. Army MACOMs constitute Army component commands in several unified commands and in certain specified and subordinate unified commands. These MACOMs are the principal suppliers of ground combat power for the appropriate CINCs. U.S. Forces Command (FORSCOM), as a CONUS MACOM, was responsible for the readiness of Army forces and, as required, provided forces in its role as a specified command. FORSCOM was also the Army component of the U.S. Atlantic Command, provided the nucleus for the Army component of the U.S. Central Command, and through its subordinate 1st Special Operations Command (1st SOCOM) provided the Army component of the U.S. Special Operations Command (USSOCOM).

During FY 1989 extensive planning was done to convert the 1st SOCOM to an independent MACOM by FY 1990. These efforts were closely coordinated with USSOCOM, since the 1st SOCOM would continue as the Army component in USSOCOM. (See Chapter 5 for additional discussion of this matter.) Through a Joint Mission Analysis (JMA), USSOCOM had refined its special operations forces (SOF) in FY 1989 to achieve a proper balance of readiness, modernization, sustainability, and force structure for SOFs of all three services. Its primary missions were to provide combat-ready SOFs to reinforce other unified commands and to plan and conduct special operations when directed by higher authorities.

CHART 1—Unified Command Organization



Source: The Joint Staff Officer's Guide, 1988.

The command also assumed responsibilities for research, development, and acquisition of specialized SOF materials and supplies and management and training of all SOF personnel. To enable it to exercise greater independence, on 24 January 1989 DOD delegated program and budget execution authority to the Commander in Chief, USSOCOM, for all SOFs beginning in FY 1992. Until that time, service budgets would contain funds to support USSOCOM. The Commander in Chief, USSOCOM, already had received "head of agency acquisition authority" to facilitate his logistical responsibilities.

In carrying out its operational and logistical functions, USSOCOM relied heavily on the assets and capabilities of each armed service. In addition to Army special operations forces being dedicated to USSOCOM, the command sought to avoid duplication by the services in SOF research, development, and procurement programs and systems. The Army also identified items in its FY 1989 budget that might be included in USSOCOM's Major Force Program budget. The Army also provided

USSOCOM with the means to improve interoperability. These efforts were concentrated in training, military exercises, and equipment. U.S. Navy sea, air, and land capability (SEAL) corpsmen, for example, received Army medical training at Fort Sam Houston, Texas, and Fort Bragg, North Carolina, and parachute packer/rigger training at Fort Lee, Virginia. Air Force SOF para-rescuemen attended Army Special Operations skill courses, and members of both the Air Force and Navy SOFs took Army basic airborne training. In January 1989 the Army Special Warfare Center and School was designated the proponent for all SOF military free-fall parachuting under the auspices of USSOCOM. In turn, Army SOF enrolled in Navy schools for combat rubber raiding craft training, dive operations, and dive maintenance training. The two services also conducted a dive instructor exchange program between the Army Combat Diver School at Key West, Florida, and the Naval Special Warfare Center at Coronado, California.

In FY 1989 the Army moved to establish a Theater Army Special Operations Command (TASOC) in each theater or Army component command to exercise command and control over Army SOF deployed to an overseas theater. On 21 August 1989, General Vuono approved the concept of establishing numbered Theater Army Special Operations Support Commands (TASOSC), a renaming of TASOC, following a one-year assessment of a provisional TASOSC in U.S. Army, Europe (USAREUR). The establishment of four additional TASOSCs was expected in FY 1990. Realization of this goal, however, entailed protracted discussions with several unified commands. The Army Staff explored activation of a TASOSC with Pacific Command (PACOM), and also proposed a TASOSC for the Western Command (WESTCOM), the Army component command in PACOM. The proposed TASOSC would become the Army component of the Special Operations Command, Pacific (SOCPAC), a subordinate unified command under the Commander in Chief, Pacific Command. Progress toward this goal in FY 1989 was complicated by such issues as adjusting Army tables of organization and equipment and obtaining approval for additional Army spaces in the Joint Manpower Program (JMP).

More substantial progress was made in adjusting command arrangements between PACOM and FORSCOM regarding the command and control of Army forces in Alaska. The Pacific Command, headquartered in Hawaii, planned to establish a subordinate unified command in Alaska to relieve FORSCOM of responsibility for Alaska's defense. The plan also entailed transferring operational command of the 6th Infantry Division (LID) from FORSCOM to WESTCOM. As the Army component command in PACOM, WESTCOM would assume command of all FORSCOM assets in Alaska, less the Northern Warfare Training Center, which FORSCOM would continue to control. The change in the defense of Alaska was facilitated by amending statutory restrictions for such changes. The realignment of command responsibilities became effective at the start of FY 1990.

FY 1989 Budget

In his 1987 biennial budget for fiscal years 1988 and 1989, President Ronald Reagan requested $323.3 billion in defense funds for FY 1989 and assumed that defense outlays would increase approximately 4 percent annually. Congress chose not to enact a two-year budget, and in January 1988, as part of the Presidential Budget (PB), President Reagan proposed an FY 1989 DOD budget of $291 billion. Primarily because of congressional cuts for the Strategic Defense Initiative, President Reagan vetoed a defense spending bill that Congress had passed. Congress approved a revised FY 1989 defense budget of $280 billion that was signed by the President in October 1988. Total DOD outlays for FY 1989, including outlays of money appropriated in previous years, amounted to $295 billion. National defense spending in FY 1989 represented 5.8 percent of the nation's gross domestic product (GDP) and 26.1 percent of total federal outlays. Defense spending, as a percent of GDP, decreased steadily after its high of nearly 52 percent during the Korean War. By FY 1989 it neared its historic low of 5 percent, previously reached in the late 1970s. Adjusted for inflation, defense spending in FY 1989 continued a four-year trend in the decline in real spending that began in FY 1985.

A significant factor in the Army budget was the fluctuation of the dollar in countries where American forces were stationed. For the FY 1989 budget, for example, the American dollar was initially valued at 2.06 West German deutsche marks. At the start of the fiscal year the dollar's value was pegged at 1.88 marks, but it declined to 1.726 by late November 1988. The persistent weakening of the U.S. dollar in Germany diminished the buying power of the Army's operation and maintenance budget by almost $700 million in FY 1989. U.S. soldiers and their dependents in West Germany experienced a loss of purchasing power.

The Army's portion of the President's Budget of January 1988 was approximately $82.6 billion. Actual disbursement, or total obligation authority (TOA), by the Army totaled $78.9 billion in FY 1989 (in constant dollar terms) and represented 27 percent of the total DOD budget, approximately 7 percent of total federal spending, and 1 percent of GDP. Although the Army's TOA increased by about $2.1 billion over its $76.8 billion TOA of FY 1988, its share of the total DOD budget increased less than 1 percent. Of the three military departments, the Army had the lowest share of the FY 1989 DOD budget, 27 percent (Navy 33.5; Air Force 32.6; and 6.9 percent for other DOD agencies). In terms of constant FY

1989 dollars, the FY 1989 budget represented a decrease of about $1.3 billion in comparison to FY 1988, or a 1.6 percent reduction in purchasing power. *Table 1* traces the Army budget, by appropriation account, through the budget process from the President's Budget request of January 1988, the amended President's Budget of April 1988, the appropriated amount, and actual disbursements or TOA.

The Army's highest budget priorities in FY 1989 were people and training. In round figures, the Army disbursed almost $30 billion for pay, allowances, and other Army personnel programs—$24.4 billion under Military Personnel, Army (MPA), for active personnel and a total of about $5.5 billion for the reserve components (Reserve Personnel, Army [RPA], and National Guard Personnel, Army [NGPA]). Spending for procurement was $14.9 billion—$2.9 billion for aircraft (ACFT), $2.6 billion for missiles (MSLS), $2.7 billion for weapons and tracked combat vehicles (WTCV), $2.0 billion for ammunition (AMMO), and $4.7 billion for Other Procurement, Army (OPA), which included a special one-year appropriation of $108 million for special operations forces and $4 million for the National Guard and Army Reserve (NGRP). Funds for the purchase of aircraft allowed the Army to expand its fleet of AH–64 and UH–60 Black Hawk helicopters and to acquire modified CH–47 Chinook and OH–58 Kiowa helicopters. WTCV funding enabled the Army to continue to acquire M1 Abrams tanks and modified M109 155-mm. howitzers, Bradley infantry fighting vehicles, and older troop and ammunition carriers. The OPA category, spending for which totaled nearly $4.7 billion, purchased tactical and support vehicles such as the High Mobility, Multipurpose Wheeled Vehicles (HMMWV), communications and electronic equipment, and other support equipment. The largest amount in this appropriation funded procurement of communications and electronic equipment, in particular the Mobile Subscriber Equipment (MSE) and the Single Channel Ground and Airborne Radio System (SINCGARS).

The Army's total obligation authority for Operations and Maintenance for FY 1989 was $25.7 billion, distributed among $23 billion Operations and Maintenance, Army (OMA), for active forces and $810 million and $1.8 billion for Operations and Maintenance, Army Reserve (OMAR), and Operations and Maintenance, National Guard (OMNG). OMA costs grew from 30 percent of the Army's budget in FY 1986 to 33 percent in FY 1989. This increase reflected increased costs of operating and maintaining more modern equipment and a reduction in procurement outlays that entailed keeping older equipment in the Army's inventory longer than expected. The OMA budget for ground operating tempo (OPTEMPO), $2.7 billion, supported 850 miles per year for the active component forces and underwrote training readiness at the C1/C2 level. OMA funds were

TABLE 1—The FY 1989 Army Budget
($$ in thousands)

Appn	PB Jan 88	APB Apr 88	Appn (BA)	Actual (TOA)
MPA	23,676,400	24,418,500	24,437,929	24,418,478
RPA	2,363,600	2,260,000	2,205,424	2,240,822
NGPA	3,269,100	3,325,300	3,292,931	3,297,805
OMA	23,679,570	22,085,200	22,053,700	23,035,494
OMAR	958,229	794,900	794,900	810,776
OMNG	2,055,011	1,797,000	1,801,200	1,826,932
NGRP	4,285	4,300	4,300	4,253
ACFT	2,229,539	2,791,500	2,882,800	2,855,205
MSLS	2,923,200	2,586,600	2,602,000	2,579,508
WTCV	3,227,762	2,960,600	2,830,300	2,671,175
AMMO	2,194,755	2,007,800	2,012,936	2,020,335
OPA	6,030,274	4,774,000	4,674,646	4,658,084
RDTE	5,972,845	5,030,700	5,197,963	5,154,184
MCA	1,487,300	1,144,300	1,141,292	1,182,792
MCNG	161,100	138,300	229,158	229,158
MCAR	108,000	79,900	85,958	85,845
AFHC	455,178	188,178	197,278	214,787
AFHO	1,419,091	1,339,722	1,329,953	1,372,067
ASF	349,927	321,900	291,900	291,900
Total	82,565,166	78,048,700	78,066,568	78,949,600

used for depot maintenance, central supply support, the procurement of spare parts, and transportation costs associated with training.

The Army Flying Hour Program (FHP) supported an OPTEMPO of 15.8 hours per crew per month for rotary-wing aircraft in the active component. The Army wanted FHP OPTEMPO of 9.8 hours for the reserve component, but underfunding supported OPTEMPOs of 9.0 for the USAR and 8.3 for the ARNG flying hours, or approximately 23 percent of the total Army FHP requirements. Costlier aircraft have made the FHP more expensive and have resulted in fewer hours of operation. While the Army has normally adjusted the FHP during the year to reallocate resources, Congress has expressed concern about the program's rising costs and urged the Army to make greater use of flight simulators.

Overall Army expenditures for construction totaled about $1.7 billion in FY 1989 and were distributed among the following accounts: Military Construction, Army (MCA), $1.2 billion; Military Construction, National Guard (MCNG), $229 million; Military Construction, Army Reserve

(MCAR), $85 million; and Family Housing Construction, Army (AFHC), $214 million. The Army also spent $1.4 billion as part of the Family Housing Operations, Army (AFHO), for the upkeep and improvement of existing Army family dwellings in the United States and overseas. The sum expended for AFHO in FY 1989 was insufficient to erase a backlog of deferred maintenance and repair requirements that amounted to $601 million.

Army disbursements for Research, Development, Test, and Evaluation (RDT&E) were $5.2 billion in FY 1989, an increase from $4.7 billion spent in FY 1988. Capitalization of the Army Stock Fund (ASF) totaled approximately $292 million in FY 1989, an increase of nearly $100 million over FY 1988.

FY 1990 Budget Outlook

Approval by the Deputy Secretary of Defense in late FY 1988 of the Army Program Objective Memorandum (POM) for fiscal years 1990–1994 paved the way to prepare the Army's FY 1990–1991 budget. The Army's priority was to preserve funding stability between FY 1989 and FY 1994 and also achieve a balance between readiness, sustainment, modernization, and force structure. The Army knew it had to meet the warfighting needs of the CINCs, so it sought the funds necessary for adequate recruitment, retention, training, and OPTEMPO. Continued underfunding of facilities maintenance, base operations, and depot maintenance programs was expected, while the Army hoped to gain funds for host-nation support equipment, accelerated procurement of Deployable Medical Systems (DEPMEDS), and high-priority ammunition items. The Army leadership believed it could maintain its FY 1989 active force structure and obtain modest growth in the civilian and reserve components during the next two fiscal years. Some decreases and delays in major weapons systems funding were anticipated, but Army planners expected that Congress would fund key modernization programs such as the Army Aviation Modernization Plan.

By early FY 1989 defense analysts and congressional leaders not only saw little likelihood of an increase in DOD's budget, they foresaw either no-growth or declining budgets that would exceed the defense budget declines experienced since 1985. For FY 1990 DOD's share of the Presidential Budget Request was $305.6 billion, which represented real growth of about 2 percent over the FY 1989 budget. The Army's share, $80.7 billion, did not represent real growth. President George Bush, in his State of the Union address, directed DOD to eliminate $6 billion from Reagan's FY 1990 budget request, which nullified a 2 percent real increase and froze DOD's budget at FY 1989 levels. President Bush's suggested reductions applied across the board, and the Army's share amounted to about $1.8 billion. Army leaders testified before the House

Appropriations Committee in March 1989 and asserted that the proposed reduction would force the Army to slow or cancel modernization programs in order to protect force structure and readiness. The Army anticipated an active component strength reduction of about 8,000, or down to 763,900. Inactivation of a 4th Infantry Division (Mechanized) brigade and a number of attack helicopter battalions, force reductions connected with base closures, streamlined acquisition, and the paring of headquarters staffs would facilitate the 8,000 cut.

During FY 1989 several congressional initiatives and studies addressed the Army budget reductions. Congressman Les Aspin, Chairman of the House Armed Services Committee, made several suggestions. Further cost reductions might be attained by staffing and equipping stateside units at less than 100 percent of authorization, extending the major equipment replacement cycle, and purchasing cheaper and less technologically advanced weapons. Army strength, Aspin suggested, might be even further decreased by troop cuts that left certain units understrength and selective elimination of other units and weapons systems from the active force structure. The Congressional Budget Office suggested reducing the Army's strength by 54,000, including three light infantry divisions, for a saving of about $9.5 billion during the next five years. Others proposed additional transfers of active component missions to the reserve component. The new Secretary of Defense, Richard Cheney, cautioned against "hollow" military forces in March 1989, noting that there would be trade-offs between sustaining a large force that lacked adequate resources and a smaller but better supported force of the highest quality. Kenneth Kramer, Assistant Secretary of the Army for Financial Management, in a report entitled "The Partnership Study" completed in December 1988, foresaw a steady decline in the Army's share of the defense budget during the next ten years. He reiterated the fact that during the past four decades the Army budget had both experienced less growth and was significantly lower than the budgets of the other services. The Army traditionally has spent two-thirds of its budget for military pay and operations and maintenance and was already forced to rely more heavily than other services on its reserve components. The Air Force and the Navy expended twice as much as the Army for weapons research and procurement. Kramer predicted that budgetary pressures had serious implications for the Army as a strategic force and for its future value as part of the nation's deterrent force.

Conclusion

The DOD Reorganization Act of 1986 and a more austere fiscal climate significantly influenced the organization of the Army in FY 1989.

Continuing a trend of previous years, civilian management by the Army Secretariat expanded to include functional areas formerly the domain of the military staff. The appointment as Secretary of the Army of Michael P. W. Stone, who came from a background in DOD and the Army associated with acquisition reform, underscored the Army's commitment to enhancing its organization for materiel development and acquisition. Other organizational changes at HQDA and in the field reflected the Army's concern over environmental issues and a new emphasis on special operations. While the number of military personnel that could be assigned to the Army Staff was reduced in accord with Congress' direction, an Army-initiated examination of its administrative overhead and the likelihood of budget cutbacks in subsequent years portended future staff reductions both at HQDA and at MACOMs. The Army's FY 1989 budget was sufficient to support the Army's varied roles and missions and to maintain a highly trained professional force. The most inauspicious aspect of the Army's FY 1989 budget was the delay caused to several equipment modernization programs. Further budget cuts threatened to have more dire consequences.

4

Doctrine and Concepts

AirLand Battle Doctrine

The fundamental tenets of the Army's tactical doctrine in FY 1989 were rooted in the AirLand Battle doctrine enunciated in Field Manual (FM) 100–5, *Operations*, of August 1982 and revised in May 1986. That doctrine has permeated all Army doctrinal publications about combat, combat support, and combat service support, operations, and training. Doctrine is dynamic, and during FY 1989 AirLand Battle doctrine was modified by lessons learned during training and operations, new technology, changing threats, and planning for future doctrinal changes. The development of Army doctrine is a principal mission of TRADOC and its subordinate integrating centers and branch and service schools. During FY 1989 TRADOC concentrated upon the three broad doctrinal areas—Army, joint, and combined. By FY 1989 TRADOC had formulated an efficient process for the development, revision, and publication of doctrinal manuals. These manuals incorporated both theoretical and practical guidance in the form of tactics, techniques, and procedures (TTP). The production of doctrinal literature by TRADOC is guided by a Doctrinal Literature Master Plan and a Doctrinal and Training Literature Program.

The preparation of doctrine in TRADOC is done by the organizational level to which it applies. Branch school commandants, for example, prepare basic branch doctrine, TTP field manuals for brigades and lower echelons, and selected multiservice and general subject publications. Commanders of integrating centers prepare doctrine for corps, divisions, and combined arms brigades, as well as multiagency and general subject doctrine. The Commanding General, TRADOC, bears responsibility for doctrine for echelons above corps, the Army's "capstone" field manuals, and doctrinal publications for joint and combined operations. In formulating doctrine for echelons above corps, the Commanding General, TRADOC, has adopted a task force approach that involves the Army War College, the integrating centers, and a "council emeritus" of retired general officers.

During FY 1989 TRADOC had a systematic process to evaluate doctrine. Changes might be engendered by lessons learned during garrison training or field exercises. New concepts might emerge through TRADOC's Concept Based Requirements System process, and products of Center for Army Lessons Learned and the JCS' Joint Universal Lessons Learned System. Since 1987 TRADOC has also consulted with the CINCs and their Army component commanders to assess Army doctrine.

In August 1986 DOD formally institutionalized the concept of Competitive Strategies to identify opportunities to achieve leverage over Warsaw Pact forces by capitalizing on U.S. military strengths to exploit Soviet vulnerabilities. The Competitive Strategies concept is compatible with the major features of AirLand Battle doctrine; it encompasses tactics and stratagems that compel the enemy to react to U.S. initiatives on disadvantageous terms. Both Army unilateral doctrine and the thrust of Competitive Strategies center on the following tasks: (1) to acquire tactical advantage when forces are joined in battle; (2) to fight in depth to reduce Soviet ability to concentrate its superior forces at times and places of its choosing; (3) to compel larger enemy forces to fight on terms for battle established by a smaller Army force; (4) to maintain superior agility to concentrate rapidly and shift decisive combat power; and (5) to link tactical battles and engagements in a larger operational scheme to attain strategic objectives.

AirLand Battle doctrine is the Army's basic warfighting doctrine. It addresses a mid- or high-intensity conflict such as the defense of NATO or a major regional conflict. It reflects the structure of modern warfare, the dynamics of combat power, and the contemporary application of the classic principles of war. It recognizes the three-dimensional, joint and combined nature of modern warfare and that all ground actions will be strongly affected by air operations. While AirLand Battle emphasizes conventional operations, it also recognizes the prospect of a nuclear conflict and serves as a foundation for developing subordinate doctrine, force design, materiel acquisition, and individual and unit training. Basically, AirLand Battle doctrine envisions combat operations that are fluid and fast paced and that employ weapons of unprecedented lethality. These operations may be conducted on both a linear battlefield and simultaneously over the full dimensions of the battle area. They may entail close operations to destroy enemy forces at the point of conflict and deep operations to delay, disrupt, and destroy enemy follow-on, or second echelon, forces.

AirLand Battle doctrine embodies four basic tenets: initiative, agility, depth, and synchronization. Initiative places a premium on commanders actively setting the terms of battle. It accords high significance to winning the first battle, and likely with fewer troops than the opposition. Agility emphasizes the ability of friendly forces to act faster than the enemy. Depth underscores the expansion of operations in space and time so that the conduct of the deep battle supports success in the close battle.

Synchronization is necessary to produce the maximum relative combat power at the decisive point. AirLand Battle doctrine stresses the role of the combined arms team and competent leadership, while the brigade is the basic unit that concentrates combat power to perform specific tactical tasks for the divisions. Doctrine for operations by heavy brigades was published in 1988 in FM 71–3, *Armor and Mechanized Brigade Operations*. The Armor School, during FY 1989, addressed voids in the doctrine for brigade combined arms operations by preparing FM 71–123, *Tactics, Techniques, and Procedures for Combined Arms (Heavy)*, while the Infantry School revised FM 7–30, *Infantry, Airborne, and Air Assault Brigade Operations*, for use by light forces.

The relation of the corps to echelons above corps in the conduct of AirLand Battle, as well as the withdrawal of intermediate-range ballistic missiles from Europe, imposed lingering doctrinal questions. During FY 1989 doctrinal planners sought to clarify the corps' dual role as the Army's largest tactical unit and as the link between the tactical level of operations and the strategic level of war. The responsibility for the latter resides with echelons above corps (EAC). The doctrinal role of EAC has been troublesome since the early 1970s, when the Army eliminated the field army and its logistics headquarters leaving no Army headquarters between the corps and the theater commands. This hiatus created difficulties in coordinating Army and Air Force joint operations and in conducting certain unilateral Army support functions that were traditionally the responsibility of field armies and army groups.

During FY 1989 one of TRADOC's major doctrinal undertakings was to clarify doctrine for echelons above corps and to consolidate it into one manual, FM 100–7, *The Army in Theater Operations*. This task was deferred until promulgation of JCS Pub. 3–0, *Doctrine for Joint Operations*. In the meantime, TRADOC tasked the U.S. Army Combined Arms Center (CAC) to prepare a TTP manual that described the corps' conduct of deep operations in 1990. Supplementing the more general treatment of this subject in FM 100–15, *Corps Operations*, the CAC's TTP handbook also addressed the role of weapons systems such as the Apache helicopter, the Hellfire missile, and the Army Tactical Missile System (ATACMS) for the conduct of deep operations. The CAC also outlined command and control arrangements between the corps and EAC and the coordination necessary for joint operations, especially to suppress enemy air defenses. TRADOC approved a draft of the new TTP manual in July 1989.

In February 1987 TRADOC launched the "Architecture for the Future Army (AFA) Initiative," a multifaceted approach to Army doctrine in the mid- and long-range future. By FY 1989 the AFA initiative had spawned a number of significant projects related to adapting AirLand Battle doctrine to evolving threats, strategies, and technologies. This effort was encapsulated in formulation of the AirLand Battle-Future (ALB-F) concept, discussed below. A second outgrowth of the AFA initiative was the conceptualization of a "Blueprint of the Battlefield," which had more immediate application. The blueprint defined a hierarchy of functions, or Battlefield Operating Systems (BOS), performed by Army forces at the tactical level. TRADOC identified seven principal BOS: maneuver, fire support, air defense, command and control, intelligence, mobility and survivability, and combat service support. The blueprint was a comprehensive, functional representation of a combined arms force and emphasized what actually occurs on the battlefield. The seven functions were divided into subfunctions and tasks linked to specific units, systems, and soldiers.

Before the tactical blueprint was promulgated, the Army Staff directed TRADOC to apply the same analytical methodology to the operational level. Six theater operating systems (TOS) were identified as major functions—movement and maneuver, fires, protection, command and control, intelligence, and support. This blueprint also analyzed the functions performed by joint and combined forces. A third blueprint was being prepared in FY 1989 for the strategic level of war. The Army Staff considered BOS to complement AirLand Battle doctrine and to have potential value in mission planning, in computer-assisted analysis of force planning and force design, and as a resource for instruction in Army schools and centers.

Late in FY 1988 General Vuono directed the integration of heavy and light forces. His goal was to employ various mixes of the two forces in divisions, corps, and echelons above corps. In a subsequent directive the Chief of Staff instructed TRADOC to review the force structure in FY 1989 to determine the best way to configure and employ a light-heavy force. TRADOC studied the employment of composite task forces at the National Training Center and during REFORGER (Return of Forces to Germany) 88, in which the 10th Mountain Division participated. A key finding was that integrated heavy-light forces caused the enemy to disperse his forces more than when these forces were used separately. Certain combinations of forces, such as air assault and heavy forces, were more lethal and highly flexible. Light forces, moreover, enhanced intelligence and target acquisition and infiltration of enemy defenses. Integrated forces posed significant differences in command and control and logistical support. Each force had different ammunition requirements, and light forces were more dependent on aerial resupply. TRADOC did not formulate an authoritative doctrinal statement on heavy-light forces in FY 1989, but Army doctrinal planners were moving toward incorporation of light forces into a corps that consisted primarily of heavy forces and light forces augmented by selective heavy force elements. The heavy-light forces study contributed positively to a contemporary evaluation of light infantry divisions (LID). (See Chapter 5 for a discussion of the assessment of LIDs.)

During FY 1989 the Army's analysis of heavy-light forces was also concerned with formulating realistic training. Through the Battle Command Training Program and other exercises, the Army filtered many relevant observations and lessons through TRADOC's Concept Based Requirements System. The cancellation of REFORGER 89, however, prevented the Army from further testing a light brigade in concert with heavy forces in Europe. General Vuono urged Army commanders to seize every opportunity to jointly exercise heavy-light force mixes, including special operations forces.

AirLand Battle–Future

According to General Maxwell R. Thurman, who commanded TRADOC from June 1987 to July 1989, the AirLand Battle–Future is the framework for developing heavy forces doctrine, organization, and equipment for the 1990s and beyond. Work began on the AirLand Battle–Future concept in November 1986, and by FY 1989 its main features were discernible. Based on the thirty-year Army Long-Range Planning Guidance, AirLand Battle–Future is divided into two time frames, one of fifteen years and a second of thirty years. The debt of AirLand Battle–Future doctrine to AirLand Battle doctrine is manifest in the fifteen-year outlook. For the thirty-year period, TRADOC planners had begun studying more radical departures from ALB doctrine and force architecture as part of the Army 21 concept. Work on Army 21 actually antedated planning for AirLand Battle–Future, but was eventually superseded by the latter. An Advanced Concepts Study was also under way in FY 1989 to explore future force design and doctrine beyond the thirty-year framework of the ALB-F studies.

TRADOC completed a rough draft of the AirLand Battle–Future concept toward the end of FY 1989. The new doctrine appeared applicable across the entire operational spectrum—general war, regional conflict, and low-intensity conflict. AirLand Battle–Future assumed the diminished significance of a contiguous, linear operational front on the Central European battlefield in contrast to an open front. This assumption had enormous doctrinal and operational implications for heavy forces and led to a closely related doctrinal development in FY 1989.

AirLand Battle–Future envisioned operations over a corps area much larger than the NATO corps of FY 1989. Army doctrinal planners delineated a four-step approach to combat: the early detection and assessment of attacking forces; destructive strikes by massing indirect fires, primarily by corps artillery brigades and other strike weapons; rapid maneuver to complete destruction of enemy units; and the recovery of U.S. forces to the rear for regeneration. To execute this concept, AirLand Battle–Future doctrine called for a forward-deployed heavy corps of about 145,000, organized for offensive maneuver in a greatly expanded area of operations. Controlling as many as five divisions, the post-1995 corps would borrow some functions and units from its divisions and have corps artillery, aviation, and engineers; a support command; and other functional units such as an armored cavalry regiment and up to three separate maneuver brigades.

The tactical division contemplated in the AirLand Battle–Future doctrine would be more agile and flexible after it gave up some of its functions and manpower to the corps and brigades. The proposed heavy division would have 13,600 men, a triangular organization from brigade to company, and a more austere division base. The primary functions of division headquarters would be command and control and integration of its subordinate components. AirLand Battle–Future doctrine also entailed major changes in logistics support with more centralization of battlefield maintenance and combat supply operations. Realization of the AirLand Battle–Future concept and its implied force design would depend upon exploiting advanced technology to conserve manpower. Army planners also underscored the necessity for more strategic lift to enable a rapid projection of combat power, improved battlefield mobility, and tailorable units. Along with initiative, synchronization, and depth, endurance in AirLand Battle–Future doctrine assured that Army units would sustain high levels of continuous combat. Although AirLand Battle–Future did not reject forward-deployed forces in regions essential to U.S. national interests, it gave added recognition to contingency forces suitable for regional conflicts and specialized forces geared to low-intensity conflict and security assistance.

While work on ALB-F continued, a related study, AirLand Battle–Future (Heavy) (ALB-F[H]), addressed the role of heavy forces in mid- to high-intensity combat in Central Europe. TRADOC assigned the task to the U.S. Army Combined Arms Center in September 1987. The AirLand Battle–Future (Heavy) Study Group developed several options for combat operations of heavy Army forces in Europe by the year 2000. In the summer of 1988 the Commander of TRADOC, General Thurman, chose one concept as the basis for further development of ALB-F(H) that stressed simultaneous operations in the main battle area and the enemy's rear. In waging the deep battle, ALB-F(H) would rely on more lethal and accurate long-range artillery and enhanced target acquisition systems. Nevertheless, ALB-F(H) adhered to the strategy of the late 1980s wherein U.S. forces would fight as part of a NATO flexible response but without intermediate nuclear forces. The ALB-F(H) had numerous ramifications for future force design. The concept gave high priority to the synchronization of combat operations among all echelons from corps to battalion and required high flexibility that allowed transfer of maneuver elements between corps, divisions, and brigades. Assigned to corps control, contingency and reserve forces would be structured for both semi-independent operations and commitment in a decisive action. To wage the deep battle, corps would control artillery and missile firepower, previously allocated to divisions, and would also carry major responsibility for winning the counterfire battle. The ALB-F(H) study group briefed senior Army commanders and completed its work at the end of May 1989. Apparent changes in the Warsaw Pact threat in Europe raised doubts on the validity of many of the ALB-F(H) assumptions. By the summer of 1989 TRADOC suspended work on the ALB-F(H) and the Army 21 project and concentrated on further development of AirLand Battle–Future doctrine.

The Army and Joint Doctrine

The Goldwater-Nichols Defense Reorganization Act of 1986 prompted increased concern in the development of joint concepts, doctrine, and training. The 1986 act charged the Chairman of the Joint Chiefs of Staff to develop joint doctrine for the armed forces; by FY 1989 several joint doctrinal statements had been published. Joint Pub. 1–01, *Joint Publication System, Joint Doctrine and Joint TTP Development Program*, constituted the Joint Doctrine Master Plan. Approved by the services and the JCS in February 1988, this plan specified publications in several categories—intelligence; operations; logistics; plans; and command, control, and communications. The master plan established thirty-six publication projects and a developmental process. The Army was assigned development of several major doctrinal publications which included Joint Pub. 3–0, *Doctrine for Joint Operations*, later changed to *Doctrine for Joint and Unified Operations*, and Joint Pub. 3–07, *Doctrine for Joint Operations in Low-Intensity Conflict*. TRADOC, supported by the Command and General Staff College, prepared Joint Pub. 3–0, which underwent interservice review and coordination during FY 1989. Written for unified and specified commanders, joint task forces, and their components, Joint Pub. 3–0 set forth a doctrinal framework for the employment of forces in joint operations and a national position for combined doctrine. In translating national strategy into assigned missions and military objectives, it presented joint planners with capabilities and concepts for the use of component forces.

The phrase "spectrum of conflict," commonly used in Army doctrine to indicate the tripartite division of conflict into levels of high, mid, and low intensity, by late FY 1989 gave way to "operational continuum." It defined several possible strategic environments—peacetime competition, conflict, and war. Peacetime competition encompassed disaster relief, joint training exercises, nation building, peacekeeping, counterdrug operations, and military show-of-force. Conflict embraced counterterrorism, contingency operations, and insurgency/counterinsurgency situations. War could occur at the strategic, operational, and tactical levels and was characterized by sustained armed conflict.

Joint operational doctrine also stressed the uniqueness of each theater and local conditions and abjured a rigid joint structure based on service equity or specific force structure arrangements. It also served as a basis for joint training, contributed to joint military education, and enabled unified and specified commanders to better assess their force requirements. During FY 1989 the JCS assigned the Army responsibility to prepare additional doctrinal publications specified in the Joint Doctrine Master Plan that included joint logistics, chemical operations, rear area operations, and fire support. The Deputy Chief of Staff for Logistics of the Army Staff was responsible for preparing Joint Pub. 4–0, *Doctrine for Logistics Support to Joint Operations*. Army agencies both contributed to and reviewed drafts of publications prepared by other services. Army units also evaluated joint doctrine for planning and operations during joint exercises such as SOLID SHIELD 89 in the continental United States in September 1989 and BRIM FROST 89 in Alaska.

Throughout FY 1989 General Vuono took a personal interest in the development of joint doctrine. As areas that required more development, he singled out doctrine for joint and combined operations at echelons above corps and theater levels. He also noted the intimate connection between the development of joint doctrine and the training of Army officers for joint service.

Before Congress mandated greater joint cooperation between the services in 1986, the Army and the Air Force had worked together to develop techniques and procedures for close air support and airlift of Army forces and air base ground defense outside the continental United States (OCONUS). Army and Air Force initiatives were institutionalized in such joint organizations as the Tactical Air Command (TAC)–TRADOC AirLand Forces Application Agency (ALFA) in 1975. The Military Airlift Command (MAC)–TRADOC Airlift Concepts and Requirements Agency (ACRA), established in 1984, during FY 1989 was actively developing joint doctrine for airlift in theater combat and airborne operations, aeromedical evacuation, employment of the C–17 transport, and future airlift requirements. To further joint training and joint combat capabilities in tactical air operations, on 14 January 1989, the JCS approved the concept of a multiservice Joint Tactical Air Operations Interface training program.

Since 1986 the Army and the Air Force have participated in another joint doctrinal effort at the Army–Air Force Center for Low-Intensity

Conflict (A–AF–CLIC), located at Langley Air Force Base, Virginia. The nineteen-person center has three divisions— operations, support, and intelligence—and works with four categories of low-intensity confict (LIC)—support to insurgency/counterinsurgency, combating terrorism, peacekeeping operations, and peacetime contingency operations. The center is the principal proponent for Joint Pub. 3–07, *Doctrine for Joint Operations in Low-Intensity Conflict*, and has collaborated on development of FM 100–20/AFM 2–20, *Military Operations in LIC*. Through its doctrinal manuals, occasional publications of papers and bibliographies, conferences, and programs of instruction, the center has raised awareness about LIC both within and outside the military establishment.

Between 1984 and 1988 the Army and the Air Force had prepared a series of Joint Force Development Initiatives (JFDI) that dealt with close air support. For example, JFDI No. 24 reaffirmed the Air Force's primacy in providing fixed-wing close air support (CAS), while JFDI No. 26 specified that the two services would develop joint positions on new aircraft for this purpose. By the start of FY 1989 JFDI No. 33, Future Close Air Support, addressed concepts for responsive close air support within the context of the Army's AirLand Battle doctrine. One outstanding issue was the selection of an appropriate Air Force ground-attack aircraft that could perform equally well in operations that ranged from low to high intensity and that possessed night and all-weather capabilities. JFDI No. 33 also dealt with several complex issues—the organization of the tactical air control party, the forward air controller concept, the joint planning cycle, and joint TTP for CAS and battlefield air interdiction (BAI). Army planners sought to enhance the influence of the Army component commander in the allocation of CAS, while Air Force planners emphasized the theater-wide responsibilities of the Air component commander. A stalemate on this issue prompted senior representatives of both services in March 1989 to produce a revised concept paper, "Air Attack on the Modern Battlefield." It was forwarded to the two service chiefs on 21 August 1989 and later approved by them. The study addressed general issues such as the respective roles of fixed-wing aircraft and Army attack helicopters in the total air attack system and their interaction with ground forces. The two services agreed that attack helicopters were a legitimate extension of ground combat power and that a joint commander to centralize the air attack system was needed. The Army acknowledged CAS as an Air Force function and also emphasized its massive rather than piecemeal use. While the Air Force was committed to fulfilling its CAS mission, the Army was concerned about the ability of high-speed, fixed-wing attack aircraft to acquire and engage ground targets in a cluttered battlefield environment on first pass. Both services agreed on the need for advanced avionics and munitions.

In early 1989 several factors intervened to place the entire project in abeyance. The Federal Republic of Germany considered assigning the German CAS mission to its ground forces, which would have profound ramifications on interoperability of NATO CAS forces. Another factor was a growing displeasure in Congress regarding the selection of a new tactical fighter by the Air Force for its CAS mission. The Army agreed, in principle, with the Air Force's concept for a multirole aircraft to perform both CAS and BAI, as long as the aircraft could adequately perform both missions according to AirLand Battle doctrine. The Army did not suggest an alternative aircraft design. In 1986 the Air Force had planned to modernize its A–7 (A–7F) and modify F–16s for the dual CAS-BAI role and conducted demonstrations of the "missionized" F/A–16 at Fort Hood, Texas, in September 1988.

Through its participation in the DOD Close Air Support Mission Area Review Group (CASMARG), the Army monitored Air Force design efforts. In January 1989 the CASMARG recommended that a number of A–10s and F–16s be upgraded with new avionics to improve target acquisition, navigation, communications, and night capabilities to enhance their CAS capabilities to support the AirLand Battlefield. For the near term, the Air Force proposed upgrading some A–10s and the F–16 to improve target acquisition and night capabilities. Acting Secretary of Defense William Howard Taft IV approved the proposal in February 1989. DOD deferred a decision on modifying the newer F–16 to an A–16 for a CAS role, but subsequent review by the CASMARG prompted DOD to agree to modify newer F–16s by hardening their surface to reduce their vulnerability to advanced man-portable antiaircraft missiles and by the addition of forward-looking infrared heat sensors to improve target acquisition, digital terrain systems for low-altitude flight and advanced night attack capabilities, and automatic target hand-off equipment to improve air-to-ground coordination. The Army in August 1989 endorsed the A–16 as the preferred CAS aircraft, but DOD had not made a final acquisition decision by the end of FY 1989.

Congressional concern about the difficulties and delays in selecting appropriate CAS aircraft inspired the Dixon Amendment to the Defense Authorization Amendments and Base Closure and Realignment Act in September 1988. The amendment mandated that DOD study the feasibility of transferring the CAS mission to the Army and directed evaluations of alternative CAS aircraft. The Army sought to limit the evaluations to the issue of fixed-wing close air support because it did not want to address wholesale changes in roles and missions. Early in 1989 the JCS directed the Army to develop a concept for assuming the CAS mission. TRADOC envisioned a transfer of CAS over a ten-year period without the transfer of Air Force personnel and equipment. Should Congress direct the Army to assume the mission by FY 1992, TRADOC proposed that the Army absorb the

A–10/forward controller forces intact from the Air Force. The Army would organize CAS forces into battalions and brigades and assign them to corps or higher Army commanders for employment as organic tactical forces.

Combined Operations in NATO

Logistics and communications were among the areas most in need of combined doctrine in NATO in FY 1989. NATO Army Group commanders lacked wartime control over multinational logistical support except on an ad hoc basis in the midst of combat operations. For the past several years the United States had spurred efforts to unify logistics doctrine among its NATO allies. This effort was recognized by NATO's Military Agency for Standardization and its Logistics Working Party (LOGWP). The U.S. military delegation to the Land Forces LOGWP was headed by members of the Office of the Deputy Chief of Staff for Logistics (ODCSLOG) and had representatives from the Army Logistics Center, the Army Materiel Command, and the Marine Corps. In March 1989 LOGWP completed a draft of the proposed Allied Logistics Publication 9 (ALP–9), which identified doctrinal principles and key considerations for a combined logistics concept. At a meeting of American, British, Canadian, and Australian (ABCA) military communications experts at Monterey, California, in March 1989, the incompatibility between the Army's Single Channel Ground and Airborne Radio System (SINCGARS), the British BOWMAN, and the Australian RAVEN tactical communication systems was addressed. The ABCA nations established a working group to study this problem with a view toward complete interoperability in the future. The United States and West Germany, during FY 1989, were working toward a similar objective with regard to tactical communications.

Near the end of FY 1989 the U.S. Army's Communications Interoperability Master Plan was adopted in principle by the British and Germans. The plan specified requirements and capabilities in terms of the type of information exchanged between allies, the transmission media, and the doctrine and tactics affecting the information exchange process. While the plan would provide the foundation for future development of combined communications doctrine, the Army considered the exchange of ideas between the allied nations a major breakthrough.

Low-Intensity Conflict

As a strategic concept, low-intensity conflict embraces an array of environments that usually entail political-military confrontation between states or groups at a level below conventional war but above the peaceful competition among states. It applies to protracted internecine struggles, often between competing ideologies commonly characterized as insurgent or subversive warfare and terrorism, as well as conflicts between states involving the use of unconventional and organized armed forces. Low-intensity conflict is rarely a pure military problem. The Army, which has a long history of participation in such conflicts, plays primarily a supporting role in securing national objectives that are fundamentally political, psychological, or economic. Indeed, the nonmilitary nature of LIC often determines the tactical conduct of supporting military operations even when conventional military forces are employed. The military component in low-intensity conflict operations, however, may range from conventional forces in peacetime contingency operations or peacekeeping operations, to SOF in irregular or unconventional warfare, to use of advisory, logistical, medical, or engineer support within the context of security assistance programs. U.S. national security policy requires reliable, flexible, and highly professional forces to participate in low-intensity operations. During FY 1989 the Army and the Air Force neared completion of a new document, FM 100–20/AFM 2–XY, *Low Intensity Conflict*, which will establish Army and Air Force doctrine for planning and executing LIC operations that will complement AirLand Battle doctrine.

Special operations are sometimes mistakenly equated with low-intensity conflict operations, but they are one of several means for conducting LIC operations. Special operations forces—Special Forces, Rangers, Special Operations Aviation Units, Civil Affairs, and Psychological Operations—can be used in all forms of conflict and are customarily assigned to CINCs for execution of wartime and contingency plans. SOF may also be assigned to U.S. country teams or authorized sensitive missions by the National Command Authority. Throughout FY 1989 the Army continued to develop SOF doctrine applicable to high-, mid-, and low-intensity conflicts and to bring SOF doctrine in line with AirLand Battle concepts. In FY 1989 special operations forces doctrine embraced new missions such as counterterrorism and drug interdiction. The four major SOF missions—foreign internal defense, unconventional warfare, special reconnaissance, and direct combat action with Army Special Forces as the principal exponent—can be carried out within either the AirLand Battle doctrine or as part of low-intensity conflict operations.

The evolution of SOF doctrine has paralleled the revision of logistical and administrative support doctrine in the Army. While SOF units have a high degree of self-sufficiency, they have also been equipped with sophisticated equipment that requires extensive logistical support. In the future SOF will rely more on conventional Army-wide support structures than on their own support systems. Under an area support concept, the Army component commander uses the appropriate theater logistics command to support deployed Army SOF units beyond their organic capability. These arrangements will help to integrate SOF operations with the broad mission of the theater commander. They will also temper the perception of SOF as elite elements and help integrate them into the mainstream of the Army.

Despite its refinement in FY 1989, SOF logistical support posed several problems. Support arrangements envisioned under the area support concept could be inadequate in underdeveloped areas. Even in a developed theater, SOF might deploy in advance or operate independently of area support units. At other times it might be infeasible to deploy an area support logistical force. Some SOF-peculiar equipment—the TSC–99 communications central, for example—may be difficult to support by standard logistics units because of insufficient repair parts or inexperienced technicians. A related problem is the difficulty of assigning officers to hold both special operations and logistical skill code identifiers without rebranching them to the Special Forces Branch. As a remedy, the Army instituted the Special Operations Staff Officer Course, which produces graduates who receive an additional skill identifier that eliminates rebranching.

Security Assistance

The Army, in support of American foreign and defense policies, conducts a variety of security assistance programs around the world. These programs provide military resources in the form of materiel, technical assistance, and education and training to promote stability and to contain external or internal threats. Such assistance helps prevent the rise of situations that might require stronger military intervention. In helping beleaguered nations deter or successfully cope with such threats, security assistance programs also help nations to strengthen the fabric of political democracy and economic prosperity. For the Army, security assistance serves several purposes. It contributes to force projection doctrine and forward defense strategy and helps allied and friendly military forces to prepare and fight coalition warfare with American troops. A significant element of the Army's role in security assistance is the professional education and training provided to promising foreign military officers, largely from developing countries. These officers are exposed to U.S. Army doctrine and joint and combined exercises designed to instill professionalism and to facilitate combined operations. The Army also emphasizes logistical and maintenance training for Army equipment provided them by U.S. military assistance programs through instruction at Army schools or the use of security assistance teams in the host country.

Security assistance varies by region and country, and the composition of security assistance teams is determined by the nature of each program. Teams are usually on temporary assignment, and their numbers vary from month to month. As of 28 March 1989, the Army had 38 security assistance teams with a total of 123 personnel deployed to 14 countries. SOUTHCOM had 17 teams with 42 people, and all but 1 person served in El Salvador. CENTCOM had 16 teams with 75 people, PACOM 1 team of 1 soldier, and EUCOM 4 teams with 5 people. Despite their military nature, security assistance programs are funded by the Foreign Assistance Appropriation, controlled by the Department of State. Since FY 1986 Congress has reduced funds for security assistance by about $1 billion, or to about $4.8 billion in FY 1989. More than 93 percent of that amount was earmarked by Congress for ten countries. Army leaders called for a more flexible approach that directed security assistance to countries most threatened by low-intensity conflicts.

The Army also participates in security assistance programs through the diversion of the Army inventory of equipment and supplies to support grant aid and the Foreign Military Sales (FMS) programs. The FMS program diverts Army assets to support U.S. policy objectives, but recipient countries pay for these items. As of mid–FY 1989 active FMS programs were being conducted with 105 countries and 7 international organizations. The six largest recipients were Saudi Arabia, Egypt, Taiwan, Germany, Israel, and Jordan. The FMS program, supply support arrangements, and grant aid by the Army in FY 1989 totaled $4.3 billion.

The Army in Space

The Army has a long history of accomplishments in supporting national space programs and advancing the potential of space for military purposes. It perfected guidance and control systems that enable ground-based air defense systems to intercept and destroy short-range tactical missiles. Since the early 1960s, as part of its Exoatmospheric Re-entry Vehicle Interceptor Subsystem (ERIS), the Army had also explored the technology for a nonnuclear means of intercepting and destroying intercontinental ballistic missiles (ICBMs) in space. It used this expertise as a participant in the Strategic Defense Initiative (SDI), which was launched in 1983 to protect the United States from ICBM and space-launched ballistic missiles (SLBM). In FY 1989 the Army continued its research and development of space programs that supported land warfare. The Soviet threat had increased because of Soviet efforts to integrate ground weapons systems with space surveillance, command and control, and targeting assets. In addition, the Soviets deployed an operational anti-satellite (ASAT) system that posed a threat to American satellites for which there was no corresponding American capability.

The U.S. Army Strategic Defense Command (USASDC), headquartered in Arlington, Virginia, carried out research that supported the SDI and managed the national test range at Kwajalein Atoll in the Pacific.

USASDC managed several projects that accounted for approximately 30 percent of DOD's SDI research and development budget in FY 1989. USASDC helped coordinate development of the Army Anti-Tactical Missile (ATM) for ground-based missile defense that encompassed kinetic and directed energy (laser and particle beam) weapons and space surveillance and battle management systems. The mission of space control is vested in the U.S. Space Command (USSPACECOM), a unified command; the Army Space Command, Colorado Springs, Colorado, is the Army component.

Spurred by superpower agreements that limited or banned medium- and long-range ballistic missiles and by the proliferation of short- and medium-range missiles among regional powers, the Army shifted its emphasis to theater missile defense (TMD) during the late 1980s to address the threat posed to ground forces by both ballistic missiles (rocket-powered weapons that carry their own fuel and oxidizer and can operate beyond the atmosphere) and air-breathing missiles whose engines require the intake of air for the combustion of their fuel. USASDC is the executive agent for portions of the Strategic Defense Initiative Organization's (SDIO) Theater Defense Programs. This mission is carried out primarily by the Theater Missile Defense Applications Project Office (TMDAPO) and by other USASDC directorates located in Huntsville, Alabama. The TMD program is divided into four major categories: cooperative efforts with selected U.S. allies; TMD architecture studies; Invite, Show, and Test (IST) programs; and the Extended Air Defense Test Bed (EADTB). During FY 1989 the Army joined in cooperative architecture studies and hardware development with the United Kingdom and Israel. The total value of TMD-related contracts with the United Kingdom was $46 million through FY 1989 and with Israel reached approximately $53 million in FY 1989 alone.

The Invite, Show, and Test program solicited off-the-shelf technologies for consideration in the TMD program. Promising technologies were tested at the White Sands Missile Range in New Mexico. A notable IST achievement in FY 1989 was the Extended Range Intercept Technology (ERINT) Program. ERINT's goal is to enable flight test vehicles to attain higher altitude and longer range intercepts through a more powerful radar, a larger booster, and a more lethal warhead. During FY 1989 USASDC continued work on an Extended Air Defense Test Bed to simulate the air defense systems that confront NATO countries. The EADTB consists of computer simulations that analyze defenses against aircraft, tactical air-to-surface missiles, cruise missiles, and tactical ballistic missiles. It is being designed to operate as a unilateral American system or in a NATO network. A prototype system was made available to the U.S. Air Force in Europe and the Army Air Defense Artillery School in FY 1989.

The Army's growing role in SDI research engendered several organizational changes during FY 1989. The Joint Tactical Missile Defense Project Office (JTMDPO), previously an element of the Air Defense Program Executive Office, was transferred to the Missile Command and renamed the Joint Tactical Missile Defense Management Office (JTMDMO). This organization reported to the Commander, U.S. Army Missile Command (MICOM), and managed the development of tactical missile defense systems in the Army. The Forward Area Air Defense (FAAD) and High-Medium Altitude Air Defense (HIMAD) program executive offices were consolidated under the Air Defense Program Executive Officer.

On 9 January 1989, the Defense Acquisition Board (DAB) recommended both a kinetic energy (KE) and a directed energy (DE) ASAT program. DAB was favorably impressed by USASDC experience in developing satellite-killing warheads that used ground-based interceptors and also the command's management of the Ground-Based Free Electron Laser technology program. In response to the DAB, the Acting Secretary of Defense, on 6 March 1989, directed the Army to lead a multiservice kinetic energy ASAT program. The ASAT joint program will be established at the Army's Strategic Defense Command in Huntsville, Alabama. Since the ASAT system will eventually have both land- and sea-based platforms, the Navy will also participate.

Work on the Army's Exoatmospheric Re-Entry Vehicle Interceptor Subsystem constitutes the first phase of the SDI. It entails converting the Mid-Infrared Advanced Chemical Laser (MIRACL), used to test SDI technology, to an ASAT weapon. SDI's second phase entails development of several directed energy lasers, including free electron and chemical, that will be developed by the Army and the Air Force, respectively.

The Army achieved another milestone in its SDI role on 13 July 1989 with the first successful space flight that demonstrated the feasibility of the Beam Experiment Aboard Rocket (BEAR) of the Neutral Particle Beam (NPB) program at the White Sands Missile Range. The experiment demonstrated for the first time that the NPB platform can operate in a space environment. Some critics felt that the ASAT system was indistinguishable from strategic antisatellite or antimissile systems and hence was banned under the 1972 Anti–Ballistic Missile Treaty. Proponents of the ASAT stressed its legitimacy because of its use in destroying enemy targeting satellites before they can launch or guide rockets against conventional land forces and ships. The Air Force was designated as the lead service for developing a single comprehensive space surveillance and battle management system for total responsibility of all DOD ASAT capabilities.

Because the Army's role in space programs was increasing, the U.S. Army Space Institute at Fort Leavenworth, Kansas, a part of TRADOC, was formulating doctrine, training, organization, and materiel for space support to land forces. It emphasized space systems support to battlefield commanders with communications, intelligence, navigation, and mapping. One example of this effort was doctrine related to the Global Positioning System (GPS), used by pilots and all armed services personnel to pinpoint their location anywhere in the world.

The Air Defense Artillery School was preparing the Anti–Tactical Missile Defense (ATMD) System Operational and Organization Plan for TRADOC, based on the Joint Tactical Missile Defense (JTMD) Operational Concept promulgated in April 1988.

Conclusion

Doctrine serves several purposes. It bridges strategy and force structure and also guides training. While supporting the strategy from which it is derived, it is the foundation for policies and actions of the Army pertaining to force design, modernization, personnel, logistics, and training. During FY 1989 the Army continued to develop and refine doctrine and concepts that would enable it to operate successfully across the continuum of military operations. While AirLand Battle doctrine and its derivatives were best suited to the operations of heavy forces in the defense of Europe, the underlying concepts of ALB were applicable to mid-intensity regional conflicts. Fiscal Year 1989 also witnessed an expansion of low-intensity conflict and peacetime engagement of conventional and special operations forces. The Army's involvement in the nation's space effort also attested to the extension of its doctrinal perspective. Not only was the Army fashioning concepts for ballistic missile defenses, it also was evolving concepts governing the use of space-based systems to augment land combat in theater missile defense and navigational systems. Finally, the expanding doctrinal focus in FY 1989 pointed to the necessity of formulating doctrine and concepts for the Army's effective participation in joint and combined operations.

5

Force Structure

Introduction

The Army in 1989 was the product of a major force restructuring that flowed from the Army of Excellence (AOE) concept of 1983. That concept evolved from the Army 86 concept developed by TRADOC between 1978 and 1982. The AOE force structure was anchored in an active component of five corps and eighteen divisions, with the corps emerging as the center of AirLand Battle doctrine. Tactical divisions also underwent design changes. Heavy divisions were reduced in size but not lethality, and new light divisions were formed. As the Army entered FY 1989, force structure and design were modified to accommodate doctrinal refinements derived from training, field exercises, and new equipment.

The division is the Army's highest tactical unit with a fixed organization. Commanded by a major general, a division is a combined-arms force with permanently assigned forces that perform five principal functions: maneuver, air defense, fire support, intelligence and electronic warfare, and combat service support. A division can fight as a self-sufficient force but is usually augmented with corps troops during sustained operations. Each division organizes for combat by assigning missions and allocating resources to its assigned maneuver brigades. In FY 1989 the Total Army consisted of 28 divisions, 18 in the active component and 10 in the National Guard (ARNG). The Army had 1 active air assault division, 6 infantry divisions each in the active force and the ARNG, 1 active airborne division, 6 active and 2 ARNG mechanized divisions, and 4 active and 2 ARNG armored divisions. Division strength varied from 10,700 to 17,300, and the number of maneuver battalions ranged from 9 to 12. The distribution of major U.S. Army combat units by major Army command at the start of FY 1989 is depicted in *Table 2*. Several active component divisions have selected reserve component "roundout" units assigned to them.

The corps, usually commanded by a lieutenant general who commands two or more divisions, is the primary headquarters for land combat operations. It has permanently assigned units that include nondivisional maneuver support and air defense, military intelligence, engineer, signal,

TABLE 2—Active Army Force Structure, FY 1989

USAREUR	*FORSCOM*
1st Armored Division	82d Airborne Division
3d Armored Division	101st Airborne Division
3d Infantry Division (Mech)	1st Cavalry Division (Armd)
8th Infantry Division (Mech)	2d Armored Division (-)
3d Brigade, 2d Armored Division	1st Infantry Division (-)
3d Brigade, 1st Infantry Division (Mech)	4th Infantry Division (Mech)
	5th Infantry Division (Mech)
Berlin Brigade	6th Infantry Division (LID)
2d Armored Cavalry Regiment	7th Infantry Division (LID)
11th Armored Cavalry Regiment	9th Infantry Division (MTZ)
	10th Mountain Division (LID)
EUSA	24th Infantry Division (Mech)
	194th Armored Brigade
2d Infantry Division	193d Infantry Brigade (Panama)
	197th Infantry Brigade
WESTCOM	3d Armored Cavalry Regiment
25th Infantry Division	

and combat service support troops. The active component's five corps in FY 1989 were I Corps, Fort Lewis, Washington; III Corps, Fort Hood, Texas; V Corps, Germany; VII Corps, Germany; IX Corps, Japan; and XVIII Airborne Corps, Fort Bragg, North Carolina.

Army combat forces are categorized as heavy or light depending on their design and missions. The Army has sought a balance of heavy, light, and special operations forces, but it also has traditionally addressed force structure mainly in terms of heavy forces. The Director of Force Development, Office of the Deputy Chief of Staff for Operations and Plans (ODCSOPS), noted in FY 1989 that the bulk of the Army's money, both investment and operating accounts, was driven by decisions associated with its heavy forces and the threat posed by Soviet land forces in Europe. Nevertheless, throughout FY 1989 the Army organized light infantry forces and studied force structure alternatives for low- and medium-intensity conflicts or special operations.

Force Structure and Readiness

The Army Readiness and Equipping Strategy helps create and sustain a meaningful force structure by supporting an established readiness goal.

That goal is for all forward-deployed forces and all major combat forces scheduled to deploy from the United States in the first thirty days (D+30) to attain a readiness status of C–2, which indicates a fully equipped and deployable force. Other deployable forces must attain a C–3 or better rating. To implement this strategy, the Army adopted its "First To Fight—First To Be Resourced" (FTF/FTR) policy that applies to active and reserve components. Combat support and combat service support units are accorded the same priority as the combat units they support. High priority units, as designated in the Department of the Army Master Priority List (DAMPL), are also accorded sufficient resources for training and personnel. This strategy has enabled the Army to increase the number of units with a status of C–3 or better by 30 percent since 1985. All Army forward-deployed major combat forces and major combat units deploying from the United States by D+30 were rated C–2 or better in mid–FY 1989.

By the end of FY 1989 most of the major active force combat units in the continental United States and Alaska under FORSCOM's command attained the highest authorized level of organization (ALO) rating, ALO 1, or 100 percent of their authorized personnel and equipment. The Army accomplished this during the past several years by reducing noncombat spaces in the active components and transferring some combat and many combat support and combat service support missions to the reserve components. This enabled the service to keep the strength of its active components within their authorized manpower ceiling despite reductions in end strength. In addition, all twelve FORSCOM divisions had a C–3 status or better; only three divisions received a C–1 rating. The remaining divisions had lower readiness ratings that reflected shortcomings in training. Two divisions, the 1st Infantry and the 2d Armored, maintained forward brigades in West Germany that were assigned to USAREUR. The 3d Armored Cavalry Regiment was the only major combat unit in FORSCOM below ALO 1. It was plagued with maintenance problems and shortages of maintenance personnel and lacked its aviation assets. Of 695 nonmajor, nonorganic active component units under FORSCOM, 502 had a readiness condition of C–3 or better.

While the readiness of USAREUR units was among the highest in the service, some of them had shortages of artillery ammunition and air-to-air missiles. War reserve stocks were also short certain tactical vehicles, radios, and other items. The U.S. Central Command (CENTCOM) was concerned about the readiness of its combat support and combat service support units.

The transition from earlier force designs to the Army of Excellence necessitated the preparation of a new family of tables of organization and equipment (TOEs). The evolution of a unit to its final reorganization and modernization goal is governed by a "living TOE" (LTOE), which the

Army has used since FY 1988. Base, intermediate, and final TOEs and other organizational documentation are applicable at different steps. A base TOE contains authority for a unit's initial reorganization. Incremental change packages (ICPs) reflect other organization documents such as the manpower authorization criteria (MARC) and the basis of issue plans (BOIP) or equipment. Base TOEs and ICPs are also used to determine requirements for the Army Field Feeding System, approved by the Army Vice Chief of Staff in May 1989. ICPs also document deviations from base TOEs caused by the substitution of equipment and reflect modifications that stem from mission or unit-peculiar requirements. All of these modifications are then added to the base TOE to form an intermediate TOE. The final TOE represents the unit's attainment of its modernization goals. During FY 1989 TRADOC published 346 new and 129 final TOEs. At the close of the fiscal year, 68 of the final 129 TOEs had been approved by HQDA. The Army's goal was to convert all TOEs to LTOEs by FY 1992. Keeping track of TOEs and other organizational documentation through the development and approval process was substantially improved in FY 1989 by adoption of the automated Documentation Management System.

Force modernization and doctrinal changes also affected the Unit Status Report (USR) system (see Army Regulation [AR] 220–1). The USR was modified in FY 1989 to preclude the designation "instant unreadiness" that referred to the unavailability of newly authorized equipment and personnel. The modification in reporting offers a more realistic appraisal of a unit's combat readiness as it aligns itself with its modified TOE (MTOE).

Mobilization Planning

The Army's capacity to mobilize rests on the readiness of its active and reserve components. Some of its endeavors during FY 1989 to improve the total force included an intensive effort to bring the 200,000 Presidential Call-up Package to deployable status. Similar attention was devoted to the M-Day Combat Support/Combat Service Support Force Package, which consisted of forty high-priority active component units. FORSCOM has developed three major force packages to reinforce the unified commands in Europe and Korea or to support deployments to Southwest Asia. The Southwest Asia Force Package, for example, consisted of units assigned to Third U.S. Army, the Army component of the U.S. Central Command, which included the 82d Airborne Division, the 101st Airborne Division (Air Assault), and the 24th Infantry Division (Mechanized), as well as 426 other active component units.

With the disestablishment of the U.S. Readiness Command and the U.S. Forces, Caribbean, in the late 1980s, FORSCOM undertook several measures to enhance rapid deployment. During FY 1989 FORSCOM developed plans for a deployable joint task force (DJTF) headquarters capable of planning and executing the initial stages (72 to 96 hours) of operations and to provide the transition to a conventional JTF headquarters. By the end of FY 1989 FORSCOM had organized a 22-man cell, including 13 from the Army, to serve as the nucleus of the DJTF headquarters. FORSCOM also established an Alert Force Requirement for the 7th Infantry and 10th Mountain Divisions, which were tasked to provide a division ready force and a division ready brigade for rapid deployment within 18 to 48 hours.

Army mobilization also rested on the industrial preparedness program, for which approximately $505 million was allocated in FY 1989. These funds were spent on military construction, research and development, operation and maintenance of the industrial base, and procurement. Among the program's objectives were preservation of Army-owned industrial facilities in a high state of preparedness to accommodate a surge capacity; the procurement, replacement, and maintenance of war reserves; and various modernization programs.

Replenishment of war reserves, a continuing process, was funded as part of the Army Stock Fund in FY 1989. The Army leadership concluded that funding constraints and increasing force requirements had prevented acquisition of sufficient war reserve stocks for the initial stages of war. Stocks at the end of FY 1989 amounted to 23 percent for major and 47 percent for secondary items, and 57 percent for preferred munitions. Continued modernization of the force, together with such force structure changes as increased 155-mm. and 8-inch guns per battery, necessitated war reserves increases as well as stocks to support a mixed inventory of old and new equipment. During FY 1989 Congress was concerned with the length of time required to fill orders; some purchase orders were outstanding for more than five years and tied up money without putting materiel on the shelves. The Army reviewed all outstanding war reserve requisitions and canceled those more than two years old to free funds for higher priority items.

To bridge a potential combat support and combat service support (CS/CSS) shortfall in the event of hostilities, the Army has established wartime host nation support (WHNS) and the logistics civil augmentation program (LOGCAP). The WHNS agreement between the United States and West Germany, signed on 13 June 1989, supplemented a basic agreement made in 1982 and created a worldwide model for burden sharing. The agreements committed West Germany to provide 100 German reserve units of 50,000 personnel to support USAREUR. With full manning and equipping expected by 1993, these units would perform CS/CSS functions for a ten-division D-Day force. WHNS agreements existed with other

NATO allies. The Army estimated that the support rendered by American allies in Europe would equal approximately 65,000 Army personnel. Civil contracts for critical wartime needs awarded under LOGCAP equated to an additional 8,500 Army troops in Europe. Similar arrangements existed with the South Korean government. The Korean government also provided the Korean Augmentation to the U.S. Army (KATUSA), Korean Army personnel who served with Army units, and the Korean Service Corps. The support furnished by South Korea equated to approximately 12,000 Army personnel. The U.S. Army, Japan, has a contingency mutual support (CMS) arrangement with the Japanese government for CS/CSS support. The Army allocated $143 million to support WHNS and LOGCAP programs worldwide in FY 1989.

Equally important to any mobilization was the Army's ability to mobilize rapidly a supporting civilian workforce. Several recent civilian mobilization exercises (CIVMOBEX) have tested the service's ability to hire additional civilians quickly and to replace civilians called to military duty. CERTAIN SAGE 89, the fifth annual retiree recall exercise, entailed the recall of approximately 308 retired military volunteers during a six-month period. They were ordered to active duty for two to twelve days at twenty-four locations. Conducted by FORSCOM, the exercise focused on refining recall procedures, the medical condition of retirees, and the development of deployability criteria for them.

Heavy Units

To remain within legislated strength ceilings, the Army planned to eliminate the 2d Brigade from the 4th Infantry Division (Mechanized) at Fort Carson, Colorado, to avoid a reduction in the strength of forward-deployed units in Europe. To compensate for the loss of an active brigade, the 116th Heavy Separate Brigade of the Idaho National Guard was selected as the division's roundout brigade, effective FY 1990. During FY 1989 HQDA also delayed indefinitely activation of the 177th Heavy Separate Brigade and its support battalion because of lack of funds. The brigade was slated to be stationed at the National Training Center (NTC) at Fort Irwin, California, as the center's opposition force (OPFOR). At the end of FY 1989 several options were being studied that included relocation of the 194th Heavy Support Brigade (HSB) at Fort Knox, Kentucky, to the NTC and the activation of a heavy armor task force in its place to assume school support missions.

The proper organization for the reconnaissance–counter-reconnaissance–surveillance (RCRS) mission in organizations from battalion to echelons above division became a significant force design issue in FY 1989. In the existing force structure, RCRS missions were normally conducted by the battalion scout platoon, division cavalry squadron, or an armored cavalry regiment. The multiplicity and complexity of the missions assigned to such units raised organizational, training, and doctrinal problems. TRADOC's Combined Arms Center recommended specific remedial training and better dissemination of doctrine, but a restructuring of units responsible for RCRS missions seemed a stronger remedy. General Vuono, in late FY 1989, approved a restructuring of the battalion scout platoon that replaced six M3 Cavalry Fighting Vehicles, considered too big and noisy for the mission, with ten High Mobility Multipurpose Wheeled Vehicles (HMMWV). TRADOC endorsed the addition of a second ground cavalry troop for the light infantry division's reconnaissance squadron, but recommended against the addition of a third ground troop to the heavy division cavalry squadron. General Vuono directed TRADOC to study further the problems of the heavy division cavalry design.

Another heavy unit force design issue considered in FY 1989 was the formation of an aviation support battalion to provide better support to the division aviation brigade. TRADOC recommended that the battalion be formed from existing aviation brigade and division support command assets. General Vuono, in August 1989, directed TRADOC to conduct a one-year evaluation of the concept in USAREUR.

Light Divisions

The organization of light infantry divisions in the Army stemmed from the changing international environment in the early 1980s, national strategy, and an extensive review of Army force structure. Strategically and tactically sound and capable of rapid deployment, the division could be used across the operational continuum, according to Army leaders. With an authorized strength of 10,778 and lighter equipment, the division could be transported by fewer aircraft than heavy divisions. In FY 1989 the Army had 5 light infantry divisions; 2 had completed their organization, and 3 were still being formed. The 7th Infantry Division (Light) was activated in FY 1985 at Fort Ord, California, as the first LID. It completed certification for the light infantry design in August 1986, while the 25th LID in Hawaii completed its conversion in October 1987. Both were poised for rapid deployment to meet specified contingencies.

The 10th Mountain Division (Light) was activated at Fort Drum, New York, in February 1985. At the start of FY 1989 the division was still being formed, its organization depending on the construction of facilities at Fort Drum. With the organization of an infantry brigade that moved from Fort Benning, Georgia, to Fort Drum and activation of the division's air defense artillery and military intelligence battalions, activation of the 10th was completed on schedule in FY 1989. The division's two active component infantry brigades are rounded out by the 27th Infantry Brigade of the New York National Guard. During FY 1989 the Army also explored a restructuring of the division's support command (DISCOM) to make it closer in design to the DISCOM of the heavy divisions. This change would enable the 10th Division to better support a light-heavy mix of forces. This change, which entailed reorganizing the division's DISCOM from a functional organization to a forward support/main support battalion configuration, was endorsed by the Army Logistics Center late in FY 1989. General Vuono approved the restructuring of the LID logistical base but directed that it be done without increasing the division's strength.

The 6th Infantry Division (Light), the newest LID, was activated in March 1986 at Forts Richardson and Wainwright in Alaska by using the 172d Infantry Brigade as its nucleus. In FY 1989 the division lacked an active component brigade and two battalions. The division's roundout brigade, the 205th Infantry Brigade (USAR, Minnesota), was converting to the light infantry design. The activation of two active component infantry battalions for the 6th Division, planned for FY 1989, was canceled because of strength reductions required in the FY 1988 budget. One battalion was replaced by the activation of the 6th Battalion, 297th Infantry (L), of the Alaska National Guard in the latter half of FY 1989. During the year the division also activated the Headquarters and Headquarters Battery of the Division Artillery and a military police company. The division headquarters, located at Fort Richardson, is slated to move to Fort Wainwright in FY 1990, where its 2d Brigade is stationed; its 1st Brigade is at Fort Richardson. This impending change also delayed filling some of the division's outstanding force requirements. Its roundout brigade, the 205th Infantry Brigade, however, remained under FORSCOM's command because it was stationed in the continental United States.

The 29th Infantry Division (Light) was activated in the National Guard in October 1985 with its headquarters located at Fort Belvoir, Virginia. It was formed from two existing National Guard separate infantry brigades, the 116th of Virginia and the 58th of Maryland, each reorganized in the light division design. By the end of FY 1989 the division was complete, except for its air defense artillery battalion.

During FY 1989 TRADOC began a reexamination of the light infantry division as an effort related to the assessment of the heavy-light force concept directed by General Vuono in August 1988 and the Army's light force modernization plan. The concentration of armored forces in mid- or high-intensity war between NATO and the Warsaw Pact raised questions regarding the suitability of the Army's light forces for such conflicts. Completed late in FY 1989, TRADOC's assessment of the LID validated its role as a strategic Army force; however, TRADOC underscored the weaknesses of the light division. The study endorsed the concept of combining heavy with light forces, but also noted that the LID's greatest utility was in contingencies and low-intensity conflicts. According to TRADOC, the division's simple design was its greatest advantage, but this quality made it difficult to organize balanced brigade combined arms task forces. The LID's insufficient man-portable tank-killing weapons, vehicular mobility and staying power, and often outmoded equipment ill-suited it for participation in mechanized warfare operations.

In the summer of FY 1989 General Vuono directed TRADOC to develop a light force modernization plan focused on system modernization rather than structural changes. Initial work on the LID modernization plan by the Combined Arms Center demonstrated the difficulty of separating system modernization from force design. TRADOC planners had already formed a new light division structure as part of the Infantry Division 96 study, which closely related to work on ALB-F. The LID of 1996 was unlikely to fight as a complete division, but rather as task-organized brigades or battalions and as elements of a task force or corps for specific missions. In its role as a rapid reaction force, the LID of the future would no longer be limited to securing lodgments for subsequent reinforcement, but would possess sufficient combat power to alter favorably the balance of power. This concept suggested converting one of the LID's three brigades to a medium or heavy brigade and pooling much of the division's combat and combat service support for disposition by corps headquarters for specific missions. In addition, planners considered modifying the structure of each light division commensurate with its most likely strategic role and giving LIDs priority for new equipment.

Designed as a rapid intervention force for deployment by air to trouble spots in Latin America, the Middle East, or Asia, the LID also had shown enough promise as part of a heavy-light force for use in mid- and high-intensity warfare. The Army explored this concept in several training scenarios at the NTC, during REFORGER 88, and during CARAVAN GUARD 89, conducted in Europe near the end of FY 1989. In REFORGER 88, the experience of a battalion task force of the 10th Mountain Division demonstrated its ability to operate independently as companies, platoons, or squads; to move quickly by foot in terrain inhospitable for armored operations; and to contend with heavy forces as long as they did not directly engage them on open ground. That heavy-light forces could be synchronized to increase a heavy division's effectiveness was also demonstrated in CARAVAN GUARD 89. In that exercise the 2d Brigade, 10th Mountain Division, operated with elements of the 3d Armored Division. The exercise demonstrated that light infantry performing in a zone reconnaissance role for a heavy force can enable the heavy division to move deeper and faster in a European mid-intensity conflict.

While such exercises helped the Army to define better the operational capabilities of light infantry forces and to clarify the doctrinal role of heavy-light forces in AirLand Battle, serious questions remained in FY 1989. One unsettled issue was the number of aircraft flights needed to move a light division. A calculation that an LID could be transported anywhere in the world in six days in 500 C–141 flights seemed unattainable in recent computer analyses due to several factors—differences between Army and Air Force calculations of lift capacity, modifications in TOEs that replaced original equipment or added new equipment, and the tailoring of force requirements to meet specific contingencies. According to Army analysts at the Combined Arms Combat Development Activity, earlier lift estimates were based on less men and materiel than more recent ones.

Conversion of the 9th Infantry Division (Motorized)

The 9th Infantry Division (Motorized) was conceived by the Army leadership as a test bed for the design of a high technology, motorized light division. Advocates believed that it offered distinctive advantages in strategic deployability and sustainability and a high degree of tactical mobility and lethality if properly equipped, and at a low cost. Advocates contended the division could effectively meet mid-intensity and regional threats usually addressed by heavy conventional forces. In 1988 the Army ended this experiment and began to convert the division to a mechanized infantry design. Congress had refused to fund a light attack vehicle (LAV) and an armored gun system (AGS) that the Army considered necessary for a motorized division. The AGS, a twenty-ton tracked vehicle that mounted a 105-mm. rapid-fire cannon that could be airlifted in a C–130, was canceled in 1987. The configuration and role of the 9th Infantry Division (Motorized) raised many doctrinal issues regarding the feasibility of organizing specialized divisions whose equipment was not standardized throughout the Army's force structure. Other questions concerned the suitability of the division's equipment for its intended mission. For example, the HMMWV, the centerpiece of the motorized concept, seemed to lack the payload and armor protection to serve as a weapons carrier or platform.

Conversion of the 9th Division from a motorized to a mechanized division proceeded slowly in FY 1989. The Army liquidated the unorthodox test agency, the Army Development and Employment Agency, which had tried to adapt off-the-shelf, high-technology systems to the motorized division concept. A decision on the division's conversion to mechanized awaited approval of an environmental impact statement, not executed until FY 1990, regarding the effect of mechanized operations at

Fort Lewis. The Army inactivated the division's 2d Brigade in FY 1988 to meet end strength reductions called for in the FY 1989 amended Army budget. In mid–FY 1989 the 9th Division's two active brigades, the 1st and 3d, each had three combined arms battalions (CAB). The 1st Brigade had a combined arms battalion (heavy) with two assault gun companies and an infantry company, a combined arms battalion (light) with two infantry companies and an assault gun company, and an armor battalion. The 3d Brigade was composed of a combined arms battalion (heavy), a combined arms battalion (light), and a light attack battalion of HMMWVs mounted with Tube-Launched, Optically Tracked, Wire-Guided Missiles (TOWs) and machine guns. The division's third brigade was replaced by an ARNG roundout brigade, the 81st Mechanized Brigade of the Washington ARNG.

The division's organization in FY 1989 was temporary pending a study of several configurations. One configuration envisioned a division of three brigades—armored, mechanized, and motorized. On 18 May 1989, the Chief of Staff endorsed planning that entailed creating a division of four armored, three mechanized infantry, and three motorized battalions and directed TRADOC to develop an appropriate AirLand Battle doctrine for this configuration. He also directed TRADOC to avoid impinging on the heavy modernization plan as it developed the division's design and to study the feasibility of adopting the Marine Corps' widely used Light Armored Vehicle (LAV–25). During FY 1989 General Vuono approved the conversion of two of the division's CAB (Light) battalions to mechanized infantry battalions. Planners were also entertaining a heavy design configuration of five armored battalions and five mechanized infantry battalions in an Army of Excellence design as a long-term goal.

Artillery and Rocket Forces

During FY 1989 the Army enacted several measures that affected field artillery forces. The ongoing 3x8 conversions of the artillery forces—three firing batteries and eight guns per battery—were suspended in late FY 1988 because of insufficient M548 ammunition carriers and conflicting priorities for the distribution of M109 howitzers. This issue, also affected by the Intermediate-Range Nuclear Forces (INF) Treaty and by budgetary considerations, remained unresolved in early FY 1989. Previously approved 3x8 conversions necessitated changes in the artillery force structure. For example, during FY 1989 Battery C, 5th Battalion, 8th Field Artillery, relocated from Fort Bragg to Fort Campbell in order to fill the void left when the 2d Battalion, 31st Field Artillery, was inactivated during the XVIII Airborne Corps' conversion to the 3x8 design. HQDA also canceled inactivation of the 3d Battalion, 18th Field Artillery.

Rocket and missile forces were influenced by other factors in FY 1989. A devastating explosion in May 1988 at the Pacific Engineering Production Company at Henderson, Nevada, destroyed half of the United States' production capacity for the rocket fuel oxidizer ammonium perchlorate (AP). In December 1988, because of a worldwide shortage of AP, the Joint DOD/NASA (National Aeronautics and Space Administration) AP Allocation Board allotted the Army 86.7 percent of its AP requirements through June 1989. Army Multiple Launch Rocket System (MLRS) forces were allotted only 85 percent of their authorized requirement. The Army anticipated that shortages of ammonium perchlorate would be alleviated by the end of FY 1989 after a new AP production plant being constructed at Cedar City, Utah, began full production.

International arms control efforts profoundly affected the structure of Army missile forces in Europe. The INF Treaty, signed in December 1987 by President Ronald Reagan and Soviet leader Mikhail Gorbachev, required that four U.S. and six Soviet missile systems be destroyed by 31 May 1991 and prohibited further production of these systems. The treaty called for verification by on-site inspections of the elimination of an entire class of U.S. and Soviet land-based missile systems with ranges of 300 and 3,400 miles. The four U.S. systems affected are the ground launched cruise missile (BGM–109G) and the nuclear-equipped Pershing II, 1A, and 1B; the six Soviet systems are the SS–20, SS–4, SS–5, SS–12, SS–23, and SSC–X–4. The Under Secretary of Defense for Acquisition had responsibility for ensuring DOD's compliance with the INF Treaty. Responsibility for verification of Soviet compliance was vested in the Under Secretary of Defense for Policy.

Charged with eliminating its Pershing II and 1A missiles erected in Europe, the Army was engaged in this task at three sites—launchers were being destroyed at the Equipment Maintenance Center in Hausen, West Germany, while missiles were being eliminated at the Pueblo Depot Activity in Pueblo, Colorado. Both missiles and launchers were being destroyed at the Longhorn Army Ammunition Plant in Marshall, Texas. The Army also supported the INF Treaty by detailing linguists, inspectors, missile specialists, and security support personnel to the On-Site Inspection Agency (OSIA), a DOD agency established in January 1988 to help implement the INF Treaty. At Army bases subject to Soviet inspection, base commanders prepared and carried out site plans and procedures to support Soviet inspection and OSIA escort teams. Members of the Army's Intelligence and Security Command also furnished security and counterintelligence support. The Army reported on its work with the INF Treaty to the U.S. Nuclear Risk Reduction Center, a State Department office. The total cost to DOD to implement the INF Treaty in FY 1989 was about $95 million, of which the Army incurred about $24 million. In FY

1989, 200 Army military personnel and 257 Army civilians were involved in the effort.

The first missile eliminated, a Pershing 1A, was destroyed in September 1988 at the Longhorn Army Ammunition Plant by static firing and crushing in the presence of a Soviet inspection team. Most Pershing missiles were destroyed by explosive demolition or burning, the solid fuel being burned during static firing, after which the missile canister was crushed. All 169 Pershing 1A short-range missiles were eliminated within the eighteen-month deadline, or by 7 July 1989. The Soviets eliminated all 957 declared shorter range missiles by November 1989. Destruction of Pershing II missiles continued in FY 1989 at the Longhorn and the Pueblo depots.

Demolition of the Pershing missiles also affected the status of approximately twelve thousand Army troops in Europe. Despite strong congressional sentiment to reduce U.S. military strength in Europe by about twenty-five thousand, the total number of American troops made excess by the destruction of missiles under the INF Treaty, Army commanders in Europe sought to retain most of the Army troops by reclassifying or retraining them. The Army discontinued four enlisted Military Occupational Specialties (MOSes) and one warrant officer MOS peculiar to the Pershing, but the majority of Pershing technicians were transferred to the MLRS MOS. Some electronic and mechanical repairmen were transferred to aviation repair specialties. The Army also planned to reassign the 2d Battalion, 4th Infantry, which provided security for Pershing missile sites, to the Seventh Army training facilities at Hohenfels, West Germany, as a permanent opposition force (OPFOR).

Destruction of the Pershing coincided with the Army's plans to expand its MLRS forces. These plans called for converting three battalions of the 56th Field Artillery Command (Pershing) and the 2d Battalion, 32d Field Artillery (Lance), to MLRS battalions beginning in FY 1989. The Army also intended to convert two Pershing batteries of the 3d Battalion, 9th Field Artillery (Pershing), at Fort Sill, Oklahoma, to MLRS batteries. Equipment for this conversion was available from on-hand assets at Fort Sill and the loan of MLRS launchers from the Oklahoma National Guard. Fort Sill would provide equipment to field A and B Batteries while the Oklahoma ARNG would have nine MLRS launchers to support individual training. The 3d Battalion, 9th Field Artillery, would retain one Pershing II battery for training and rotational purposes through the INF Treaty period, or until FY 1992. The Army intended to "backfill" the battalion with new production MLRS launchers in FY 1991. The conversion plan also affected several support companies. Plans to convert two 8-inch howitzer battalions in USAREUR to MLRS and two self-propelled 155-mm. artillery battalions at Fort Sill to MLRS configuration were under review by HQDA in FY 1989. The delay in converting the latter units was attributed to a lag in the production of MLRS launchers. The Army planned to upgrade USAREUR's field artillery forces with the introduction of ATACMS, the long-range missile for the MLRS launcher, by FY 1990.

The INF Treaty did not affect the Army's Lance missile, a nuclear-armed tactical missile with a range of approximately seventy-eight miles. Eighty-eight Lance launchers were assigned to NATO in FY 1989. The Army considered extending the range of the Lance to three hundred miles, but West German officials urged removal of the Lance from Europe. In discussing the future of the Lance in NATO, however, the alliance's High Level Group reported to the NATO Nuclear Planning Group in the spring of 1989 that the United States had selected the M270 MLRS launcher as a Follow-on-to-Lance (FOTL).

Special Operations Forces

Established on 1 October 1982, and recently subordinated to FORSCOM, the Army's 1st Special Operations Command (Airborne) commanded all Army special operations forces. These included special forces, rangers, psychological operations and civil affairs units, and special operations aviation units. The U.S. Special Operations Command (USSOCOM), a unified command located at MacDill Air Force Base, Tampa, Florida, set major policy and exercised operational command over SOF of all services assigned to it. In August 1989 the Army Chief of Staff approved designation of the 1st SOCOM as a major Army command effective in early FY 1990. FORSCOM's Special Operations Division controlled much of the Army's planning and management of SOF, and it transferred approximately 75 percent of the responsibility to the 1st SOCOM by the end of FY 1989. With its headquarters at Fort Bragg, North Carolina, and a strength of about eighty-five hundred, the 1st SOCOM also became the Army component of USSOCOM. The 1st SOCOM's major subordinate units are the 75th Infantry Regiment (Ranger); the 1st, 5th, 7th, and 10th Special Forces Groups (Airborne); the 4th Psychological Operations Group; the 96th Civil Affairs Battalion; the 528th Support Battalion (Special Operations) (Airborne); the 112th Signal Battalion (Special Operations) (Airborne); and the 1st Battalion and Company A, 3d Battalion, 160th Aviation Group (Special Operations) (Airborne). FORSCOM's exercise of control, however, was an intermediate step in the Army's goal of forming a U.S. Army Special Operations Command with two major subordinate commands: the 1st SOCOM for active component SOF and a U.S. Army Reserve SOCOM for reserve component SOF.

Several SOF command issues were unresolved as FY 1989 ended. Among them were funding arrangements and the relation of the 1st

SOCOM to Army Reserve special operations forces. FORSCOM proposed establishing an Army Reserve SOCOM at Fort Bragg, North Carolina, to exercise command and control of reserve component SOF. In August 1989 General Vuono approved FORSCOM's concept for an organization to be known as the U.S. Army Reserve Special Operations Command. He deferred assigning it an activation date pending approval by DOD and Congress. In the interim the 1st SOCOM would exercise operational control over reserve component SOF units while FORSCOM supervised the training of 11,500 reserve component special operations forces dispersed throughout thirty-seven states. Approximately 50 percent of the Army's SOF, 33 percent of the total special operations aviation assets, and more than 90 percent of the Army's psychological operations and civil affairs capabilities were in the reserve components.

Throughout FY 1989 the Army sought to strengthen its special operations forces through restructuring, activating selected units, and modernizing. A Special Forces Branch was established in FY 1988, which allowed Special Forces officers and NCOs to pursue a career in their specialty without having to transfer between their basic branch and the Special Forces. The Army enhanced career management in FY 1989 by establishing the new branch's first advanced NCO course at Fort Bragg, North Carolina. Army Special Forces in FY 1989 were organized into eight groups, four each in the active and reserve components. The four active groups are the 1st Special Forces Group at Fort Lewis, Washington (its 1st Battalion was forward-deployed in Okinawa); the 5th Special Forces Group at Fort Campbell, Kentucky; the 7th Special Forces Group at Fort Bragg, North Carolina (its 3d Battalion was forward-deployed to Panama); and the 10th Special Forces Group at Fort Devens, Massachusetts (its 1st Battalion was forward- deployed to Bad Toelz, West Germany). During FY 1989 the Army was completing plans to activate an additional group, the 3d Special Forces Group (Airborne). Four special forces groups were in the reserve components, two each in the USAR and the ARNG.

Effective September 1989 SOF units began converting to Army of Excellence force designs and changed from the "H" series TOEs to the revised "L" series. The conversion affected ranger, special forces, and active psychological operations units. The new force design complemented other AOE initiatives in restructuring heavy and light forces and took better advantage of recent modernization efforts. The three separate functional support companies of a Special Forces group were to be inactivated and replaced by four multifunctional support companies with responsibilities similar to the old companies. One company will be assigned to each of a group's three special forces battalions, while the fourth company supports the group headquarters. Other changes entailed the activation of two chemical reconnaissance detachments and a Special Operations Aviation (SOA) battalion.

Nearly all of the Army's psychological and civil affairs capabilities were assigned to the reserve components. The 4th Psychological Operations (PSYOP) Group (Airborne), Fort Bragg, North Carolina, was the Army's only active component PSYOP unit. The 96th Civil Affairs Battalion (Airborne), also at Fort Bragg, was the Army's sole active component civil affairs (CA) battalion. In accord with Total Army Analysis–96, the Army planned to activate as many as thirty-one PSYOP units in the future. Throughout FY 1989 the Army and USSOCOM debated whether Army civil affairs and psychological operations units should be part of SOF. The Army held that they were, while the Commander in Chief, Special Operations Command (CINCSOC), maintained that they were not. By existing statute, CINCSOC is responsible for functional PSYOP and CA activities but only insofar as they relate to special operations. CINCSOC's narrow interpretation of USSOCOM's relation to Army PSYOP and CA units had significant implications for Army force structure, command and control, doctrine, training, and other matters. Formal discussions on this issue continued into FY 1990.

Army Special Operations Aviation units included one SOA Group, the 160th Aviation Group (SO) (Airborne), consisting of two battalions, a separate company, and a forward-deployed detachment. One of the group's battalions is assigned to the Oklahoma National Guard. With a strength of 828 men, the 160th is equipped with a mix of gunships and utility helicopters (MH–60A, MH–47D, UH–1H, and MH/AH–6 helicopters). Known as Task Force 160, or the Night Stalkers, the group specializes in night operations. It has state-of-the-art radars, navigational aids, radios, and an array of electronic countermeasures. The group's helicopters can insert, resupply, and extract special operations forces from hostile territory or furnish limited airlift of troops and equipment, fire support, and air and sea rescue service. Under a reorganization approved by the Army Chief of Staff in 1987, the SOA structure will evolve into an SOA regiment consisting of 4 SOA battalions (3 active and 1 reserve), 2 separate SOA companies, and 1 forward-deployed SOA detachment. The regiment will eventually have 144 aircraft.

A detachment of four specially equipped UH–60 Black Hawk helicopters is assigned to each Special Forces group. The Army planned to eliminate these detachments from all SF groups by FY 1991 and to make the groups totally dependent on theater army general support aviation and Air Force resources. Army SOFs are also supported by Air Force helicopters and fixed-wing aircraft. The feasibility of transferring the entire special operations airlift mission to the Army was examined but rejected by a DOD study in late FY 1988.

Army Aviation

Army aviation force structure was affected by two primary factors in FY 1989—the modernization of Army helicopters and budgetary constraints that reduced active component aviation personnel, units, and equipment. As directed by DOD, the Army had already eliminated 2,200 aviation-related manpower spaces in FY 1988. DOD also directed the Army to eliminate 450 aircraft by the end of FY 1988 and an additional 900 over the next five years. Much of this reduction was carried out in FY 1988/1989 through turn-in of obsolete, unrepairable, or damaged aircraft without replacement and by reducing TDA and general support aviation companies. In FY 1989 the Defense Resources Board instructed the Army to eliminate 7 attack helicopter battalions (2 active, 3 National Guard, and 2 Army Reserve) and to decrease the number of active component AH–64 aircraft from 18 to 15 in each battalion. These measures were expected to eliminate 2,141 additional aviation-related personnel spaces (754 active, 831 Guard, 566 Reserve) between FY 1990 and FY 1994. The Army Staff recognized that leaner budgets required that it stand down aviation units in all components and downsize remaining units.

To reduce further its aviation force structure, the Army eliminated six OH–58A observation helicopters from each division's aviation company, effective September 1989. It downsized AH–1 attack helicopter battalions from 21 AH–1, 13 OH–58D, and 3 UH–1A aircraft to 18, 10, and 2, respectively, which also reduced each battalion by eighteen crew members. Downsizing aviation units before new high-performance helicopters were fielded posed risks to readiness. The AH–1 Cobra attack helicopter refurbishment program, for example, lagged behind expectation and resulted in some decrease in readiness and delays in training the 3d Armored Cavalry Regiment, the 10th Mountain Division (LID), and the 6th Attack Helicopter Battalion (Army Reserve), according to FORSCOM. Shortages of pilots and aircraft maintenance personnel adversely affected OH–58 Kiowa and AH–1 fleet operations. Shortages of night-vision goggles posed safety hazards.

Throughout FY 1989 the Army upgraded its aviation force structure by converting AH–1 Cobra battalions to AH–64 Apache attack battalions. It gave priority to fielding combat-ready attack helicopter battalions to Europe and other high-priority national defense requirements. Conversion training from the AH–1 to the AH–64 was conducted at Fort Hood, Texas. The following units trained and were relocated during FY 1989: the 4th Attack Helicopter Battalion, 229th Aviation Regiment, to Illesheim, West Germany; the 1st Attack Helicopter Battalion, 1st Aviation Regiment, to Fort Campbell, Kentucky; the 2d Attack Helicopter Battalion, 229th Aviation Regiment, to Fort Rucker, Alabama; the 3d Attack Helicopter

Battalion, 1st Aviation Regiment, to Ansbach, West Germany; the 3d Attack Helicopter Battalion, 227th Aviation Regiment, to Hanau, West Germany; and the 1st Attack Helicopter Battalion, 24th Aviation Regiment, to Hunter Army Airfield, Savannah, Georgia. At the end of FY 1989 the Army had 14 AH–64 battalions in its active force structure (9 in CONUS; 5 OCONUS), an increase of 4 since the end of FY 1988.

The Army had planned to acquire a total of 573 Apache helicopters, but in FY 1988 Congress increased the total purchase to 975 and approved a procurement program slated for completion by FY 1991. Based on that number, the Army planned to field a total of 48 AH–64 battalions by FY 1996, depending on whether the battalion had 18 or 15 helicopters. In FY 1989 DOD reduced the Apache procurement objective from 975 to 807 aircraft, resulting in elimination of five Apache battalions from the Army's projected force goal of forty-eight. Funding for the AH–64 increased from $911 million in FY 1988 to about $1.7 billion in FY 1989. Higher unit costs reduced the number of Apache helicopters that the Army bought from 77 in FY 1988 to 72 in FY 1989. The accelerated production schedule for the AH–64 threatened to leave the Army with a cold production base for attack helicopters until the LHX entered production.

To meet the Apache battalion fielding plan, the Army resorted to manning them with experienced Cobra pilots, a policy that contributed to shortages of the latter. By mid–FY 1989 the Army was short 383 active duty warrant officer Cobra pilots. A shortage of Cobra aircraft required the Aviation Systems Command to reduce AH–1 training by 4 to 6 students per class, with the potential loss of an additional 54 to 84 newly trained pilots in FY 1989. Shortages of funds and replacement parts also contributed to difficulties in maintaining deployed Apache units and adhering to the fielding schedule. HQDA and several Army MACOMs—AMC, TRADOC, FORSCOM—sought to stabilize the organization of Apache units by minimizing MTOE changes, deleting obsolete items, and redistributing assets within units. These and other measures helped the readiness of Apache battalions that had recently converted to the new "L" series TOEs to support contingency and mobilization requirements.

On 13 May 1989, violent winds in excess of 100 miles per hour damaged or destroyed 142 of the 495 aircraft at Fort Hood Army Airfield and nearby Robert Gray Army Airfield. The III Corps' fleet of 150 AH–64s, one-third of the Army's Apache inventory, was hit the hardest. Apaches from the 1st Cavalry Division, the 2d Armored Division, the 6th Cavalry Brigade (the Army's only separate air combat brigade), and the Apache Training Brigade were damaged. Of the 101 Apaches damaged, 31 needed depot repairs. Thirty to forty other helicopters (UH–60s, OH–58s, UH–1s, CH–47s, and AH–1s) were severely damaged. Most of the helicopters suffered damage to the main rotor blades, structural faults, and damage to transmissions. Losses were initially estimated in excess of $600 million, which included facilities repair. A second severe storm in early June damaged about fifty helicopters at Fort Polk, Louisiana, with losses there estimated at $9 million.

After assessing the damage, General Vuono indicated that the Army would not reconstitute the Apache fleet at Fort Hood by transferring helicopters from other posts since that would lower the readiness of other Apache units. Fort Hood would absorb the losses, but the Apache Training Brigade would be reconstituted to minimize slippage in unit activation, conversion, and training. By "cross-leveling" equipment between units, borrowing Apaches from the National Guard, and acquiring new aircraft, an additional seventy-five AH–64 helicopters were made available while damaged aircraft were being repaired. In May damage assessment teams suggested that the damage was not as severe as originally believed. Some aircraft originally thought to be unsalvageable were repairable. A new estimate lowered the repair cost to $101.6 million and indicated that most repairs could be made in about one year. In July 1989 Congress passed the Dire Emergency Supplemental Appropriations Bill, which gave DOD authority to transfer approximately $176.7 million from various DOD accounts to the Army to defray the cost of emergency repairs.

Nevertheless, an assessment of available Apaches made by the Army in mid-June indicated that the combat capability of thirteen aviation battalions or battalion equivalents had been impaired. Despite the damage to the Apache fleet, the Army planned to field attack helicopter battalions OCONUS on schedule and expected a delay of one to two months to field CONUS attack battalions. By August 1989, 11 of 101 damaged Apaches were returned to service. Under Project Broken Wing the majority of the Apaches were being repaired at Fort Hood by Army mechanics. Some of the most seriously damaged helicopters were being refurbished by Lockheed Support Services, Inc., at nearby Killeen Municipal Airport in Killeen, Texas.

Other force structure changes in Army aviation that occurred in FY 1989 included the activation of the 3d Battalion, 160th Aviation Regiment, at Hunter Army Airfield, Georgia; the establishment of a provisional assault helicopter battalion at Fort Riley, Kansas, from assets of the 1st Infantry Division; the activation of the 3d Assault Battalion, 159th Aviation Regiment, at Fort Campbell to provide the 101st Air Assault Division with a third airlift battalion; and the activation of Company C, 3d Battalion, 159th Aviation Regiment, at the National Training Center, Fort Irwin, California. The activation of Company C on 16 October 1989 converted the NTC's Flight Detachment from a TDA to a TOE unit. To flesh out the structure of the 6th Infantry Division (LID), FORSCOM assigned the 2d Battalion, 123d Aviation Regiment, to the division's roundout brigade. In addition, the 4th Platoon, Company B, 1st Battalion, 58th Aviation Regiment, Fort Bragg, North Carolina, was transferred to U.S. Southern Command (USSOUTHCOM) for employment by U.S. Army, South (USARSO), effective 1 August 1989. In July 1989 FORSCOM activated the Air Traffic Control Platoon of the 10th Mountain Division at Fort Drum, New York. FORSCOM assumed responsibility for the Army's air traffic control functions from the Information Systems Command in FY 1987 and planned to convert these units from a Signal Corps TDA structure to Army of Excellence TOE units.

The Army's aviation force structure also contained a variety of special mission aircraft for SOF (see discussion of SOA above) and to support other Army and national intelligence requirements. These Special Electronic Mission Aircraft (SEMA) are in the active component force structure as part of the Army's Intelligence and Electronic Warfare tactical mission responsibilities. The fleet in FY 1989 included the RV–1D (Electronic Intelligence—QUICKFIX), the OV–1D (Side-Looking Airborne Radar) aircraft, the RC–12D and RC–12H/K (GUARDRAIL—signals intelligence) aircraft, and the EH–60 electronic warfare helicopters. The OV–1D, in the Army's force structure since the Vietnam War, is the only aircraft organic to Army corps that can monitor moving targets. It supports NATO's Follow-on Forces Attack doctrine by enhancing the corps' deep battle capability with multiple sensors that develop target information. The EH–60 helicopter allows division commanders to disrupt hostile communication on the battlefield.

In FY 1989 experienced artillery noncommissioned officers (NCOs) began replacing officers as aerial observers in OH–58D Kiowa scout helicopters as part of the Aerial Fire Support Observer Program. The first NCO aerial observer class graduated in November 1988 at the Aerial Observer Branch of the Army Field Artillery School, Fort Sill, Oklahoma. Operational tests under the Army Helicopter Improvement Program (AHIP) had demonstrated that the Kiowa's capabilities were enhanced when experienced NCO artillery observers replaced less experienced lieutenants. Another factor that influenced the change was the general reduction of officer strength and a consequent conversion of officer observer positions in division artillery and field artillery brigades to NCO positions.

Combat Support and Combat Service Support

The Total Army's combat support/combat service support (CS/CSS) force structure experienced manpower and equipment shortages in FY 1989. The Army had a shortfall of 37,400 CS/CSS personnel from the authorized level of organization (ALO) but planned to reduce this deficit by about 3,400 during the next five years. These deficits were compounded by soldiers' lacking MOS qualification, especially in the reserve components. The reserve components adopted several remedial measures that addressed this deficiency (see Chapter 9). Shortages among Army support units in Europe and reserve component units earmarked to support forces in USAREUR were brought to the attention of Congress by the Commander in Chief, European Command (CINCEUR), in FY 1988. Manpower and equipment shortages in the active component CS/CSS units were shared proportionally by theater with distribution determined by local requirements, major force OPLAN arrival dates, and order of precedence on the Army's Master Priority List. In FY 1989 the equipment readiness status of CS/CSS units ranged from C–1 to C–4. Equipment currently in the Army's inventory, however, together with equipment scheduled for procurement over the next five years, was regarded as sufficient to enable all CS/CSS units to attain a readiness level of C–3 or better. The Army's policy regarding the CS/CSS force structure was not to activate or convert any CS/CSS unit to a new TOE unless it could meet a combat readiness status of C–3 or better.

During FY 1989 active component chemical companies that had been split between stations were consolidated. The 84th Chemical Company was consolidated at Fort Polk, Louisiana, in September 1988; the 172d Chemical Company at Fort Carson, Colorado, in March 1989; and the 164th Chemical Company at Fort Irwin in June 1989. The capability of other chemical units was enhanced by the fielding of the M1059 Smoke Generator Carrier. The 144th Chemical Company received its initial increment of the M1059, while the 31st Chemical Company, Fort Riley, Kansas, and the 45th Chemical Company, Fort Polk, Louisiana, were issued their full complement of new generators. Additional deliveries were made also to the 84th and 172d Chemical Companies. Two smoke generator battalions, two smoke companies, and one chemical decontamination company were activated in the National Guard. During FY 1989 HQDA conducted a force validation review of the chemical force structure in the reserve components that indicated a sharp reduction in the number of activations and conversions planned in FY 1990.

Since it was designated DOD's executive agent for land-based water resources in 1980, the Army has developed its Tactical Water Program with manpower and equipment to detect, produce, treat, store, distribute, and also cool water in arid regions. The Army, under ODCSLOG's proponency, has focused on supporting the U.S. Central Command (CENTCOM), whose likely area of operations experiences an acute shortage of fresh water. In FY 1989 the Army acquired a 3,000-gallon reverse osmosis water purification unit to supplement existing smaller units. Most general support (GS) water units designated to support CENTCOM are in the reserve components. The majority of the planned fifty-three GS water units have been organized, and the remainder are expected to be organized by the end of FY 1990. To train these units, eleven water training sets were assembled and assigned to the CONUS armies for water supply company and tactical water distribution system training. A centralized training facility is also being established to allow reserve component water purification units to train during their two-week annual training.

In accord with TOE changes derived from the Logistics Unit Productivity System (LUPS) analysis of combat service support functions, the Army activated the 54th Quartermaster Company Graves Registration (GRREG) on 6 December 1988 at Fort Lee, Virginia. The activation of two additional GRREG companies, one in Germany and the other in the Pacific, was postponed until FY 1998. Army officials anticipated that the delay would create a shortfall in GRREG capabilities during the first 180 days of a large mobilization. To mitigate this situation, the Army considered stationing GRREG platoons in EUCOM and PACOM. The absence of GRREG refresher unit training conducted for the Army Reserve in FY 1988 and FY 1989 adversely affected GRREG readiness. A disagreement among the Army Quartermaster School at Fort Lee, Virginia, FORSCOM, and the continental United States armies (CONUSAs) regarding proponency curtailed all GRREG training in FORSCOM. A 1988 agreement between the Vice Chiefs of Staff of the Army and the Air Force transferred the mission of the port of entry (POE) mortuary to the Air Force. On 30 September 1989, the Army closed the Army mortuary at Oakland Army Base, California. The facility will be reestablished at Travis Air Force Base (AFB) in California and will be patterned after the one at Dover AFB, Delaware, to handle mass casualties.

The Engineers

During FY 1989 the Engineer Center and School completed the draft of a new force design concept, the Engineer Force, or E-Force. It addressed both combat engineer support of heavy forces in close combat in the AirLand Battle and engineer requirements for AirLand Battle–Future. The AirLand Battle concept envisioned an increase of engineer support to divisions to accommodate their greater maneuver requirements. The E-Force consisted of the combined assets of a division combat engineer battalion and a corps combat engineer battalion that formed a headquarters and three engineer battalions, and each battalion would support a maneuver brigade. The battalions would deploy well forward in the brigade area to perform mobility, countermobility, and survivability tasks. This concept would eliminate the current division-corps split in task-organized engineer forces. Under the E-Force concept the division engineer would synchronize the support of engineer forces to combat units in forward areas as the tactical situation evolved. The CG, TRADOC, approved the E-Force concept in FY 1988 but directed that it be tested using the 7th Infantry Division before submitting it to HQDA for approval. TRADOC coordinated a test plan with USAREUR and FORSCOM that was scheduled to begin in June 1990 in CONUS and to culminate in Europe in October 1990 during REFORGER 90.

Conclusion

Army force structure in FY 1989 demonstrated a shift from an overwhelmingly Warsaw Pact threat–based force structure to a capabilities-based structure. Within the context of the Army's strategic roles, current and potential threats, and cost considerations, the Army sought to maintain sufficient ready forces to provide versatile force projection and forcible-entry capabilities for crisis responses and to sustain forward-deployed forces in Europe and Asia. Consisting of heavy, light, and special operations units, their supporting elements, and sustaining base activities, the Army's force structure in FY 1989 reflected its orientation to AirLand Battle doctrine. Army force structure development during FY 1989 also reflected a widening doctrinal scope that included further growth of its light infantry divisions, experimentation in combining heavy and light forces, and the augmentation of special operations forces.

6

Operations

Introduction

Army operations in FY 1989 reflected two basic themes that defined the Army as a strategic force. The first one pertained to the Army's global responsibilities, which are considerable in peacetime as well as in wartime. Forward-deployed Army forces in Europe and Korea have been inextricable elements in the nation's Cold War strategies of containment and deterrence. In Latin America the Army addressed the deterioration of security in Panama, while its security assistance programs in El Salvador and Honduras helped to deter the spread of insurgency from Nicaragua and to strengthen anti-Communist governments coping with threats to their security. The Army's peacekeeping and other missions in the Middle East further illustrated the Army's global role. The second theme resonated with the history of the Army's centuries of service characterized by the Army's assumption of multifarious missions to assist federal, state, and local authorities. While the Army's involvement in environmental issues, the war against illegal drugs, and combating terrorism grew during FY 1989, the service continued its long tradition of providing humanitarian assistance.

Central America

The Army has maintained a presence in Panama for most of the twentieth century. The U.S. Army, South, the major Army command in Panama, is the Army component of the unified command, the U.S. Southern Command. USARSO's area of interest is Central and South America. Its primary units were the 193d Infantry Brigade and the 324th Support Group, stationed at Fort Clayton, and the 470th Military Intelligence Group, with headquarters at Corozal. U.S. armed forces personnel assigned to Panama in FY 1989 totaled 12,719, of which 8,605 were Army forces. The large number of American civilians there included many military dependents and civilians who worked with the Panama Canal. There were 2,111 of these workers, and about half worked for the Army.

As FY 1989 began, the harassment of American soldiers and civilians by Panamanian military and paramilitary elements had slackened from the high level that began in the spring of 1988. Nevertheless, the Reagan administration had reinforced American military forces in Panama. The Army dispatched several military police (MP) units and intelligence teams from the United States. The Commander of USSOUTHCOM (CINCSO) activated Joint Task Force–Panama (JTF-P) to prepare contingency plans and arrange for the command and control of U.S. combat forces should hostilities erupt between American forces and the Panamanian Defense Forces (PDF), a 14,000- to 16,000-man security force that exercised both military and police functions under Panamanian President Manuel Noriega.

The majority of the JTF-P staff were Army personnel who also served on the USARSO staff. In preparing its contingency plan, ELABORATE MAZE, JTF-P assumed that the PDF was hostile. Throughout the spring and summer of 1988, confrontational actions by the PDF worsened. The PDF intruded into American installations and sometimes exchanged gunfire. American forces adhered to nonprovocative rules of engagement, but prudence dictated that security be reinforced. Between August 1988 and April 1989 several Army MP and aviation units were sent to Panama. During this period USARSO was reinforced by one military police battalion headquarters, three MP companies, and an aviation task force, TF HAWK, with about twenty-seven aircraft from the continental United States. During early FY 1989 tensions in Panama abated. Some consideration was given to inactivating JTF–Panama, but American officials deferred until after the Panamanian elections scheduled for May 1989. JTF–Panama maintained operational control over Army forces in Panama, but in February 1989 the Army's XVIII Airborne Corps became the JCS' executive agent for contingency planning for possible hostilities in Panama. USCINCSO proposed a phased redeployment of the security augmentation forces from Panama during FY 1989, but the Army continued to replace forces temporarily sent there. Army aviation assets were rotated about every ninety days.

To minimize incidents between Americans and Panamanians, USSOUTHCOM directed military dependents either to leave Panama or to move to base housing. In the spring of 1988 USSOUTHCOM directed shorter service tours in Panama to encourage newly assigned soldiers to accept unaccompanied tours, thereby mitigating the severe housing shortage and reducing the risk of terrorist attacks against Americans. Under a new DOD policy announced in September 1988, tours for service personnel assigned to Panama after 1 March 1989 were trimmed by six to nine months.

Early in 1989 General Noriega's PDF began a campaign of harassment, detention, and beatings of American dependents, servicemen, and civilian employees following Noriega's indictment by federal grand juries in Florida on several counts of drug trafficking. In March 1989 Americans recorded fifty-seven incidents of harassment and ninety-one violations of American treaty rights. Anti-American incidents by Noriega's forces grew in number and virulence with the approach of the May elections, and American officials in Washington and Panama debated several courses of action. The evacuation of American dependents was held in abeyance, but DOD also deferred redeploying any augmentation forces in Panama until after the election. To improve security, USARSO delegated guard and detail activities to Army combat support and combat service support units and kept combat units in a ready reaction status.

The election resulted in the defeat of Noriega's candidates by pro-democratic opposition candidates, but Noriega immediately nullified the election and denied the victory to the legitimate winner, Guillermo Endera. In the crackdown that followed, many of the duly elected opposition candidates were arrested, and some were tortured. On 11 May 1989, as civil unrest intensified, President Bush ordered American military forces to Panama as part of Operation NIMROD DANCER. The Army deployed a brigade headquarters and the 2d Battalion of the 9th Infantry, 7th Infantry Division (Light), from Fort Ord, California, and the 1st Battalion, 61st Infantry, 5th Infantry Division (Mechanized) (subsequently redesignated 5th Battalion, 6th Infantry) from Fort Polk, Louisiana, together with supporting elements. In subsequent rotations the 4th Battalion (Mech), 61st Infantry, replaced the 1st Battalion, 61st Infantry, and the 1st Battalion, 9th Infantry, replaced the 2d Battalion, 9th Infantry.

All Army units that deployed to Panama came under the control of JTF–Panama. JTF–Panama created three subordinate task forces. The task force under the 7th Infantry Division (LID) brigade commander was responsible for the Atlantic side of the canal area. The 193d Infantry Brigade assumed responsibility for the east bank of the canal on the Pacific side, while the Marine Corps company from Camp Le Jeune, South Carolina, assumed responsibility for the opposite bank on the Pacific side. Revised rules of engagement allowed reassertion of American treaty rights that the PDF had violated at will. Army units established roadblocks, conducted patrols, enhanced security at major installations, and carried out numerous joint exercises.

USSOUTHCOM conducted Operation BLADE JEWEL between 15 May and 1 July and moved from off-base to on-post housing or evacuated 6,300 DOD employees and dependents. At the end of FY 1989 the number of active Army and DA civilian dependents remaining in Panama was 6,128.

Panamanian violations were of particular concern to the Army, since it was executive agent for administration of the Panama Canal and the Canal Zone and responsible for oversight of the Panama Canal Treaty

Implementation Plan (TIP). General Vuono, in March 1989, requested a validation of Office of the Secretary of Defense (OSD) policy on Panama Treaty implementation. The OSD confirmed American policy for the total withdrawal from the Canal Zone in 1999 and reaffirmed the policy to retain adequate forces in Panama until that date. The Chief of Staff, through ODCSOPS, was responsible for executing the TIP. On 1 September 1989, the Under Secretary of the Army appointed the Assistant Secretary of the Army (Civil Works) (ASA[CW]), chairman of the Panama Canal commission, as the lead Secretariat official for oversight of the Panama Canal Treaty implementation.

In the waning months of FY 1989 the situation in Panama remained unchanged. A provisional government, headed by Francisco Rodriguos, was arbitrarily installed by General Noriega, who retained real political and military power. Noriega sought to turn regional opinion against the United States by alleging American violations of the Panama Canal Treaties, while President George Bush tried to wean the PDF from Noriega's control. On 2 October 1989, Noriega was able to quash a poorly organized coup, staged by a handful of dissident PDF officers, which the United States was reluctant to support. During FY 1989 the rapid deployment of Army forces and their operation in Panama constituted the most visible element of the administration's determination to protect American interests in Panama. Less visible, but equally prominent, was the Army's leading role within the joint military environment of planning for the military operations that would soon ensue in Panama. American military activities in Honduras again underscored the value of military forces to further American interests through security assistance programs. Approximately nine hundred Army personnel were stationed in Honduras at the start of FY 1989 as part of USSOUTHCOM's 1,200-man Joint Task Force–Bravo (JTF-B). Headquartered at Soto Cano AFB (formerly Palmerola), fifty miles northwest of the Honduran capital, Tegucigalpa, JTF-B provided active and reserve component units that deployed to Honduras for training through field exercises and other activities.

Active component units from the United States were rotated approximately every six months. The temporary duty (TDY) tour that Army units served in Honduras was not without risk. Five members of the 2d Battalion, 19th Aviation Regiment, XVIII Airborne Corps, from Fort Bragg, North Carolina, were killed 8 December 1988 when their CH–47 helicopter crashed upon landing near the town of La Ceiba. On 11 April 1989, an Army convoy of eleven vehicles, mostly from the North Dakota National Guard, was attacked in northern Honduras about 125 miles north of Tegucigalpa while on a routine supply mission. Six of the twenty-two American soldiers on the mission were injured. In Panama, on 15 June 1989, three servicemen were killed when the OH–58 helicopter that was escorting a convoy crashed. In June 1989 terrorists injured seven soldiers of the 549th MP Company, on TDY from Panama, who were in a local night club in violation of a dusk-to-dawn curfew.

In addition to several National Guard engineer units that were constructing a major road in Honduras, active component units conducted mountain and jungle warfare training in remote areas of northern Honduras. Among the Army units that undertook this training were the 2d Battalion, 22d Infantry, 10th Mountain Division, from Fort Drum, New York, and the 2d Battalion, 7th Special Forces Group, from Panama. Rules of engagement for units that trained in Honduras prohibited ground operations closer than five kilometers from the Nicaraguan border and restricted aircraft to flights outside a twenty-kilometer border buffer zone. Members of the joint task force also conducted extensive civic action. During 1988, for example, Army medical elements at Soto Cano AFB treated approximately 21,000 patients, immunized and gave dental care to several thousand natives, and provided veterinary treatment to more than 15,000 animals.

Middle East

Since April 1982 the U.S. Army has contributed a battalion-size task force to an approximately 3,000-man Multinational Force and Observers (MFO) mission, supported by eleven nations, in Egypt's Sinai Peninsula. Army battalions were rotated every six months and were drawn from one of four CONUS divisions: the 9th Infantry Division (Motorized), the 82d Airborne, the 101st Air Division (Air Assault), and the 7th Infantry Division (Light). On 23 March 1989, a 549-man task force comprising the 3d Battalion, 9th Infantry, 7th Infantry Division (Light), from Fort Ord, California, replaced the 1st Battalion, 187th Infantry, 101st Air Division, which returned to Fort Campbell, Kentucky. Near the end of FY 1989 a task force from the 2d Battalion, 505th Parachute Infantry Regiment, 82d Airborne Division, replaced the battalion from the 7th Division.

To maintain peace in this disputed region, Army units supported a buffer zone between Israeli and Egyptian forces. American units patrolled the southern sector of Zone C and maintained 24-hour surveillance of air, land, and sea traffic across an area stretching along the Gulf of Aqaba from the southern Israeli port of Eliat to the southern tip of the Sinai Peninsula. The main American base is at South Camp, twelve kilometers from the remote airstrip at Ras Nasrani on the Gulf of Aqaba. The American task force also manned 13 remote sites, 4 check points, 4 sector control centers, and 5 observation points (OP). Elements of the task force spend as long as twenty-one days at a remote site, followed by twenty-one days at South Camp. While there, soldiers perform one week of perimeter guard duty, a week as a quick reaction force, and then a week of rest and recuperation. During FY 1989 the Army task force located at the OP 3T in the vicinity of Taba, a previously disputed area at the northern end of the Gulf of Aqaba, was withdrawn after Egypt and Israel resolved outstanding territorial and property claims that required MFO presence.

As FY 1989 began, Army elements continued to support Operation SAFE PASSAGE, a Central Command operation to secure unmolested passage of commercial shipping through the Persian Gulf. In November 1988, as tensions in the area decreased, the number of Army OH–58D helicopters and M167A1 Vulcan air defense weapons that supported Task Force 118 was reduced. Army helicopter crews involved in the operation received deck landing and underwater survival training from the Navy. Army operations in support of Operation SAFE PASSAGE continued into FY 1989, with Army helicopters and air defense systems operating from the Navy's Mobile Sea Base *Hercules*, the frigate *Underwood*, and the destroyer *Conolly*. Since the cease-fire between Iran and Iraq and the reduction of the threat in the Persian Gulf to allied shipping, OH–58D operations primarily entailed night surveillance flights. Depending on maintenance requirements and ship scheduling, Army helicopters usually rotated from the mobile sea base and other combatant ships to a land base every seven to fourteen days. On 18 September 1989, an Army helicopter crashed during night gunnery practice and sank, but with no loss of personnel. With the inactivation of the Mobile Sea Base *Hercules* in September 1989, most Army helicopters and antiaircraft weapons were redeployed to the continental United States. As FY 1989 ended, five Army OH–58D helicopters remained in the Persian Gulf in support of operations.

Since 25 August 1987, Army personnel serving in the Persian Gulf have received imminent danger pay. Based on a recommendation by the Commander in Chief, U.S. Central Command (USCENTCOM), DOD terminated this special pay effective 1 April 1989, except for case-by-case exemptions.

Asia

In support of U.S. policy in Afghanistan, the Army in FY 1989 conducted mine-awareness and mine-clearing instruction for the anti-Communist resistance movement. Instruction was given in Pakistan by teams from the 5th Special Forces Group, and Army teams also provided mine-awareness training to several voluntary aid organizations.

At the start of FY 1989 DOD affirmed that 2,387 Americans were still unaccounted for in Southeast Asia; 702 of them were Army personnel. As Special Presidential Emissary, retired Army Vice Chief of Staff General John W. Vessey, Jr., headed U.S. efforts to resolve Hanoi's accounting for missing Americans and to discuss other bilateral humanitarian issues with the Socialist Republic of Vietnam (SRV). Late in FY 1988 the SRV and the United States agreed to allow a three-person Army team to participate in the joint recovery efforts on seventy unresolved prisoners of war/missing in action (POW/MIA) cases. The U.S. Army Central Identification Laboratory in Hawaii continued to identify remains released to the United States by the SRV. Fifty-four remains were identified during FY 1989, which left 2,333 Americans unaccounted for at the end of the fiscal year.

The Army believed that the likelihood of identifying physical remains in the future would be increased if each soldier obtained panographic dental x-rays, and a duplicate set was filed at the Central Panographic Storage Facility in Monterey, California. This requirement stemmed from a DOD policy instituted after the tragic air crash at Gander, Newfoundland, in December 1985 that killed 248 soldiers. By late March 1989 only 7 percent of Army personnel had not complied with this provision.

Security and Counterterrorism

Terrorism directed against Army personnel and Army assets during the past several years prompted the Army leadership to heighten individual awareness, to institute defensive measures, and to execute counterterrorism when necessary. The assassination of Col. James N. Rowe, an Army member of the Joint U.S. Military Group in the Philippines, by Philippine insurgents on 21 April 1989, underscored the dangers that Army personnel face overseas. The terrorist threat to the Army extended to the continental United States; it encompassed both personal security and the physical security of arms and ammunition. In FY 1986 the General Accounting Office (GAO) criticized the Army's physical security of arms and ammunition. That same year Congress passed the Omnibus Diplomatic Security and Antiterrorism Act, which charged DOD and other federal agencies to improve their security programs.

A major initiative was the Army's Combating Terrorism Program; it supported the service's Terrorism Counteraction Improvement Plan (TCIP) and other Army initiatives and DOD and national programs. By the start of FY 1988 all Army security responsibilities, to include law enforcement, were transferred from ODCSPER to ODCSOPS. In FY 1988 DOD made the Army DOD's Coordinating Agent for security in the National Capital Region, and the Commander of the Military District of Washington (MDW) was assigned to implement this task.

For FY 1989 the Army allocated $99 million for antiterrorist programs, which helped pay contract guards, purchase commercial warning and detection devices, and make communication equipment secure. During FY 1989 the Army continued to upgrade the security of ammunition bunkers, especially those with Stingers, Redeyes, and TOWs, and also chemical storage facilities. For weapons such as the Stinger, Congress directed the Army to demonstrate and test electronic interlock safety devices that could be installed or retrofitted on the basic and Reprogrammable Microprocessor (RMP) Stinger missiles. Congress also allocated funds to construct physical and personnel security at several Army installations. The AMC's Field Fort and Barrier Team neared the final stage of development of an easily deployable tactical force protection package that consisted of sensors, alarms, closed circuit television, night-vision goggles, and other equipment for units deploying to areas where the terrorist threat was high.

As the Army's proponent for awareness and counterterrorist training and doctrine, TRADOC was developing appropriate training for enlisted and officer courses. Nine specialized training courses were conducted during FY 1989 and addressed subjects such as intelligence, evasive driving for senior officers' drivers, and hostage negotiations. The Army Antiterrorism Operations and Intelligence Cell (ATOIC), located in the Army Operations Center (AOC), had an around-the-clock capability to analyze information and make recommendations regarding potential terrorist threats. It prepared an Army Force Protection Message sent daily to MACOMs and other agencies that summarized key intelligence and operational terrorist information affecting the Army.

Assistance to Civil Authorities

Following the outbreak of widespread fires in Yellowstone National Park in the summer of 1988, some twenty-four hundred Army troops from the 9th Infantry Division (Motorized), Fort Lewis, Washington, assisted local, state, and national authorities in controlling the fires. Approximately eighteen hundred additional soldiers from the 9th were dispatched in mid-September to squelch fires in Canyon Creek, north of Helena, Montana. Participating Army personnel, about five thousand, were awarded the Humanitarian Service Medal (HSM). When forest fires erupted in many western states in the summer of 1989, Army units again were assigned to fire-fighting duties. Troops from Forts Carson, Campbell, Lewis, Polk, and Riley battled fires and performed mop-up operations in the Payette and Boise National Forests in Idaho. In late July 1989 FORSCOM asked Fort Riley for a 550-man task force composed mainly of the 55th Engineer Company (Medium Girder Bridge) and a command and control element from the 4th Battalion, 37th Armor, that served until 19 August 1989. The I Corps, Fort Lewis, Washington, furnished two 500-man battalion task forces of engineer and aviation elements to assist the Boise Interagency Fire Center in the vicinity of Baker, Oregon, for about a week.

The Army furnished a number of helicopters to provide mobility and medical evacuation. Aviation units that deployed came under the operational control of Sixth U.S. Army, Presidio of San Francisco, California, and were detailed to the Boise Interagency Fire Center. The major aviation force came from Fort Campbell, Kentucky, and consisted of 16 UH–60 Black Hawk and 3 UH–1 Huey helicopters with 160 crew members and support personnel. The UH–60s self-deployed, but the UH–1s were ferried aboard an Air Force C–5 transport. Redeployment was carried out in the same manner at the end of August. Smaller detachments were sent from Fort Carson (3 UH–1s for command and control), from Fort Lewis (3 UH–60s and 2 UH–1s for medical evacuation), and from Fort Polk (3 UH–60s for medevac).

Between 17 and 22 September 1989, Hurricane Hugo struck the U.S. Virgin Islands, Puerto Rico, and portions of North and South Carolina and caused massive destruction. Acting as the DOD executive agent for military support, the Secretary of the Army, in coordination with the Federal Emergency Management Agency (FEMA), established a joint task force on 20 September. Upon the issuance of presidential disaster declarations, the Commander in Chief, Atlantic Command, was designated action agent for DOD support in the Caribbean, and the Commander in Chief, Forces Command, was given responsibility for the continental United States.

On St. Croix, the Virgin Islands, public services were disrupted, and civil order broke down. Task Force 140, some 1,235 soldiers who deployed as part of FORSCOM's Operation HAWKEYE, assisted federal authorities in maintaining law and order and rendered medical and other assistance. Among the first units to arrive from the United States were elements of the 16th MP Brigade, the 503d MP Battalion, and a command element from XVIII Airborne Corps, all from Fort Bragg, North Carolina. They were joined by the 720th MP Battalion, which consisted of the 258th MP Company from Fort Polk, Louisiana; the 410th and 411th MP Companies from Fort Hood, Texas; and the 463d MP Company of Fort Leonard Wood, Missouri. Prohibited from enforcing civil law on St. Croix, a U.S. protectorate, military police detained criminal suspects for possible arrest by Federal Bureau of Investigation (FBI) agents, U.S. marshals, or Virgin Island police. Members of the 20th Engineer Brigade from Fort Bragg helped repair two prisons, removed debris, restored electrical power, and undertook minor repair and construction projects.

Support for TF 140 included elements of the 1st Corps Support Command (COSCOM), also from Fort Bragg, and the 46th Support Group. This support included detachments from the 516th Military Intelligence Battalion, the 50th Signal Battalion, the 27th Engineer Battalion, the 407th Composite Support Battalion, the 49th Public Affairs Detachment, and the 4th Psychological Operations Battalion. Medical support was provided by the 109th Medical Evacuation Hospital, Alabama National Guard, which established a forty-bed medical care facility on St. Croix, and two medical teams from the 36th Medical Company, Fort Bragg. Communications specialists from the 7th Signal Command, Fort Ritchie, Maryland, helped restore commercial telephone service on the islands. The Army also provided 106 electrical generators, a portable airport control tower, a laundry unit, water purification units, 81 vehicles, 3 OH–58C helicopters, and 200,000 meals, ready to eat (MRE). Offshore, the USS *Pensacola* generated 30,000 additional gallons of potable water to refill reservoirs. In Puerto Rico, approximately twenty-eight hundred guardsmen were activated to aid in clean-up and recovery operations, assisted by a ten-member Corps of Engineer debris removal team. Approximately forty-seven hundred uniformed personnel from all services participated in relief operations in the Caribbean.

On 26 September CINCFORSCOM began disaster relief operations in North and South Carolina. Nearly two thousand soldiers and Army civilians, together with 640 vehicles and 12 aircraft, were committed to relief operations in South Carolina. All active component units that operated in South Carolina were controlled by a brigade headquarters of the 24th Infantry Division (Mech), Fort Stewart, Georgia. Participating in the relief operation were the 43d Engineer Battalion (Combat) (Heavy), Fort Benning, Georgia; the 92d Engineer Battalion (Combat) (Heavy), the 3d Engineer Battalion (Divisional); and the 260th Quartermaster Battalion. These units removed fallen trees and debris, repaired roads, and undertook limited construction in Charleston, South Carolina. The Corps of Engineers moved survey boats into Charleston Harbor and put other equipment on standby to ensure the safe passage of vessels in and out of the harbor.

A bridging element of the 3d Engineer Battalion, Fort Stewart, assembled rafts and operated a ferry between Charleston and two isolated barrier islands. Later, forty-eight members of the 329th Transportation Battalion, Forts Eustis and Story, Virginia, arrived with four landing craft, each capable of transporting twelve cars or two hundred people. The 3d Battalion, 15th Infantry, from Fort Stewart, operated a central warehouse and eighteen distribution centers to receive, store, and issue supplies in the area. The 533d Transportation Company, Fort Benning, Georgia, provided twenty-one twenty-ton tractors and thirty-eight trailers. Military police and signal elements of the 24th Infantry Division were assigned to the 3d Battalion, 24th Aviation Brigade, to provide security and traffic control and communications support. Active component forces were augmented by almost thirty-three hundred South Carolina guardsmen. Recovery operations in North Carolina and other mid-Atlantic states were less demanding than in South Carolina. Approximately seven hundred North Carolina guardsmen performed debris removal, traffic control, and security operations, primarily in Charlotte. Forty Virginia and fifteen Delaware guardsmen were mobilized. Army relief efforts in areas struck by Hugo continued for several weeks into FY 1990. In Georgia and North and South Carolina, Corps of Engineers survey teams assessed beach erosion and other storm damage.

Following an eleven million–gallon oil spill caused by the rupture of the Exxon tanker *Valdez* on 24 March 1989 in Prince William Sound, Alaska, President Bush directed DOD to support the massive cleanup. Active and reserve component Army personnel participated along with personnel from other military and federal agencies, state authorities, and commercial enterprises. By mid-June the number of military personnel involved in the effort reached a high of 1,413. The U.S. Coast Guard (USCG) served as the Federal On-Scene Coordinator (FOSC). Military authorities in Alaska had drawn up plans to assist civil authorities in disaster relief that called for activation of Joint Task Force–Alaska (JTF-AK) under the Alaskan Air Command. The Secretary of Defense, however, established a special Alaska Oil Spill Joint Task Force (AOS-JTF) staffed by personnel from the Alaskan Air Command and the 6th Infantry Division (Light). Rather than reporting through the chain of command to the JCS as would have been the case with JTF-AK, the AOS-JTF reported directly to the Army's Directorate of Military Support (DOMS) in ODCSOPS. This arrangement recognized the Army's role as DOD's executive agent for military support to civil authorities. On 6 April the Army activated its DOMS task force in the Army Operations Center. In Alaska, the DOD effort was headed by the commander of the Alaskan Air Command and the newly activated AOS-JTF. The Coast Guard retained authority to assign missions to the AOS-JTF.

Army cleanup efforts began on 24 March when the 207th Aviation Regiment (Army National Guard) began air support with a helicopter and fixed-wing aircraft. The Alaska Army National Guard (AKARNG), under state control, created an air coordination and control center at Valdez, Alaska, to control the heavy air traffic that was using the small airfield there. Guardsmen provided an aerial port team to load and unload civilian and military aircraft along with radios, helicopters, and fixed-wing aircraft. The AOS-JTF organized a DOD Assessment Team on 9 April at Elmendorf AFB, Alaska. This team included Army engineer and medical specialists and the DOMS. The team assessed damages and served as the JTF's coordinating staff. A smaller team was dispatched to Valdez for direct liaison with the USCG and Exxon. Three crisis action teams (CATs) monitored the situation around the clock and, at one point, controlled military units. Following the DOD Assessment Team's initial surveys, a variety of military assistance was furnished. Requests for DOD assistance that could not be satisfied locally were referred to the Army's DOMS and ranged from opening facilities in Alaska to accommodate the decontamination of wildlife to the provision of Army UH–60A Black Hawk helicopters to support search and rescue and medical evacuation operations.

Two Army dredges, the *Yaquina* and *Essayons*, berthed in Oregon when the spill occurred, were transferred by the Corps of Engineers to the Alaska District to conduct oil-skimming operations. The *Yaquina* arrived in Alaska on 19 April; the *Essayons* two days later. The resourceful dredge crews perfected new techniques that enabled the craft to recover several hundred thousand gallons of oil. The dredges, with their sophisticated communications equipment, coordinated the activities of numerous smaller vessels operating in Prince William Sound.

The Army also contributed landing craft and decontamination units, some of them from Army Reserve and National Guard units in Alaska, California, and Washington. Army engineers, medical personnel, public affairs officers, and logisticians were detailed to support the AOS-JTF. With the onset of winter weather, all DOD assistance was suspended on 15 September. The value of DOD's assistance in the cleanup totaled about $58.7 million, of which nearly $15 million derived from the Army. On 28 September the Army inactivated the DOMS-TF.

In the wake of a train disaster at Ufa in the Soviet Union on 3 June 1989, Soviet officials requested American assistance in treating burn victims. The Army deployed a burn team from the Institute of Surgical Research, U.S. Army Medical Research and Development Command, on 10 June that consisted of about twenty medical personnel, several translators, and a C–141. The Army team was responsible for direct care to approximately ninety moderate to severely burned patients, and it performed twenty-six major surgical procedures. On 16 June, after a team of volunteer doctors departed, the Army team assumed the care of thirteen children, some in critical condition. Most of the Army team redeployed on 25 June, but four members stayed at Ufa until 30 June to render postoperative care. More than twenty-three thousand pounds of medical supplies were consumed during the mission, and some Army medical equipment was left behind to ensure patient survival. The U.S. Deputy Ambassador in Moscow described the mission as historically important with far-reaching implications for U.S.-Soviet relations. Throughout their stay at Ufa the team received highly favorable local media coverage and widespread public gratitude.

In response to a devastating earthquake at Yerevan, Armenia, in December 1988, USAREUR provided medical supplies to assist the civilian population and cold weather gear and rations to support a British rescue team. Stressing their priorities for rescue equipment and medical supplies, Soviet officials insisted that no U.S. military personnel were required in Armenia.

Civil Works

With a program of more than $3 billion for civil works projects, in addition to its military engineering and construction and support for other agencies, the U.S. Army Corps of Engineers is the largest water resources development and management agency in the federal government. The Secretary of the Army relies on the Assistant Secretary of the Army (Civil Works) to direct and supervise the Corps of Engineers Civil Works Program. Under the Assistant Secretary's supervision, the Commanding General, U.S. Army Corps of Engineers, and the Director of Civil Works are responsible for conducting the Army's water resources program. In FY 1989 the Corps employed the equivalent of 28,181 full-time employees to carry out the Civil Works Program. In addition, approximately 275 Army engineer officers were assigned to support civil works. The Corps of Engineers is organized into a headquarters in Washington, D.C., thirteen divisions, and under them thirty-eight districts. During FY 1989 eleven divisions and thirty-six districts had a civil works mission.

The Civil Works Program consists of congressionally mandated planning, design, construction, and operation and maintenance of water resources projects pertaining to navigation, flood control, shore and hurricane protection, fish and wildlife restoration, hydroelectric power, municipal and industrial water supply, and recreation. It also regulates construction, dredging, and fill operations done by others in the nation's waterways and wetlands. In addition, the program encompasses emergency operations, research and development, and Army mobilization construction planning. As part of its Civil Works mission, the Department of the Army also carries out reimbursable engineering work for other federal agencies, such as the cleanup of toxic waste areas for the Environmental Protection Agency's "Superfund" program.

The Corps of Engineers' numerous navigation and flood control projects serve many purposes. In FY 1989 the Corps produced nearly 30 percent of the nation's hydropower, or 3.5 percent of the total electric energy, with 20,000 megawatts of generating capacity at seventy locations. During FY 1989 the Corps generated 72 billion kilowatt hours of electricity and returned $414 million to the U.S. Treasury. One hundred fifteen Corps lakes stored 275.2 million acre-feet of water for agricultural, municipal, and industrial use. Under cost-sharing provisions of Public Law 99–662, the Department of the Army entered into twenty-two Local Cooperation Agreements during FY 1989 that enabled local communities to avail themselves of the benefits of Corps water resources projects.

In addition to the economic development benefits the Civil Works Program afforded the nation, it also supported the Army by providing a trained workforce experienced in large-scale engineering and construction management disciplines. In FY 1989 Corps personnel, drawn largely from the Civil Works mission area, helped clean up the Exxon *Valdez* oil spill in Alaska, assisted in evacuation planning and emergency response efforts in connection with Hurricane Hugo in the eastern Caribbean islands and the Carolinas, and provided emergency water assistance to drought-stricken communities in California, the Southwestern states, and the Missouri River Basin.

The largest element in the Civil Works FY 1989 $3.376 billion appropriation was the $1.370 billion operations and maintenance account—a slight decrease from the FY 1988 amount. This account supported much of the Corps' efforts to relieve drought-stricken areas west of the Mississippi River. As the drought of 1988—one of the worst this century—continued into 1989, many relief measures initiated by the Corps in 1988 were carried into the current fiscal year. Channel restrictions, such as slower speeds, light loading, smaller tows, and one-way traffic, were either imposed on waterways or voluntarily adopted by shippers to ensure the movement of commercial navigation during low-water periods. As many as five dredges were used to open channels in drought-stricken areas. Boat ramp extensions installed at Corps lakes and reservoir projects to conserve water and minimize the effects of the drought also were continued.

During FY 1989 the Corps operated and maintained 191 lock and dam sites, including 236 lock chambers; dredged navigation channels at approximately 400 ports; and performed maintenance activities at 382 of the 884 harbor projects within the United States and its territories. Commercial shippers were assessed approximately $159 million in fees for the use of federal ports during FY 1989, the fees being applied to the Harbor Maintenance Trust Fund and used to recover a portion of the costs of maintaining federal harbors. The fund was established by the Harbor Maintenance Revenue Act of 1986.

Income from certain other fees and rents has been permanently appropriated by Congress to cover specific Corps activities. Among these are half the license fees levied by the Department of Energy (DOE) for private construction, operation, and maintenance of hydropower facilities and all license fees collected by DOE for federal headwaters improvement. These are used to operate and maintain navigation structures. Three-fourths of the income derived from the lease of land on Corps flood control and navigation projects was returned to the state in which the project is located to fund public schools, roads, and other local government expenses. Fees paid by mine operators in the Sacramento and San Joaquin basins in California were used to maintain mine debris–retaining works. The total allocation of funds from these permanent appropriations in FY 1989 was $10.5 million.

The second largest Civil Works appropriation account in FY 1989 was the $1.179 billion "construction, general" account, a slight decrease of $20 million from FY 1988. Approximately $67 million of the appropriation from this account was derived from the Inland Waterways Trust Fund. The largest allocations of construction funds went to the Red River Waterway navigation project in Louisiana ($118 million); the Levisa and Tug Forks of the Big Sandy and Upper Cumberland River flood control project in West Virginia, Virginia, and Kentucky; the Bonneville Navigation Lock on the Columbia River in Oregon and Washington; and the Robert C. Byrd Locks and Dam on the Ohio River in West Virginia and Ohio. In all, construction continued on 159 projects during FY 1989. Twenty projects were completed and no new construction was started during the fiscal year.

Under a separate appropriations account, "Mississippi River and Tributaries," the Corps continued work on its long-standing program of flood control and resource development on the Mississippi River and its tributaries below Cairo, Illinois. This program was funded at $338 million in FY 1989 and continued to support the study, construction, and operation and maintenance of various water activities for water resources development in the Lower Mississippi Valley.

Portions of the Army Civil Works Program were supported by several other appropriation accounts. Under the "General Investigations" account ($142.4 million) the Corps initiated fifty-one survey studies and preconstruction engineering and design activities for forty-six projects during FY 1989. Work was performed on 320 studies, the cost of 55 being shared between the Army and state governments. In addition, 152 preconstruction engineering and design projects were under way. The General Investigations account also supported the Construction Productivity Advancement Research Program, which completed its first full year of operation in FY 1989. Through industry-government cost-shared studies, the program sought to lower the cost and increase the efficiency of the Corps' construction program and benefit the construction industry. FY 1989 was also the first year of the Corps' new concurrent review process, by which the Corps sought to significantly expedite its project review process.

Other aspects of the Civil Works Program were underwritten by the "Regulatory Program" ($63.8 million) and the "General Expenses" account ($122.6 million). The latter provided for the executive direction and management of the overall Civil Works Program through the Department of the Army and Corps headquarters and the eleven division offices. The FY 1989 appropriation of $20 million for the "Flood Control and Coastal Emergencies" account supported emergency preparedness, flood-fighting and rescue operations, and the repair of flood control and shore protection works damaged by floods or hurricanes. It also furnished emergency supplies and clean water where sources became contaminated and, in drought-distressed areas, provided adequate supplies of water for human and livestock consumption.

Drug Interdiction and Enforcement

In FY 1989 Congress made DOD the lead federal agency for detection of aerial and maritime transit of illegal drugs into the United States and for integration of related federal command, control, communications, and intelligence assets. Congress authorized $300 million for the fiscal year for DOD, of which $60 million was set aside for National Guard drug interdiction and enforcement that was in addition to its normal annual training requirements. Because it perceived DOD as reluctant to commit military resources to this effort, Congress noted that its FY 1989 authorization was seed money for a larger DOD role in the antidrug effort that was also consistent with combat readiness. According to the recommendations of its Task Force on Drug Enforcement, DOD allocated only $40 million to the Army and Air National Guard for state and federal enforcement, $60 million for a national communications network, $130 million for a new airborne radar system, and smaller amounts for current DOD efforts that included research and development.

Congress amended the Posse Comitatus Law (Chapter 18, Title 10 U.S. Code) in 1981 and authorized DOD to support civilian law enforcement agencies in countering illegal drug trafficking. Earlier statutory constraints, combined with long-held tradition, barred the armed services from exercising domestic police powers. The Army provided full-time support to several national policy-making bodies. An Army officer was assigned to the National Drug Policy Board and the Drug Enforcement Administration (DEA), while an officer and seven NCOs served with the Office of the Vice President's National Narcotics Border Interdiction System. In addition, the Army assigned liaison officers to the Coast Guard, the DEA, the Customs Service, and the Immigration and Naturalization Service, as well as to state and local authorities and several foreign governments.

The Anti–Drug Abuse Act of 1988 waived the prohibition to train foreign law enforcement personnel specifically engaged in narcotics enforcement. Funds were authorized for deployment of U.S. Army mobile training teams (MTT) to support narcotics control and interdiction efforts in Latin America and the Caribbean. MTTs from the Special Operations Command taught military skills and techniques to local police in Bolivia, Colombia, and Peru, as well as to DEA agents working in those countries. The Army has lent thirty-seven aircraft to other federal agencies, as well as night-vision equipment, communications equipment, ground surveillance radar, wheeled vehicles, and weapons. Army National Guard elements from twenty-nine states executed 370 support missions that involved 2,237 personnel for 3,478 man-days under state jurisdiction. The active Army was the principal trainer for federal and state drug law enforcement agencies in the United States. During FY 1989 Ranger Training Brigade instruction at Fort Benning trained federal drug enforcement agents in operational tactics and survival techniques, and DEA agents received training at Army jungle training facilities in Panama.

When operating under state jurisdiction, ARNG personnel can exercise police powers that are proscribed to active duty forces in the performance of interdiction and enforcement activities. Limited largely to annual training before 1988 because of funding restrictions, the ARNG's antidrug role was widened in FY 1989. Nevertheless, the Army has reviewed and monitored state plans to ensure that ARNG antidrug efforts are compatible with military training and that they do not overly detract from the ARNG's mobilization responsibilities. The International Narcotics Control Act of 1989 (Public Law 101–231) revised the Foreign Assistance Act of 1961 and allowed the transfer of excess defense equipment to Latin American nations. A primary purpose was to encourage military forces of eligible countries to assist local law enforcement agencies in comprehensive national antinarcotics programs. Countries eligible for this assistance were Belize, Bolivia, Brazil, Colombia, Ecuador, Jamaica, Mexico, Paraguay, and Peru.

On 21 August 1989, the President issued National Security Directive 18, which established a strategy for antidrug efforts in the Andean region of South America. It focused on support through training indigenous government personnel and armed forces. It also entailed the supply of $65 million worth of military equipment under the authority of a Presidential Determination on 25 August. This policy directed the Army to provide Colombia with $25.6 million in equipment that included UH–1H helicopters, mines, grenades, ammunition, and 2.75-inch rockets from existing stocks.

On 5 September 1989, President Bush unveiled the National Strategy for the War on Drugs, prepared by William Bennett, who headed the interagency effort. The Bennett Plan envisioned an expanded role in the antidrug war for DOD, and on 18 September the Secretary of Defense released DOD's guidance for implementation of the President's strategy. It directed the military departments and the commanders of unified and specified commands to prepare implementing plans. On 22 September General Vuono indicated that the Army was prepared to employ its assets in the national drug war. This included reduction of demand, interdiction, and aiding foreign countries with training, reconnaissance, command and control, planning, and logistics support. General Vuono was concerned that some antidrug tasks unrelated to wartime missions might detract from priority training needs.

Bennett also proposed using Army detention facilities to confine civilian drug dealers because of overcrowded federal, state, and local prisons. The armed services doubted whether military stockades were sufficiently secure by civilian prison standards. At the direction of the Deputy Assistant Secretary of Defense for Drug Policy and Enforcement, the Army identified prison space excess to the FY 1988 average daily prisoner population at five posts—Forts Polk, Hood, Riley, Gordon, and Campbell. Space available at these posts, according to the Assistant Secretary of the Army for Manpower and Reserve Affairs, represented 672 spaces of the original requirement for 1,372 stipulated by DOD from all services. An additional 700 minimum security spaces were available at more remote installations such as Camp Pickett, Virginia; North Fort Polk, Louisiana; and Fort Indiantown Gap, Pennsylvania. Army officials preferred that drug offenders be held at less populous Army installations. No steps were taken in FY 1989 to use the facilities that the Army had identified. However, the Installation Detention Facility (IDF) at Fort Dix, New Jersey, was leased to the state of New Jersey until the end of May 1989. Discussions regarding the state's continued use of this IDF were related to the Army's long-range plans to modernize its corrections system. This effort was guided by a study, "Army Corrections into the Year 2000 (ACS 2000)," which foresaw a significant role for Fort Dix's IDF as a diagnostic, reception, and transportation center and as an Army detention facility.

Army Safety Issues

The Army Safety Program ended FY 1989 with reductions in nearly every category of vehicular and training accidents and fatalities. Accidents and fatalities that involved privately owned vehicles (POVs) also reached a record low since the Army Safety Center began keeping statistics in 1975. Army motor vehicle accidents also attained the lowest number ever recorded. A disturbing note was the extensive failure of Army personnel to use safety belts. An analysis of Army POV accidents in FY 1988 suggested that two out of three deaths might have been prevented if the victims had worn their safety belts. The new Army Driver Improvement Program introduced in FY 1989 sought to encourage more stringent enforcement of Army safety regulations by installations.

Nonaviation training accidents in FY 1989 also reached their lowest number since 1980, which was attributed to strong command emphasis on vehicular safety. Even greater reduction was expected after completion of the Tank-Automotive Command's program to install seat belts in all 2 1/2- and 5-ton trucks and other tactical vehicles. This program began in May

1989 and was slated for completion in FY 1990. The number of civilian injuries that resulted in lost time from work declined slightly in FY 1989, but the Army's rate of 24.38 per 1,000 employees was above the goal of 24.08. The cost to the Army for worker's compensation in FY 1989 was $130.7 million.

The number of class A Army aviation accidents in FY 1989 was thirty-two, identical to FY 1988. Because of a decrease in flying hours, the rate (accidents per 100,000 flying hours) was slightly higher in FY 1989 (1.90) than FY 1988 (1.86). The class A–C accident rate of 7.42 in FY 1989 increased from the previous year's rate of 4.82. The Army's loss in warfighting capability, measured in dollars, was substantial in FY 1989 and was exacerbated by the damage or loss of aircraft from violent spring storms.

A persistent Army aviation safety issue in FY 1989 was the efficacy of night-vision goggles used by Army helicopter pilots. Several recent helicopter crashes suggested that distorted optical vision caused by night-vision goggles contributed to the accidents. Most helicopter pilots felt confident using the AN/PVS–5 night-vision goggles, but congressional critics and some aviation safety experts believed the goggles prevented pilots from distinguishing hazards in low ambient light. The Army's Center for Night Vision and Electro-Optics, Fort Belvoir, Virginia, explored possible improvements. A mid-air crash at night between an OH–58 Kiowa and AH–1 Cobra at Fort Ord, California, on 1 February 1989, in which both pilots were wearing night-vision goggles, imparted a sense of urgency to a congressional investigation. In March 1989 the Army evaluated all AN/PVS–5A–C series goggles and the AN/AVS–6 aviator night-vision imaging system (ANVIS), the replacement for the AN/PVS–5 series goggles. The Office of Testing and Evaluation (OTE), OSD, conducted its own evaluation of the Army's testing of its night-vision goggles and training of helicopter crews. In its report to Congress in June 1989, OTE found no fault with the Army's testing and training for the AN/PVS–5 and AN/AVS–6. OTE recommended a joint working group for night-vision devices to establish common training standards and the exchange of information.

The Army was evaluating other night flight safety equipment that ranged from new helmets to improved radar. Romeo, a new avoidance radar for use in AH–1 Cobras and AH–64 Apaches, may provide the ability to detect power cables, trees, and other terrain obstacles. The vulnerability of Apache and Black Hawk helicopters to electromagnetic interference from sources such as high-tension power lines was another safety concern. This type of interference was believed to have caused the crash of an Army helicopter in Germany by registering false instrument readings. The Army and DOD have disagreed about the cost and effectiveness of corrective measures. As an interim corrective, the Army applied metallic paint as a shield for the Apache's electronic components. The Army Aviation Systems Command (AVSCOM) was considering installing protective pods, pending the completion of tests at the Vulnerability Assessment Laboratory in White Sands, New Mexico.

Mechanical problems, particularly on older helicopters, caused the Army to ground several aircraft during FYs 1988 and 1989. The Army grounded its entire Chinook CH–47D heavy-lift transport helicopter fleet following the crash of a CH–47D in Honduras in December 1988. The helicopter went out of control when a fire destroyed its control rods. The Army took corrective measures to protect these rods. All CH–47D helicopters with Dash 3 oil cooler fans were grounded again at the end of July 1989. A subsequent grounding of the entire 245 CH–47D fleet occurred on 10 August 1989, following a crash of a CH–47D at Fort Campbell, Kentucky, in late July. The fire that caused the crash was traced to a Dash 4 oil cooler fan that had been modified to correct the conditions that had led to the earlier grounding of the CH–47D. The grounding did not affect other Chinook models, and safety modifications were being incorporated in the upgrading of 144 CH–47A, B, and C models to the CH–47D. In another example, AVSCOM grounded approximately thirty-four hundred UH–1 Huey helicopters for inspection in July 1989 after cracks were discovered in the universal control lever.

Throughout FY 1989 the Army engaged in a series of remedial measures that addressed both immediate safety concerns and upgrading the AH–64 Apache aircraft. Among its failings were debonding of the main rotor blades, failure of the shaft-driven compressor, elastomeric bearing debonding in the tail rotor, chafing of hydraulic hoses, and random failures of the ammunition feed of the Apache's 30-mm. gun. Corrective actions included work performed by maintenance contract teams in the field and by contractor depot teams and modifications made during production. This effort was supervised by representatives from the Aviation Systems Command, the McDonnell Douglas Helicopter Company, and the Apache Program Manager. A general officer steering committee, with membership from the Army Aviation Center, the Army Safety Center, AVSCOM, the Apache Program Manager, and HQDA, reviewed the team's work to ensure an early resolution of the Apache's problems.

Conclusion

While continuing to man forward-deployed positions in Europe and Korea, other Army elements engaged in contingency, peacekeeping, security assistance, counterterrorism, drug interdiction, and disaster and humanitarian relief operations throughout the world. Growing political unrest in Panama in FY 1989 prompted the Army to enlarge its presence there. Elsewhere in Latin America the Army took an active role in security assistance programs. Through a variety of civic action and other assistance, elements of both the Army's active and reserve components contributed to nation-building in the region. Other Army elements supported national drug interdiction programs in the Americas. As peacekeepers, the Army continued to contribute a battalion to the Multinational Force and Observers mission in support of the United Nations' peacekeeping mission in the Sinai Peninsula. In its time-honored tradition of assisting civil authorities, the Army played significant roles in fighting forest fires in the West, in aiding federal and state agencies in preserving order and restoring vital services in the wake of Hurricane Hugo, and in serving as part of DOD's joint task force that helped contain and clean up a massive oil spill in the vicinity of Valdez, Alaska. Under its Civil Works mission, the Army executed the nation's largest water resources management and development program. While pursuing vigorous programs to ensure the security and safety of its forces, Army operations in FY 1989 attested to the versatility and professionalism of the Army.

7

Manpower

Strength and Demographics

The active component entered FY 1989 with an authorized strength of 771,800, or 8,800 fewer than FY 1988. Actual strength at the start of FY 1989 was 769,369, and that figure was 769,741 at year's end. It consisted of 106,877 officers, 658,321 enlisted personnel, and 4,543 cadets. The Army's operating strength at the end of FY 1989 was approximately 770,000, a decline of 7,000 from the previous year's operating strength. Of a total DOD active uniformed strength of 2,130,229 at the end of FY 1989, the Army constituted approximately 36 percent. The Army's strength in FY 1989 was its lowest post–World War II strength since the start of the Korean War. At the end of FY 1989, 679,207, or 89.5 percent of the active component, was male: 584,024 enlisted and 94,680 officers. Female soldiers numbered 86,494, or 10.5 percent of the Army's strength, with 74,297 enlisted personnel and 12,197 officers. Female strength at the end of FY 1989 was 2,722 greater than at the end of FY 1988, with the increase concentrated in the officer corps. Black active component strength was 212,157, or 27.64 percent of the force; blacks constituted 30.43 percent of enlisted personnel and 10.4 percent of the officer corps. Other minorities totaled 61,163, or 7.96 percent of the active Army, and 8.51 percent of enlisted personnel and 3.84 percent of the officer corps. The distribution of active component officers and enlisted personnel by grade at the end of FY 1989 is displayed in *Table 3*.

The educational level of the Army in FY 1989 reflected the service's success in attracting higher quality recruits. Only 1.6 percent of the enlisted force had not graduated from high school. Almost all officers had attended college; 95.2 percent had college degrees. In contrast, only 2.5 percent of enlisted personnel and 22.2 percent of warrant officers were college graduates. At the end of FY 1989, 75 percent of the officer corps and slightly less than 50 percent of all enlisted soldiers were married. More than 24,000 officers and 4,000 enlisted personnel had spouses who were also service members; 30,550 enlisted members and 2,676 officers were single parents. Total dependents (spouses, children, parents, and other adults) numbered 991,035 on 30 September 1989, or 2.51 per family unit.

TABLE 3—Active Duty Army Personnel by Grade
30 September 1989

Rank (Officers)	
General, O–10	13
Lieutenant General, O–9	42
Major General, O–8	146
Brigadier General, O–7	197
Colonel, O–6	4,242
Lieutenant Colonel, O–5	10,617
Major, O–4	17,055
Captain, O–3	33,586
1st Lieutenant, O–2	13,829
2d Lieutenant, O–1	11,886
Chief Warrant Officer, W–4	2,140
Chief Warrant Officer, W–3	3,919
Chief Warrant Officer, W–2	6,410
Warrant Officer, W–1	2,795
Total Officers	106,877
Rank (Enlisted)	
Sergeant Major, E–9	4,233
Master Sergeant, E–8	14,602
Sergeant, First Class, E–7	51,215
Staff Sgt, E–6	90,095
Sergeant, E–5	119,723
Corporal/Spec, E–4	184,679
Specialist, E–3	91,635
Private, E–2	51,684
Private, E–1	50,455
Total Enlisted	658,321
Cadets	4,543
Grand Total	769,741

Recruitment and Retention

The Army's ability to perform its strategic roles depended on the quality of its manpower and its capacity to recruit, train, and retain talented soldiers. During the 1980s the Army conducted a concerted campaign to increase the number of its personnel with high educational and mental aptitude levels. From the main pool of potential Army recruits (1.45 million 17- to 21-year-old males in the total population), in FY 1989 the Army hoped to recruit one of ten. Given the record low rate of unemployment in FY 1989, recruiters faced a daunting task to meet their goals. The Army's enlisted accession plan for FY 1989 called for recruitment of 111,700 non–prior-service (NPS) volunteers and 8,900 enlistments from those with prior service. The enlisted reenlistment goal was 88,000 (34,400 initial term, 25,400 mid-term, and 28,200 career reenlistments). For officers and warrant officers, the Army's accession goal was to commission 9,440 individuals to maintain the budgeted officer strength objective of 196,877.

The profile of Army enlistees, however, showed a marked increase in the late 1980s in the percentage of high quality recruits and a sharp decline in the percentage of enlistees who tested in the lowest acceptable mental category. Projections made early in FY 1989 by ODCSPER indicated that the pool of eligible enlistees would shrink to about a million men by 1994. If Army strength stayed stable, the Army would have to recruit one of eight eligible males. In FY 1989 the usual term of enlistment was three years, but the combat arms had a two-year enlistment option. Within this environment the Army recruiting goal for FY 1989 was set at 119,901. The Army also expected a 3 percent decline in the number of volunteers who were high school graduates and those who scored in Armed Forces Qualification Test (AFQT) Test Category I–IIIA, and an increase from 4 to 10 percent in Test Category IV.

During the first half of FY 1989 the Army experienced difficulty in attracting a sufficient number of high quality recruits. Among NPS enlistments there were declines in the percentage of high school graduates and test scores in AFQT categories I through III, and a small rise in Category IV. The total Delayed Entry Program (DEP) for FY 1989 was 15.7 percent lower than FY 1988, which diminished recruiting and training options for enlistees because of the pressure to accelerate DEP accessions. Continued economic expansion, a widening gap between civilian and military pay, and the elimination of tuition benefits for two-year enlistments contributed to the decline of high quality volunteers. In 1989 TRADOC, the RAND Corporation, and the Army Research Institute conducted several empirical research projects whose results demonstrated a strong relationship between high AFQT scores and performance.

In January 1989 recruiting contracts were 10 percent below force requirements, quality was declining, and the DEP had the smallest group of recruits in six years. To counter these adverse trends, the Army intensified its recruiting and reenlistment efforts and gave wide publicity to its enlistment incentives. The popular Montgomery GI Bill had a monthly participation rate of 90 to 95 percent. Other popular incentives included the Army College Fund (ACF), which offered selective bonuses that ranged from $8,000 to $14,000 above the basic GI Bill, the higher amounts pegged to longer enlistments. Enlistment bonuses (EB) were designed to attract persons with critical skills. Depending on the skill and length of enlistment, bonuses could vary from $1,500 to $8,000. Higher reenlistments enabled the Army in April 1989 to stop enlisting recruits who tested in Category IV.

The Army conducted several trial programs to boost recruitment of high school graduates in FY 1989. In March it initiated the Hometown Recruiter Assistance Program, which allowed outstanding enlisted soldiers to return to their hometown for two weeks to assist local recruiting efforts. Some monetary incentives were made available to recruits with one or two years of college, and an Early Shopper Bonus was offered to those who signed an enlistment contract by 31 May 1989. The Army continued to pursue legislative authority to test a two-year Army College Fund enlistment for noncombat arms MOS. Known as the "2+2+4 Enlistment term test," this option entailed two years' active training and commitment, followed by two years in a troop program unit in the USAR or ARNG, and the option of fulfilling the remaining four years in the Individual Ready Reserve (IRR). Pending legislative approval, the Army received OSD and congressional permission to test the concept. Beginning in July 1989, under a fifteen-month trial, the ACF enlistment option was extended to noncombat arms specialties to attract college-bound youths. Army recruiters credited it with attracting highly qualified recruits who might not have considered enlisting in the Army.

Despite the troublesome recruiting picture of early FY 1989, the Army attained its FY 1989 recruiting goals but with a slight decline in the quality of volunteers. The number of enlisted personnel accessioned in FY 1989 was 120,558, nearly 5,000 more than FY 1988. The percentage of both women and nonwhite volunteers also inched upward. (*See Tables 4 and 5.*)

The Army's recruiting success in FY 1989 was aided by an increase in the funds, $621.7 million for the fiscal year, that covered advertising, enlistment bonuses, recruiter support, military pay, and other recruitment-related costs. The Army's advertising budget attracted congressional concern because of the rapid growth of this cost during the early and mid-1980s. The Army emphasized the importance of advertising and attributed its success in recruitment in part to the positive image of the Army portrayed in advertising campaigns. In FY 1989 the Army introduced a new theme to buttress its recruiting efforts, one that stressed the benefits of Army service to future success in civilian life. Advertisements suggested that Army veterans earned more in the private sector than nonveterans and that soldierly qualities were highly valued by employers.

TABLE 4—Army Enlisted Accessions, FY 1988 and FY 1989, by Gender (in thousands)

	FY 1988			FY 1989		
	Male	Female	Total	Male	Female	Total
Non–Prior-Service:	91.3	14.3	105.6	95.5	16.2	111.7
Prior Service:			9.7			8.9
Total:			115.3			120.6
Objective NPS:	91.2	14.2	105.4	95.5	15.5	111.0
Objective PS:			9.6			8.9
Total Objective:			115.0			119.9
% of Objective NPS:	100	101	100	100	104	101
% of Objective PS:			101			100
% Total Objective:			100			101

Source: DOD/PA 585–89, 19 Dec 89.

TABLE 5—Enlisted Accessions, FY 1989, by Race (in thousands)

	FY 1988		FY 1989	
	Number	Percent	Number	Percent
White:	73.7	70	76.2	68
Black:	26.5	25	29.3	26
Other:	5.5	5	6.2	6
Total:	105.7	100	111.7	100

Source: DOD/PA, 585–89, 19 Dec 89.

Reenlistments enabled the Army to retain sufficient numbers of high quality and technically proficient soldiers to provide the experience and leadership needed for a professional career force. The Army leadership understood that soldiers and their families must have adequate compensation, quality of life benefits, and professional satisfaction comparable to civilians. In recent years the Army had succeeded in retaining high caliber volunteers even in the critical category of first-term reenlistments. Of the 119,997 soldiers eligible to reenlist in FY 1989, 74,716 reenlisted, for an unadjusted rate of 62.3 percent. First-term reenlistments reached a record high in FY 1989, totaling 42,911 out of an eligible 87,232, the highest number since FY 1982. At the outset of the fiscal year the Army had projected a requirement for 34,400 first-term reenlistments, about 10,000 more than in FY 1988. The Army's success in exceeding its first-term reenlistment goal helped offset the decline in NPS recruitment by allowing the service to accept fewer marginally qualified enlistees.

Career reenlistments, which had reached a record high unadjusted rate of 98.1 percent in FY 1988, dropped slightly to 97.1 percent in FY 1989; 31,805 career soldiers, out of 32,765 eligibles, reenlisted. The high number of career reenlistments was credited to better leadership by officers and NCOs and to greater command involvement in reenlistment programs. The high percentage of career reenlistments also allowed the Army to be more selective, especially with first-term reenlistments, which are traditionally the most difficult group to retain. The minimum "quality points" needed to reenlist (points that reflected civilian education, military test scores, and military training) was raised from 66 to 70 on a scale of 100.

The Army attributed the high rate of all reenlistments to several factors—job satisfaction, potential for advancement, and retirement benefits. Accelerated promotions for outstanding soldiers in the lower NCO ranks, an increase in the number of monthly promotions for NCOs, and selective reenlistment bonuses were important retention incentives. Of the Army's 368 job specialties, 102 were subject to some retention incentive. The Selected Reenlistment Bonus (SRB) and the Bonus Extension and Retraining (BEAR) programs offered junior and mid-level enlisted personnel in critical or understaffed MOSes monetary incentives to reenlist for three or more years.

During FY 1989 the Army tailored both the SRB and BEAR programs to increase selectively bonuses for various specialties. Bonuses were usually offered for a limited amount of time to induce reenlistment when recruitment rates fell. SRBs were increased in ninety-seven military specialties and reduced or removed in ten others. SRBs were offered for most combat skills and for a variety of maintenance, intelligence, and communication specialties. Because of a slowdown in promotions to E–4, SRBs were extended for the first time to two-year enlistees who had yet to be promoted above E–3, provided that they reenlisted for a second term. Bonuses under the BEAR program applied to only ten MOSes. Using a formula that combined basic pay, years of reenlistment, and skill multipliers, an individual could receive a $20,000 bonus. To attract experienced Special Forces NCOs, the Army agreed to reinstate qualified E–6s and E–7s to active duty without loss of rank within three years of their retirement.

Nonmonetary incentives for reenlistments available to the Army included allowing certain soldiers to serve a second consecutive tour at one station, retraining into an underpopulated MOS to enhance career advancement, and reassignment to a location of choice where a valid vacancy existed. Soldiers who reenlisted for their current assignment could choose a two-year reenlistment; the other options required a reenlistment for at least three years.

Volunteers must pass a battery of physical and mental tests to qualify for enlistment. Individuals who scored below Category IV of the AFQT or who failed certain physical standards, including testing positive for the human immuno-deficiency virus (HIV), were prohibited from joining the Army. Even though only 5 percent of the recruits tested positive for drugs or alcohol, suggesting to Congress that testing and remedial treatment of such recruits might be deferred until basic training, the Army continued to test for drug and alcohol abuse during entrance processing during FY 1989. During the last six months of 1988, out of 100,000 recruits tested, the Army rejected 4.1 percent who tested positive for marijuana or cocaine; 0.10 percent who tested positive for alcohol were eventually rejected. Recruits took a series of skill and aptitude tests as an aid to branch and vocational assignments. Beginning 1 January 1989, DOD modified the Armed Service Vocational Aptitude Battery (ASVAB), in use since 1976, to emphasize mathematical rather than clerical skills. The change reflected the growing need for enlisted personnel with aptitudes for more complex technical training. Personnel officials anticipated that the revised ASVAB would favor white males and cause a slight drop in the number of minority males and all female recruits that qualified for highly technical training. The new test was not expected to cause a decline in the total number of recruits.

Enlisted Personnel

During FY 1988 Congress mandated a reduction in NCO strength from 284,000 to 277,000 by the start of FY 1989. With only seven months to attain this goal, the Army pared enlisted strength by about thirty-five thousand with a combination of waivers for service obligations for early retirements, an early-out program, and a slowdown of promotions. Promotions in the top five NCO grades in FY 1988 amounted to only 37,707, which precluded the need to freeze all NCO promotions and conserved nearly $140 million in personnel costs. For FY 1989 Congress mandated an additional 4,000-man reduction in the NCO authorized strength, with a year-end goal of 273,000. Because of the larger than anticipated number of NCO separations in FY 1988, the Army entered FY 1989 with nearly twelve thousand fewer NCOs than it was authorized. This large deficit enabled the Army to increase moderately the rate of promotions for the top five NCO grades but also caused imbalances in the enlisted force structure.

The shortage of NCOs had several adverse effects throughout the Army. In the active component, NCO operating strength in career fields for infantry, artillery, and armor was 96 percent of the authorized strength for those fields. USAREUR, for example, had a deficit of about five thousand NCOs, which represented about 50 percent of the Army's total NCO shortage. NCO shortages were prominent in combat support and combat service support units, especially E–5s. USAREUR considered its NCO shortage as its most pressing readiness problem. It had a potentially deleterious effect on training and readiness, and the inability to expeditiously promote outstanding NCOs threatened morale. To alleviate the problem, USAREUR increased the number of intratheater transfers and encouraged NCOs to extend in their current assignments or to sign up for a consecutive overseas tour.

Since 1985 the Army's Enlisted Alignment Plan had been the vehicle to align MOSes and grade levels to satisfy authorizations. The Army had used more refined recruiting for critical skills, promotions, and reclassification and retraining for understrength MOSes to address imbalances in critical MOSes. In January 1989 the Army began reviewing its about 330 enlisted MOS codes to reduce the number. Chaired by the U.S. Army Personnel Information Systems Command (USAPIC), Alexandria, Virginia, and consisting of representatives from ODCSPER and PERSCOM, the group charged with this task recommended the deletion of fifty MOSes but obtained the concurrence of proponent branches for only eight of them. On 21 August 1989, the Deputy Chief of Staff for Personnel tasked each branch to restudy the recommendations. The Army expected to promote an estimated fifty-nine thousand NCOs in FY 1989, but such restrictions as the one that limited the grades of sergeant major and master sergeant to 1 and 2 percent, respectively, of the total enlisted strength reduced the Army's number of top-graded NCOs. The top five enlisted grades accounted for 41.6 percent of the Army's FY 1989 total enlisted strength of 660,400.

In January 1989 Secretary of the Army John O. Marsh, Jr., along with Chief of Staff General Vuono and Sergeant Major of the Army Julius W. Gates, declared the Army theme for 1989 as "The Year of the NCO." General Vuono viewed it as an opportunity to enhance both the responsibilities and the status of the NCO corps by programs that underscored the four enduring roles of NCOs—leader, trainer, role model, and standard-bearer. General Vuono authorized an adjustment to the Army budget that allowed an additional 3,000 enlisted personnel to be promoted to sergeant E–5 during the last eight months of FY 1989. Shortages in that grade accounted for two-thirds of all NCO vacancies. Approximately 60,000 of 202,000 specialist E–4s and corporals were eligible to advance to sergeant E–5. The Army estimated that a 1 percent increase in NCO operating strength caused nearly a 2 percent increase in the number of units that reported readiness ratings at or above their authorized level of organization (ALO). By his action, the Chief of Staff raised the NCO strength to nearly 276,000.

The NCO ranks of E–6 through E–9 had an exceptionally good year for promotions in FY 1989. Promotions increased as much as 45 percent in senior grades. This followed the increases approved by the Chief of Staff in operating NCO strength. Promotions in FY 1990 returned to a more normal level. The 5,997 NCOs selected for promotion to sergeant, first class, E–7 in November 1988 represented a drop from 15 to 11 percent of those eligible compared to the previous year, presaging the return to more normal rates in the future (FY 1990). The rate for promotion to master sergeant E–8 in FY 1989 was 12.9 percent, slightly higher than the 10.8 percent rate of FY 1988. Of the approximately 22,000 soldiers considered for promotion to master sergeant, the E–8 selection board chose 2,834, or about 600 more than the prior year's total of 2,200. Promotions to master sergeant were above average in fields such as special operations, aviation maintenance and avionics, ammunition, and topographic engineering and below average in combat arms except for air defense and armor.

A hallmark of "The Year of the NCO" was the work of the NCO Leader Development Study Group. Organized by TRADOC in October 1988, the eight-month study was conducted at the Sergeants Major Academy, Fort Bliss, Texas, by a task force that included representatives from TRADOC, PERSCOM, the Center for Army Leadership, the Health Services Command, and the reserve components. On 22 August 1989, General Vuono approved eighteen of the group's recommendations during a briefing at the Center for Army Leadership, Fort Leavenworth, Kansas. Many of the group's recommendations stemmed from initiatives contained in an earlier study, the 1985 NCO Professional Development Study. That study prompted the Army to modify the NCO evaluation system and to tie NCO promotions more closely to the NCO Education System (NCOES).

The NCO Leader Development Study Group's most salient area of recommendations was its identification of skills, knowledge, and attitudes (SKAs) expected of NCOs at each level and formulation of career or leader development models for both active and reserve component NCOs. SKAs were the foundation for the NCOES. Leader development programs in service schools, units, and operational assignments were based on SKAs developed for each grade based on the nine leader competencies described in FM 22–100, *Military Leadership*—communication, supervision, training/counseling, soldier-team development, technical/tactical proficiency, decision making, planning, the use of available systems, and professional ethics. Other skills were identified and defined using NCO leader training curriculum, FM 25–100, *Training the Force*, and FM 100–5, *Operations*, the Army's capstone doctrinal manuals for training and operations. The study group identified specific knowledge requirements for each skill. Attitudes deemed essential for successful NCO leaders were derived from the tenets of professional ethics in FM 100–1, *The Army*; FM 22–600–20, *The NCO Creed*; and the Oath of Enlistment. Unlike skills and knowledge, the attitudes were the same for all NCO grades.

The second key area of the study group's recommendations linked NCO advancement to attainment of specific levels of training in the NCO Education System and leadership qualities that included continuing education and self-development. As a prerequisite for advancement, the group proposed that NCOs attain minimum reading standards. About 30 percent of the Army's soldiers read at the 9th grade level or lower. For NCOs attending the primary, basic, and advanced NCO courses, a 10th grade reading level was expected. Students at sergeant major courses were required to read at the 12th grade level. Remedial instruction would be afforded to NCOs and an extensive program of diagnostic testing that used the Test of Adult Basic Education (TABE) would be instituted at regional and installation NCO academies.

Some improvements were made in 1988 to the Qualitative Management Program (QMP), which prescribed stringent standards for promotion and retention in the four highest NCO grades and became the basis for a new NCO evaluation report (NCO-ER). The QMP provisions were published in FY 1989 as a revision of AR 601–200, *Enlisted Ranks Personnel Update 15*. The rigor of the revised screening process for promotion was evident when a promotion board for sergeant, first class, in early FY 1989 tagged 904 staff sergeants E–6 from a pool of 55,000 for possible involuntary separation. Adverse ratings on the NCOs' records included several factors, such as failure to meet minimum performance standards, numerous Articles 15, letters of reprimand for driving under the influence, the inability to carry out duties commensurate with grade, or a lapse of moral or ethical rectitude. The period for an appeal was shortened from a year to ninety days. A sustained finding on appeal was followed by separation from service within ninety days. NCOs within two years of retirement, however, could remain on active duty until they attained twenty years of service.

After almost a year's experience with the new NCO-ER System both NCOs and raters accorded it high praise. Required quarterly counseling by a senior officer, already required for E–5 through E–9, began for corporals in December 1988. An assessment of the new system indicated that counseling engendered a better understanding among NCOs of their duties and compelled unit officers to become more actively involved in the evaluation process. The QMP fostered unit cohesion and discouraged inflated ratings by the substitution of short narrative evaluations for numerical scores. The new evaluation system enabled selection boards to identify more accurately the best qualified NCOs for advanced schooling and promotion. A modified NCO-ER was introduced in the reserve components in FY 1988 and FY 1989.

High priority was given to NCO training and education as a requisite for promotion. By FY 1989 most facets of a revised NCO Education System that based advancement on satisfactory completion of a sequential mandatory education and training program were in place. The NCOES spanned the development of fire-team leaders in the Primary Leadership Development Course (PLDC) to schooling for command sergeants major. Since NCOs were first-line supervisors, NCO training emphasized "training the trainers." Basic was acknowledgment of the NCO's crucial role in integrating individual and unit training and determining training plans and objectives. NCO training focused on how each training task developed wartime skills, or "battle competencies." The PLDC was the initial rung in the NCO educational ladder, a four-week resident course conducted at twenty-five regional NCO academies in the United States and overseas. Each academy followed a common curriculum with the aim of preparing promising corporals and specialists to be sergeants and team leaders. A requirement was adopted in FY 1988, effective FY 1990, that specialists and corporals must complete the PLDC before promotion to sergeant. In FY 1989 the Chief of Staff made the PLDC more performance oriented; classroom instruction was reduced from twenty-one to eight days, and the time devoted to hands-on training was increased. Many NCO academies lacked the capacity to train the large number of E–4s on selection lists. On 28 March 1989, the Chief of Staff modified promotion policy to allow E–4s nominated for promotion during FY 1989 to retain their eligibility for advancement to sergeant E–5 during FY 1990.

Completion of the PLDC was required for selection to a Basic NCO Course (BNCOC). A promotion policy change stipulated that, effective FY 1991, promotion to sergeant, first class, E–7 and selection to the Advanced Noncommissioned Officer Course (ANCOC) would be contingent on graduation from the basic course. For the combat arms, a five-week BNCOC was given at eighteen NCO academies in the continental United States, Hawaii, Alaska, and Panama. Combat BNCOCs prepared sergeants E–5 and staff sergeants E–6 to become squad and section leaders or tank commanders. For combat support and combat service support MOSes, the BNCOC was conducted at stateside branch service schools. During 1989 attendance rates stayed at 105 percent for the third consecutive year. The BNCOC lasted from 3 to 18 weeks, with 8 weeks the average, and had about 22,000 spaces and nearly 150 courses. The highest levels of NCO training were offered at the ANCOC and the Sergeants Major Academy. Late in FY 1989 the Army made the ANCOC, geared to producing platoon sergeants, mandatory for promotion to sergeant, first class, effective October 1990. The ANCOC was also required for promotion to master sergeant E–8.

Graduation from Sergeants Major Academy or an equivalent course was necessary to be appointed as a command sergeant major. In FY 1989 the Army selected 1,224 senior NCOs from approximately 5,000 candidates to attend the Sergeants Major Academy at Fort Bliss, Texas, or an equivalent Air Force or Navy NCO school, or to enroll in the academy's two-year sergeant major correspondence course. A total of 945 NCOs attended one of Sergeants Major Academy's three classes scheduled in FY 1989, nearly twice the number selected in previous years when promotions were fewer to meet the lower NCO strengths mandated by Congress.

Other changes occurred in NCO personnel policies during FY 1989. Beginning 1 January 1989, the Army ended its long-standing practice of computing dates of rank (DOR) separately from effective promotion dates for the four highest NCO grades and made both dates the same. This system is comparable to the one employed to manage the officer corps. Limitations on the size and rate of NCO promotions extended to the lower enlisted ranks as well. At the start of 1989 new enlisted personnel policies curbed the growth of the E–4 population caused by the slower rate of NCO promotions. Advancement from private, first class (E–3), to specialist (E–4) and corporal was managed by MACOM commanders rather than the Total Army Personnel Agency, which controlled E–5 through E–9 promotions. Enlisted personnel with twenty-six months of service, six of them as E–3, were eligible for promotion to E–4. Accelerated promotion was permissible for soldiers with twelve to twenty-five months' service and three to five months as E–3, but was limited to 20 percent of a unit's E–4 strength.

The normal period for promotion from private E–1 to private E–2 was six months. Company commanders, however, had authority to reduce that period by two months for E–1s who demonstrated exceptional leadership qualities. Potential leaders were given opportunities to volunteer for extra training and placement in a fast track NCO leadership development program. In early 1989 the Army allowed commanders to award accelerated promotions to 10 percent of the E–1s within their commands, provided they successfully completed a fast track program or were satisfactorily progressing and had at least four months' service. In addition, the Army granted commanders authority to appoint specialist E–4s as corporals. This action required no local selection board, provided the selectees were assigned to NCO positions. Once appointed to corporal, enlisted personnel would retain their rank and insignia even if reassigned to a non-NCO position.

Unit Manning

In February 1988 General Vuono approved a plan to continue and expand the Unit Manning System. Under the plan commanders of combat units would replenish personnel in peacetime with either company-size units or packages of trained troops rather than replacing soldiers individually. The new system, started on a trial basis in 1988, was a modification of the existing Cohesion, Operational Readings, and Training (COHORT) system to enhance unit cohesion and facilitate the transition of the Army to a unit/package versus an individual replacement system. When fully implemented, about one-third of all Army combat units would be manned using the unit manning methodology, which had two forms—traditional and sustained COHORT. The traditional COHORT system would be used by seventy-six company-level units to support requirements in South Korea. These units would form and spend their first two years in the continental United States or Hawaii before rotating to Korea for a one-year tour. The companies that comprised the rotating units would reach the end of their life cycle after the one-year tour in Korea and be replaced by new COHORT companies, which normally would be manned by first-term soldiers who had trained together. The sustained COHORT program relied on the package, or group, replacement system rather than an individual or a unit rotation system. Under this concept, most other Army units received sustainment packages of officers and enlisted personnel once every four months, or once a year in the case of the 6th and 7th Infantry Divisions (LID). Replacement packages could contain as many as 500 men, but would not be organized into teams, crews, and squads, as they would in wartime, until after arrival in the battalions.

Unit personnel stability improved in FY 1989, attributable in large measure to the extension of tour lengths, better force alignment, and a reduction of the NCO shortfall. As a measure of unit personnel stability, the number of enlisted personnel who remained in the same unit for a year increased from 39.4 percent in FY 1985 to 45.6 percent in FY 1989, while the percentage of officers to do so increased from 40.3 to 42.7 percent. The gains in unit stability reflected a proactive approach by Army personnel managers to the distribution of personnel at battalion and lower levels during a period of declining operating strength.

Speaking before the U.S. Army Personnel Management Symposium in early FY 1989, Lt. Gen. Ronald L. Watts, the commander of VII Corps, USAREUR, praised the quality of NCOs and junior officers being assigned to his command. The benefits of the revised NCOES and emphasis on leadership training were manifest in the way NCOs took charge of individual and unit training. General Watts also indicated that frequent changes in personnel authorizations caused by grade and skill restructuring, the introduction of new equipment and attendant TOE modifications, and the tasking of new missions made it difficult to keep tactical units fully manned with qualified personnel. Shortages were acute among critical MOSes in combat service support units, and combat personnel were often diverted to perform combat support tasks. The personnel system, Watts suggested, was not fully supporting warfighting and training requirements in the VII Corps.

Officers

Between 1980 and 1985 the officer corps grew by approximately 11,400, but active authorized strength stayed about 781,000. The Army used the additional officers to increase the number of combat units, fill vacant officer billets in existing combat units, and enhance capabilities in critical specialties. Of the 11,400 new officers, 9,400 newly commissioned officers and 2,000 warrant officers, 83 percent of commissioned officers were lieutenants and captains assigned to the combat arms. Sixty-four percent of the warrant officer increase was also attributable to the growth in combat units. Field grade officers, major through colonel, accounted for the remaining 17 percent of commissioned officer gains, and 97 percent of this increase was in the medical branches.

In FY 1987 Congress directed DOD to reduce active component commissioned officers by 6 percent during a three-year period based on the total officer strength as of 30 September 1986. Reductions would occur at the rate of 1 percent in FY 1987, 2 percent in FY 1988, and 3 percent in FY 1989. OSD reduced Army strength by 1,635 officers (1.5 percent) in FY 1987 and by 1,515 (1.4 percent) in FY 1988. The Army achieved these reductions through voluntary and involuntary release programs, the induction of fewer second lieutenants, selective early retirement boards for senior colonels and lieutenant colonels with twenty or more years of service, and tighter standards for promotion and attainment of career status. Junior officers absorbed most of the cuts. During FY 1987 and 1988 approximately seven hundred fewer lieutenants were commissioned than required and seventeen hundred lieutenants and captains chose to or were forced to leave the Army. About half of them left involuntarily because they had been passed over for promotion twice.

Because of the Army's progress in meeting the officer reduction goals, Congress eased the size of the reductions slated for FY 1989 and FY 1990 and required only a 500-man reduction in each of those years. Congress exempted all medical officers because of critical shortages of doctors and nurses. The Medical Department accounted for 17,508 officers, or about 19 percent of active component officers. DOD also assessed small decreases of seventeen and thirty officers in the Army in FY 1989 and FY

1990, respectively, following its review of unified and specified command headquarters staffing. The Army's officer strength reductions for FY 1987 through FY 1990 would total 4,196, or 3.89 percent. As FY 1989 began the Total Army Personnel Agency (TAPA) established an FY 1989 end-of-year officer strength goal of 106,380 which it planned to reach by slowing the rate of officer accessions and release of additional first lieutenants who had been twice passed over for promotion.

Early in FY 1989 the Chief of Staff issued guidance on how to achieve the 500-man officer reduction within the context of the Army's Officer Distribution Plan (ODP). He stressed the importance of fully supporting warfighting companies, maintaining adequate officer strength in USAREUR and Eighth Army, and retaining sufficient qualified officers for joint duty positions. Aggregate officer support levels for TRADOC and AMC were reduced in FY 1989. The Army decided to retire involuntarily as many as 260 senior colonels and lieutenant colonels and achieve further reductions through voluntary retirements. Higher reductions of field grade officers were necessary for the Army to comply with the Defense Officer Personnel Management Act (DOPMA) of 1981, which specified strength percentages for each field grade based on total officer strength. The Army proposed that field grade officer strength should decrease by nearly 825 by the end of FY 1990.

The officer corps had structural imbalances caused by excess officers in certain higher grades. On 29 November 1988, the Chief of Staff established the Authorization Discipline Task Force (AUDIT) to align field grade officer authorizations with officer operating strength. AUDIT sought to achieve this goal through better management of officers in transit, holding, and student status and by adjusting officer billets in TOEs by making the battalion S–3 a captain, thereby eliminating a field grade officer billet. AUDIT's overriding goals were to protect the officer requirements for combat forces, to provide a minimal essential officer force structure for other functions, and to man joint positions.

To correct the grade imbalances and remain within congressionally mandated grade ceilings, General Vuono also directed the Army to establish Selective Early Retirement Boards in FY 1989 to reduce senior officer overages. He also directed a steady accession of junior officers to sustain readiness and provide qualified future leaders. General Vuono approved policies that allowed promotion boards to choose 10 percent of their selectees from below the zone of consideration and eliminated ceilings on centralized command selections of officers from the first-time-considered category. Selection boards were advised to choose the best qualified candidate regardless of date of rank.

Since 1985 the distribution of officers promoted from above and below the zone of consideration had been reversed as the number of selectees from below the zone of consideration increased as a career incentive for young, promising field grade officers during periods of slack promotions. During FY 1989, as officer promotions increased and cuts decreased, the number of officers selected for early promotion also diminished. *Table 6* shows a gradual increase for the period. In FY 1989 the Army began placing greater emphasis on physical suitability as a condition for promotion. Personnel files of thousands of overweight officers were flagged by TAPA early in FY 1989, which forestalled promotion, reenlistment, and selection to attend service schools.

TABLE 6—Elapsed Time for Officer Promotion, 1984–1989
(Expressed in years and months)

Rank	1984	1985	1986	1987	1988	1989	Goal
Captain	3.6	3.6	3.8	4.0	4.0	4.4	3.6–4.0
Major	11.4	11.2	10.5	11.3	11.6	11.9	10.0
Lieutenant Colonel	16.8	16.6	17.5	17.3	17.7	17.9	16.0
Colonel	22.2	19.6	22.5	22.5	22.7	22.8	22.0

Source: Officer Policy Office, Total Army Personnel Command

The rate of promotion for minority officers to major and lieutenant colonel was slightly below the Army average, but it was the same for first lieutenant and captain. Among explanations for the disparity was a 3 percent lower selection rate for minority officers for the Command and General Staff College. The rate of selection of minority officers for branch or specialized schools was equal to that of nonminority officers. The selection rate of female officers to service staff colleges was generally higher than for males.

The promotion rate for first lieutenants in FY 1989 was 61.8 percent, or 1,068 out of 1,727 considered, and was below the 84.2 and 82.9 percent rates of the two previous boards. In addition to slower promotion rates in FY 1989, 371 first lieutenants selected for promotion to captain were rebranched or assigned to branches with shortages of junior officers—military intelligence, quartermaster, signal, ordnance, and transportation. Captains in the combat arms branches—air defense, armor, aviation, field artillery, and infantry—normally were assigned a secondary or functional career specialty after qualifying in their basic branch. This usually happened following completion of an advanced course in their basic branch or about their seventh year of service. Based on the Leader Development Plan, TAPA accelerated assignment of functional career specialties in FY 1989 to near the end of a captain's fifth year of commissioned service. The new policy would also speed up combat arms branch qualifications.

Officers whose basic branch was in combat support or combat service support would follow their basic branch as a single career track.

By mid–FY 1989 the number of second lieutenants commissioned in the Army was several hundred below the service's own estimated requirements. In addition, the use of first lieutenants to offset shortages of captains threatened to limit the number of lieutenants available for assignment as platoon leaders. During 1989 the Army added approximately fifty-eight hundred second lieutenants to its rolls. Most of the new officers were graduates of the Reserve Officer Training Corps (ROTC) program. A total of 4,879 ROTC cadets were selected by the Cadet Command of TRADOC in September and November of 1988 for commissioning, compared with 4,062 for FY 1987 and 3,594 for FY 1988. Cadets selected in FY 1988 entered the Army between April 1989 and March 1990. About one thousand graduates of the U.S. Military Academy (USMA) received commissions in FY 1989. When possible, newly accessioned lieutenants were given one-year assignments that provided experience in the command of troops, usually in Korea. Lieutenant billets without troop command responsibilities were filled, to the extent possible, by lieutenants who returned from short-tour command assignments.

Late in FY 1989 the Army issued its FY 1990/1991 Transition Officer Distribution Plan (ODP). The ODP reflected the work of AUDIT and contained guidelines for the requisition and distribution of officers to align actual strength with force structure. The ODP contemplated a decrease of 1,423 authorized officer positions, 1,181 of them company officers. To redress imbalances in field grade officers, the ODP provided for redistribution of approximately two thousand captains in FY 1990 to serve in positions normally filled by majors. To enable better management of its officer corps, the Army Research Institute (ARI) embarked on an Officer Longitudinal Research Project, Project PROTEUS. ARI began a survey of 9,000 majors, captains, and lieutenants randomly selected by TAPA that would track officers for four years to identify significant factors in career choices. It would expand on similar earlier surveys of USMA graduates and include officers commissioned from other sources.

Title IV (Joint Officer Personnel Policy) of the Goldwater-Nichols 1986 Defense Reorganization Act strengthened the authority of the Joint Chiefs of Staff and the commanders of unified commands. It prescribed a formal program of joint duty assignment for senior officers to form a reservoir of officers with joint duty experience. As a requisite for promotion to general officer, the act required most senior officers to serve in a joint duty assignment and attend professional joint education courses. Officers in certain technical fields who received a presidential waiver were exempted from serving in a joint duty assignment prior to promotion, but they had to serve their first tour of duty as a brigadier general in a joint duty assignment. Congress established a new officer skill qualification—joint duty specialist or joint service officer (JSO)—to identify officers with multiservice training and experience. Congress left the detailed definition of joint duty to the services, but it stipulated that such positions be under the JCS, in a unified or specified command, or in a DOD agency. An initial Joint Duty Assignment List (JDAL) was approved by the Secretary of Defense in FY 1987 and revised in June 1988.

The percentage of positions designated as Joint Duty Assignments in organizations varied. Nearly 100 percent of the positions in OSD, the JCS, and the unified and combined commands were included on the JDAL. Other agencies, known as Category II through IV activities, had no more than 50 percent of their billets accredited as JDA. The Office of the Joint Chiefs of Staff (OJCS) adopted this lower percentage to constrain the size of the JDAL because of problems with the capacity of Joint Professional Military Education programs, tour lengths, and the drain of high quality officers from the services. The law prohibited the services from nominating their own billets for the JDAL. Because of its decline in officer strength, the Army felt that selective inservice positions were a reasonable option, but Congress refused to allow it. Congress, however, made some concessions. In September 1988 it gave DOD an extra year to implement the program. Congress reduced the tour length for JDAs from forty-two to thirty-six months for field grade officers in the continental United States and to two years for combat arms and combat engineer officers. In addition, the amended law allowed some brigadier generals to be promoted after twenty-four rather than thirty-six months in a joint service tour. Accommodating changes in joint duty tour lengths proved difficult at times because it required reprogramming automated personnel management systems and altering professional development patterns.

DOD concomitantly broadened the definition of joint duty positions to include certain uni-service assignments that responded to both joint and single service organizations, single service assignments that dealt extensively with multiservice matters, and service assignments that were evaluated by a joint duty officer from a joint, combined, or international organization. These changes enlarged the JDAL by approximately a thousand positions, but they required the Army to transfer some billets to joint manning authorization documents. By April 1989 the Army had identified 3,050 joint positions for JSOs and planned to fill 50 percent of them with field grade officers on three-year tours. Most of these officers would enter their first joint assignment after completing the first phase of their joint education requirement. About 12.5 percent of the assignments, 360 to 370, were available to combat arms officers, who served the two-year tour. Another 12.5 percent of the positions were deemed "critical," which obligated the Army to fill them with colonels or lieutenant colonels who had completed their required joint education and also had previous joint assignment experience. Problems resulted from the fact that 58 percent of the Army's officers were in the combat arms, while the majority of JDAL positions were in combat support and combat service support specialties. This factor raised the possibility that many highly qualified combat officers might be deprived of promotion opportunities. Moreover, the Army leadership feared that the diversion of combat arms officers from their basic branch to JDA assignments threatened combat readiness and could aggravate the structural imbalances in the officer corps. The Army planned to assign combat arms officers to joint positions by their secondary specialties, which allowed these officers to serve as JSOs in operations and plans or intelligence.

To manage the assignment of JSOs, the Army established the Joint Management Office within PERSCOM and a standing board to review eligible officers. The board reviewed 450 officer files per month in FY 1989. Most officers who qualified for a JDA did so by virtue of either previous training in joint operations or an earlier joint assignment. Only 12 percent of those awarded the new JSO skill code (3L) were fully accredited under the qualifications slated to become effective in FY 1990. Officers classified as JSOs would be required to complete formal joint training at an appropriate service school and the Armed Forces Staff College in Norfolk, Virginia. After 1 October 1989, half of the 8,200 billets identified as JDA by DOD would have to be filled by JSOs or an officer nominated to that specialty. General Vuono was concerned about the need for a clear concept of required knowledge and skills for JSOs in order to develop the proper training.

In FY 1988 Congress stipulated that joint professional military education (JPME) would be provided exclusively by the National Defense University in Washington, D.C., and the Armed Forces Staff College, Norfolk, Virginia. Late in FY 1988 the JCS promulgated a new JPME plan that stressed both assignments and education. All the armed services obtained permission to modify the curricula at their intermediate and senior officer schools to qualify temporarily for an approved JPME program. Phase I of the JPME became effective at the Command and General Staff College and at the Army War College during academic year 1989–1990. By the start of FY 1989 the Army had begun pilot JPME Phase I and II at intermediate and senior level service colleges. Phase I stressed the development of core joint curricula at the Command and General Staff College and at the Army War College during FY 1989. Resident students would then complete Phase II of the JPME, which consisted of intermediate- and senior-level courses provided at the Armed Forces Staff College (AFSC), expected to begin in mid-1990. While not all officers assigned to JDAL positions were required to attend Phase II, completion of both phases was required for designation as a JSO. Officers in critical occupational specialties could be nominated as JSOs and serve their first JDA before attending Phase I. In FY 1989 Congressman Ike Skelton, head of the House Armed Services Committee Panel on Military Education, issued the Skelton Report, which recommended a two-tiered program of joint education with emphasis on exposing senior officers to strategic studies at a national senior war college. A study by a committee appointed by the Chairman of the Joint Chiefs of Staff (CJCS) proposed modifying the National Defense University (NDU) curriculum, increasing its faculty, and creating a national center for strategic studies.

In a separate initiative that also affected the number of joint positions, the Inspector General of the Department of Defense found approximately 7,300 positions (2,100 military and 5,200 civilian) of the unified commands and the Joint Staff that either overlapped or duplicated other positions. The Army offered 1,115 positions for possible elimination, but the OJCS objected to cutting a majority of them. In December 1988 the Secretary of Defense declared about three thousand of the seventy-three hundred joint positions as superfluous. The Army was slated to lose 1,123 military and civilian spaces during a three-year period, 379 of them military.

Warrant Officers

By implementing new policies and through the enactment of legislation, the Army sought to create a warrant officer (WO) personnel management system similar to the DOPMA system used to manage officers. The Army wanted to stem the exodus of warrant officers at mid-career and the loss of their technical skills. Studies indicated that 50 percent of warrants who reached twenty years of service left the Army by their twenty-second year, at an average age of forty-one. A better alignment of actual warrant officer strength with authorized spaces was needed. Congress authorized 15,330 warrant officer spaces for FY 1989, which continued a recent trend in which authorized TOE and TDA positions exceeded actual strength. To remedy this discrepancy and obtain a better mix of occupational specialties, the Army planned to eliminate 2,010 excess warrant officer spaces. This would be done by converting 1,500 spaces to civilian or enlisted personnel status, transferring warrants from several overly filled MOSes to ten understaffed ones, and discontinuing fifteen warrant officer specialties. The Army hoped to make these adjustments through voluntary MOS transfers, some involuntary transfers, and attrition.

Adopted in May 1987, the Total Warrant Officer System (TWOS) became the core of the Army's warrant officer personnel reforms. A major feature of TWOS was streamlining the dual-track system that governed warrant officer promotions and career development. As an amendment to TWOS, the Army proposed the Warrant Officer Management Act of 1989 to create a single active duty list and promotion system. This approach would incorporate all warrants into the Regular Army when promoted to CW3 and accord them permanent status. Beginning in FY 1988 most enlisted personnel who became warrant officers were given five-year appointments as active duty reserve officers, and their eligibility for career status was assessed after five years. Favorable consideration allowed them to receive a Regular Army appointment upon promotion to CW3. By law the Army must promote no less than 80 percent of the warrant officers who qualify for promotion for the first time to CW3 or CW4. The new policy would also convert all existing senior WOs to Regular Army status so that the Army could manage them by the year in which they were commissioned rather than by total service time, enlisted service plus warrant. To further enhance the status of WOs, the proposed legislation called for a new pay grade of CW5, equal in basic pay to a major. Although CW5 existed in FY 1989, its pay was the same as MW4. The new CW5 grade would be limited to about five hundred senior warrants or 5 percent of the warrant officer corps. In May 1989 DOD approved the Warrant Officer Management Act and submitted it to the Office of Management and Budget. The proposed legislation had not been introduced in Congress by the end of FY 1989.

The Army also sought to improve warrant officer career progression by emphasizing leadership and tactical training concurrent with traditional technical training. Warrant officer training programs would be geared to three groups—a basic level for warrant officers CW1 and CW2, a senior level for CW3 and CW4, and a master level for the new grade of Master Warrant, or MW4, and the proposed CW5. A new program to train MW4s began at the Warrant Officer Career College, Fort Rucker, Alabama, in September 1988. The first class consisted of thirty highly qualified CW4s. This course fulfilled Phase II, or the resident phase, of the Master Warrant Officer training program and emphasized writing, speaking, and managerial skills. To qualify for the 8-week course, candidates were required to complete Phase I, a 100-hour correspondence course. Upon completion of both phases, warrants could enroll in Phase III, a proposed step in the MW4 program that consisted of additional MOS-related training. Upon satisfactory completion of Phase III, a participant would be designated MW4, senior to all CW4s.

Women in the Army

At the start of FY 1989, 11,900 female officers and 71,700 enlisted women were in the active component, constituting 10.8 percent of active strength. Between 1977 and 1987 the number of females in the Army nearly doubled. Five-year projections indicated that the number of female soldiers would reach approximately 11.5 percent by 1994. While the Army experienced no shortages of female enlistees, the female enlisted retention rate was sharply below that for males. Despite their growing strength in the active force, some female soldiers felt that DOD and Army policies prohibited full equality of opportunity for them. Others complained of sexual harassment. Women in the armed services made some gains during FY 1989. DOD increased maternity leave from four to six weeks on 6 February 1989. The primary object of dissatisfaction centered on the DOD policy that barred women from several noncombat jobs and excluded them from serving in combat units.

The Defense Advisory Committee on Women in the Services (DACOWITS) urged the Army to liberalize its assignment policies with respect to women in combat units. The GAO suggested in late FY 1988 that the Army assignment policies for women stunted their careers and proposed that the service liberalize its restrictive interpretation of the risk rule. That rule excluded women from noncombat positions in units if the risk of those units becoming involved in combat were equal to, or greater than, combat units in the same locality.

The conclusions of a DOD task force that also studied career opportunities of women in the armed services supported the GAO findings. In response to both studies, the Army opened 11,138 new positions to women by a slight liberalization of the risk rule. Under new guidelines, 56 percent of all authorized spaces in the Army could be filled by women. They were eligible to serve in 86 percent of the 368 enlisted MOSes, in 91 percent of the 77 warrant officer MOSes, and in 96 percent of the 207 officer MOSes. Previously prohibited positions such as signal lineman, truck and construction equipment operators in engineer units, and a variety of headquarters billets in infantry, armor, and artillery combat units were opened to women. As Army planners addressed recruitment quotas and training spaces for women in FY 1989, the Army initiated the Female Officer Professional Development Review to determine the impediments female officers encountered as they advanced through the officer ranks. The Adjutant General, Finance, and the Quartermaster Corps branches were surveyed in FY 1989, with the other branches to follow.

A related issue was whether female soldiers would remain in their positions in overseas commands in the event of mobilization or hostilities. On 27 September 1988, DOD informed the Army of its policy to keep female soldiers in the theater in the event of either mobilization or hostilities to perform the same jobs in wartime as in peacetime.

During FY 1989 the Army considered eliminating women from the field artillery branch, in which there were 430 women and 51,000 men.

The impetus came from the phase-out of Pershing II missiles from Europe under the INF Treaty. Nearly 46 percent of the females in the branch, 163 enlisted women and 32 officers, were assigned to Pershing missile units in Europe and training elements in the United States. In addition, a small number of women served in the headquarters elements of eight short-range Lance missile battalions in Europe. Female members of the Field Artillery branch, joined by DACOWITS, expressed concern about the potential loss of career opportunities for female members of the branch. In June 1989 the Army Staff recommended to the Chief of Staff that women members already assigned to the branch be allowed to remain in it, but that no additional field artillery units or positions be opened to them. At the end of FY 1989 the issue remained unresolved.

Retirees and Transition Programs

Liberal retirement benefits have been one of the compelling incentives for enlistment and reenlistment in the Army. In 1986 two retirement systems were created: one for soldiers already in the Army and another one for new personnel. Neither system was altered in FY 1989, but there were proposals to consolidate all military personnel into the new system, to decrease retiree cost of living allowances, and to impose user fees for retirees at military health facilities. The Army opposed any erosion of retirement benefits, which underscored its concern for retirees as part of the Total Army Family. General Vuono viewed retirees as important links to the active Army. They participated in Installation Retiree Councils and had a voice on health, commissary, post exchange, and other installation councils. Selected members of the Installation Retiree Councils also served on the Chief of Staff's Officer and Enlisted Retiree Councils, which met annually with the Army leadership to discuss retiree and family programs.

Helping soldiers make the transition to civilian life became a growing concern as the Army downsized. The Army paid $65 million annually in unemployment benefit costs for veterans unable to find employment after leaving active service. To help place retiring soldiers in new careers, the Army and the Department of Education established a clearinghouse to match military personnel with available teaching positions in states that hire teachers with nontraditional certification. Anticipating increased force reductions during the next five years, the Army was developing plans for other transition assistance programs in FY 1989 that would utilize Army alumni and create a network of job banks around the country. The Transition Management Program was tested at Fort Bragg, North Carolina, and five other stateside installations in FY 1989. It offered transition counseling to soldiers leaving the Army, whether they were first-term soldiers or career retirees. This program sought to help soldiers successfully enter the civilian job market or institutions of higher learning, and also persuaded soldiers to reenlist. Skeptical of claims that a similar Air Force program produced effective results, Congress discontinued funding for both the Air Force and the Army programs.

Miscellaneous Personnel Issues

While reducing its officer strength in FY 1989, the Army discovered problems in relating its personnel accounting systems to DOD programming and budget systems. The Secretary of Defense directed the Army to refine its personnel accounting systems and to provide specific billet information from The Army Authorization Documentation System (TAADS) to justify its five-year manpower requirements. By early FY 1989 the Army had successfully aligned its requirements with the DOD Five Year Defense Plan by consolidating manpower projections provided by each MACOM into an overall Army requirement in tune with DOD's programming cycle.

In FY 1989 the Army neared the final stages in the development and fielding of a portable individual data storage device. The Individually Carried Record (ICR), developed by the Army Soldier Support Center, would contain an electronic file of a soldier's personnel, medical, and finance data. Positive results expected of the ICR were a decrease in the use of printed forms, reduced communication requirements, accelerated processing of personnel actions, and simplified mobilization operations.

The Army's Personnel Information Systems Command was developing an Optical Digital Image Military Personnel Records System for the active and reserve components. Most individual personnel records for active component personnel were converted to microfiche between 1973 and 1977, but there were difficulties regarding slow access to records and keeping them updated. The new system was slated to enter production in FY 1990. The Soldier Support Center and PERSCOM have simplified personnel administration by equipping units with the computerized Company/Battalion Administrative System (CBAS), compatible with the Tactical Army Computer System (TACCS) and the Standard Installation/Division Personnel Reporting System (SIDPERS). Testing of the CBAS by the 24th Infantry Division was completed early in FY 1989. The CBAS was designed to eliminate most typing by companies and to facilitate the processing of promotions, the rating of personnel, and the completion of daily status reports.

The Federal Employment Liability Reform and Tort Compensation Act of 1988 (PL 100–694), enacted 18 November 1988, immunized Army personnel, military and civilian, from common law torts for performing their official duties. The legislation made the United States the defendant instead of individual federal government employees. The act did not extend to suits based upon violations of the Constitution or federal statutes that concern breaches of civil rights. The 1988 act became the exclusive remedy for suits against the U.S. Government and required suits introduced in state courts to be vacated to the federal judiciary. The Office of Management and Budget required the Army to collect delinquent debts owed to some federal agencies by military personnel. Monies were collected each month from nearly two thousand soldiers by payroll offsets that, by law, could not exceed 15 percent of a soldier's net income. The U.S. Army Finance and Accounting Center (USAFC) administered salary deductions for debts owed to the Department of Education, the Office of Housing and Urban Development, and the Veterans Administration. Early in FY 1989 the USAFC expanded its collection efforts to debts owed to five additional federal agencies: the Small Business Administration, the Department of Agriculture, the Department of the Navy, the Department of the Air Force, and the Marine Corps. HQDA reemphasized to commanders the Army's policy of providing financial counseling to all military personnel with debt problems and to give soldiers the opportunity to remove erroneous information from their financial and credit records.

Civilian Manpower

The Army's total civilian strength at the end of FY 1989 was 487,852 (based on fractionalized counting of part-time permanent employment). The U.S. citizen appropriated fund work force numbered 376,213 at the end of FY 1989 (347,090 in military functions, 28,989 in civil functions, and 134 in cemeterial functions). Including direct and indirect hire foreign national employees, the total appropriated fund civilian strength was 447,644. Civilians comprised most of the Army's sustaining base and worked in over six hundred occupations. They constituted the majority of Army manpower assigned to logistics, communications, training, and depot operations. The vast majority of appropriated fund American civilian employees worked in the continental United States, but more than 30,700 were employed in foreign countries and U.S. territories. Of the Army's 71,431 foreign national employees at the end of FY 1989, more than 48,000 were employed in West Germany.

Throughout FY 1989 the Army pursued civilian leadership enhancement and modernization of civilian management systems. It had recently succeeded in reducing internally generated civilian personnel regulations by more than 50 percent and in delegating more authority to MACOMs for civilian personnel management. Army managers received authority to hire more civilians directly; this stemmed from a congressional decision to waive civilian personnel strength ceilings and instead set a dollar limit. An Army initiative, Managing the Civilian Work Force to Budget (MCB), delegated authority for position classification and management of civilian personnel resources to the lowest practical level of supervision. During FY 1989 MCB was tested at several Army activities. It was slated to begin Army-wide implementation in FY 1990, pending evaluation by the Army Audit Agency.

During FY 1989 the Army also tested and began installing its Army Civilian Personnel System (ACPERS), which supported civilian personnel management and processing in the field and at HQDA. The system would replace the Standard Civilian Management Information System, the Corps of Engineers Management Information System, and the Civilian Personnel Accounting System. In the field, Army civilian personnel offices will use ACPERS to support recruitment, training, retention, and separation of civilian personnel during peace, mobilization, and wartime. To create ACPERS, the Army adopted and modified the existing Air Force Civilian Personnel System. Following systems acceptance tests at the Corpus Christi Army Depot, Texas, in late 1988, phasing in of ACPERS began at various MACOMs during FY 1989. ACPERS was scheduled to be fully operational by March 1991.

Modernization of civilian management entailed greater use of automated data systems to manage current programs and to analyze future civilian manpower requirements. The Civilian Employment Level Plan (CELP) was prepared by each MACOM, based on relevant Program Budget Guidance and the Annual Financial Target. HQDA fashioned them into a single Army CELP, which was used to generate extensive detailed reports to OSD and Congress on all categories of civilian employment by appropriation. The Army Personnel Proponent System (APPS), a life-cycle management system, centralized all phases of managing military personnel—the structure of the work force, manpower acquisition, training and education, sustainment, professional development, and separation. In 1987, as a result of the Civilian Personnel Modernization Project, the Chief of Staff directed creation of a Civilian Personnel Proponent System (CIPPS) comparable to APPS. Under CIPPS one proponent agency became responsible for monitoring several civilian occupations and established career patterns for them from entry through separation. CIPPS provided the Army with a means to coordinate military and civilian manpower management requirements more closely. Throughout FY 1989 the Army continued to phase in CIPPS and to test pilot programs in various MACOMs and agencies, with full implementation planned by FY 1991.

Closely related to CIPPS was the Army Civilian Training, Education, and Development System (ACTEDS), which mapped out sequential work assignments and training for civilian employees in specific career fields from entry level to senior executive positions. It provided a structured approach to technical, professional, and leadership training for Army civilians. During FY 1989 ACTEDS managed twenty-four civilian career fields and planned to incorporate others. These plans would be merged into the Army's Training Resource Access Information Network (TRAIN) and made accessible to personnel officers throughout the Army, with eventual consolidation into CIPPS. Another program subsumed under ACTEDS was the Civilian Leadership Training Program (CLTP), which consisted of three career levels—intern, supervisor, and manager—controlled by the Center for Army Leadership (CAL) at Fort Leavenworth. Through the end of FY 1988 CAL had trained 2,179 civilians and anticipated training an additional 1,760 civilians in FY 1989. The highest level of the CLTP was conducted at the Army Management Staff College in Alexandria, Virginia. Both military officers and civilian executives attended this fourteen-week course. Its curricula included acquisition, resource, personnel, logistics, and installation management.

The Army also supported the affirmative action policy by reaffirming the importance of providing Army-sponsored training that included enrollment in senior service schools and fellowships for qualified minority applicants with leadership potential. The Army has had limited success in carrying out this policy. Minority participation in managerial training programs increased from 8.6 percent in FY 1987 to 15 percent in FY 1988, but female participation decreased from 22.9 to 14.7 percent during the same period.

Since the mid-1980s Army personnel policies have addressed the use of illegal drugs and the incidence of AIDS among its civilian workforce. Beginning in 1986 the Army administered random drug tests to detect the use of cocaine and marijuana to about ten thousand civilian workers annually. These workers were concentrated in selected occupations—security guards, pilots, alcohol and drug counselors, and employees in nuclear and chemical surety programs. Civilian employees were not tested for AIDS except when working overseas if the test was requested by the host nation. The Army's drug testing program was challenged and declared unconstitutional in a lower court but upheld in the Court of Appeals for the District of Columbia on 29 August 1989. The appeals court found testing of civilian pilots, aircraft mechanics, security personnel, and alcohol and drug counselors to be constitutional. Testing of civilian personnel in nuclear and chemical surety programs was returned to the lower court for further evidence. The Court of Appeals ruled against random drug testing for laboratory technicians and individuals who administered drug tests.

Conclusion

During FY 1989 the Army conducted many programs to improve personnel management. As the fiscal year ended, the key manpower issues remained quality and stability, as suggested by the experience of VII Corps. The recruitment and retention of high quality soldiers by special incentives and strong leader development programs such as the new NCOES were major ingredients of this effort. In FY 1989 the Army sought to lay the foundation for the force it expected to field in the 1990s and into the next century. Many characteristics of that future force seemed discernable in FY 1989. Tomorrow's soldiers would be volunteer, more comfortable in the high-tech and joint military environment, older, more mature, and better trained. They would have less combat experience, and there would be fewer of them. The force would also include more minorities and women. General Vuono urged planners to take full advantage of the capabilities of NCOs that were enhanced by NCO career development programs. Whether this vision of the Army of the future would be realized remained to be seen. Personnel, like any other resource, were affected by the fiscal, strategic, and domestic climate in which the Army existed and operated.

8

Reserve Components

Introduction

By FY 1989 the Total Force policy had placed 50 percent of the Army's peacetime force structure in the reserve components (RC), the U.S. Army Reserve (USAR), and the Army National Guard (ARNG), which included both combat and noncombat units. The transfer of missions from the active to the reserve components has compensated in part for the decline in active force strength. Many USAR and ARNG units that participated in the CAPSTONE and Affiliation programs with the active component (AC), including roundout combat units, must be ready to mobilize, deploy, and perform their assigned wartime missions with the same dispatch and competency as their active force counterparts. The RC, insofar as they are effectively integrated into the Total Force, are an essential ingredient of the Army's deterrent and combat capabilities. By FY 1989 many active and reserve units were aligned under the CAPSTONE system in wartime organizations to meet mobilization requirements for one or more of three wartime scenarios—Europe, Southwest Asia, or the Pacific—and to support the stateside sustaining base. A unique feature of CAPSTONE was that the commander of the senior organization, whether active, USAR, or ARNG, exercised command. Roundout, an HQDA management program, brought selected active component units up to a designated structure by filling organizational voids with RC units.

The RC constituted the initial and primary augmentation for active forces in an emergency that required rapid or sustained expansion of the Army. Despite the priority given to attaining a high state of readiness for CAPSTONE and roundout units, the basic intent of the Total Force Policy was not to bring reserve component elements to the same readiness level as the AC. Rather, the Army has sought to mesh the strengths of both components to obtain the maximum capability within Army budget and manpower constraints and to overcome the problems that limited RC training placed upon readiness. The Army hoped to maintain a reserve force capable of making a timely transition to a contingency or wartime posture and also of meeting its peacetime responsibilities to federal and state authorities.

The status of RC manpower, training, equipment, and readiness directly affected the Army's overall ability to carry out its strategic missions. In a February 1989 report, the General Accounting Office (GAO) cast doubt on the RC's capacity to execute some of its mobilization missions. Using the Army's own readiness reports, the GAO estimated that about 42 percent of RC personnel needed additional training to perform their missions. The GAO highlighted the primary problem of limited training time—only thirty-eight days annually for the USAR and thirty-nine days for the ARNG (about one-sixth the time available to active units). The GAO faulted the Army for a lack of proper training equipment and for not emphasizing battlefield survival skills.

Other factors also detracted from RC readiness. Fewer funds were available in FY 1989 than in FY 1988 to support annual, school, and special training; their respective decreases were 1.3, 11.4, and 17.5 percent. Funds for refresher and proficiency school training were also insufficient. RC training was adversely affected by a high incidence of personnel turbulence that stemmed from the loss or reassignment of reservists caused by changes in their civilian jobs, modernization and changes in force design, the assignment of additional missions, and revisions in CAPSTONE alignments. These disruptive factors affected manning levels and contributed to the widespread mismatch of MOSes. The latter often necessitated reclassification and individual and unit retraining that further degraded readiness. Shortages of full-time support (FTS) personnel and the geographical dispersion of units and unit members affected readiness. Approximately seven thousand RC company-level units, for example, were based at more than forty-six hundred separate locations.

Recent mobilization exercises had highlighted deficiencies that impaired the Army's ability to collect current data essential to mobilize the RC. As a remedy, the Army was fielding the Reserve Component Automation System (RCAS), an automated information system consisting of two subsystems: Mobilization Command and Control, and Unit Administration. With complete fielding expected in FY 1992, the RCAS would provide an efficient automation capability for more than ten thousand RC units. Congress had a special interest in RCAS and appropriated $109.9 million for the program in FY 1989. The GAO's findings, congressional concerns, and internal assessments that highlighted RC shortcomings emphasized the underlying debate about the Army's shifting missions from the active to the reserve components. The RC leadership cautioned that the GAO's sampling of units was too small. Much of the information used by the GAO, they noted, was two years old; many of the deficiencies that the GAO cited had been rectified, and RC readiness had improved.

Command and Control

Notwithstanding the questions raised about the Total Army policy, the Army in FY 1989 became increasingly dependent on the RC. Peacetime command and control of the USAR and ARNG not only defined relations between active and reserve components but were crucial to the readiness, mobilization, and wartime roles of the Total Force. Command and control of the USAR attracted considerable scrutiny during the year. FORSCOM, a major Army command, exercised extensive responsibilities for directing and monitoring RC activities in peacetime. The FORSCOM commanding general commanded assigned USAR Troop Program Units (TPU) in the continental United States and Puerto Rico through five subordinate continental United States armies (CONUSAs)—First, Second, Fourth, Fifth, and Sixth. The CONUSAs commanded USAR units in their areas and also supervised the training of area ARNG units based on HQDA and FORSCOM guidance. They assisted RC units in attaining and maintaining a prescribed readiness status, developed and remained prepared to execute designated contingency plans, and controlled mobilization and deployment operations for all mobilization stations (MOBSTAs) in their areas. Upon mobilization, the CONUSAs would become Joint Regional Defense Commands (JRDCs). In Alaska, FORSCOM commanded all assigned USAR units and monitored ARNG training through the 6th Infantry Division (LID).

The USAR chain of command extended from the CONUSAs to commanders of the Major U.S. Army Reserve Commands (MUSARCs) and then to the assigned TPUs. The 46 MUSARCs consisted of 21 U.S. Army Reserve Commands (ARCOMs), the 12 U.S. Army Reserve training divisions, and 13 selected General Officer Commands (GOCOMs). Major exceptions were the 157th Infantry Brigade (Mech) and the 187th Infantry Brigade, both assigned directly to the First U.S. Army, and the 205th Infantry Brigade (LID), which was the roundout brigade of the 6th Infantry Division (LID) and was assigned to the Fourth U.S. Army. These high-priority brigades were further assigned to the 79th, 88th, and 94th ARCOMs in order to permit their division commanders to concentrate on improving each brigade's combat effectiveness. Twenty-nine Readiness Groups were subordinate to the five CONUSAs. During FY 1989, through Project JUMPSTART and other measures, FORSCOM assigned highly qualified active component officers to the Readiness Groups as advisers. FORSCOM assigned promotable officers as advisers to avoid the stigma attached to career advancement often associated with reserve assignments. Readiness Groups were control headquarters for USAR units in their region and monitored ARNG units in their execution of the Army Readiness and Training Program.

Each state had a State Area Command (STARC), which consisted of a mobilization entity within an ARNG headquarters and headquarters detachment that would go on active duty when the state's ARNG units were alerted for mobilization. Once ordered to active duty, the STARC would exercise command and control of all mobilized ARNG units until they arrived at their mobilization stations. The STARC would also exercise command and control of USAR units selected by the appropriate CONUSA and coordinate the movements of AC and RC units to their mobilization stations. As mobilization progressed, the STARC would convert to a Joint State Area Command (JSAC). Although the Army did not command the ARNG in peacetime, HQDA established training criteria and evaluated the training of the ARNG in the continental United States, Puerto Rico, the Virgin Islands, and Alaska through FORSCOM. The ARNG had most RC combat units—10 divisions, 18 separate brigades, 3 armored cavalry regiments—and most of the roundout units for AC combat forces. FORSCOM also played a leading role in organizing RC units into Total Army Force packages for contingencies.

The command and control of USAR units had changed little since FORSCOM was established in July 1973. By FY 1989 the diffusion of authority and responsibility for the USAR TPUs spawned growing dissatisfaction with the existing system in some quarters of the Army and Congress. The Chief, Army Reserve (CAR), commanded the Army Reserve Personnel Center (ARPERCEN) and those USAR troops not affiliated with a unit. The Office of the Chief, Army Reserve (OCAR), and FORSCOM shared control of USAR resources. The CAR appeared before Congress to request funds for the USAR but doubted his authority to determine the allocation of those resources.

Two major studies addressed USAR command and control in FY 1989, one by FORSCOM and the other by a special Army panel. FORSCOM stressed the importance of a single chain of command for the USAR and the active component as well as Army Staff agencies performing common functions for both components. The single most important corrective action, according to FORSCOM, was to fill full-time manning positions in USAR units and commands and to relieve USAR commanders of onerous administrative burdens. FORSCOM proposed a full-time USAR lieutenant general as Deputy Commanding General for Reserve Affairs at HQ, FORSCOM, and also a full-time USAR lieutenant general as Chief, Army Reserve, on the Army Staff or as an Assistant Vice Chief of Staff, U.S. Army. General Colin L. Powell, who assumed the dual position as Commander in Chief/Commanding General of FORSCOM on 4 April 1989, endorsed the FORSCOM study. In April 1989 HQDA established its U.S. Army Reserve Command and Control Study Panel at the request of the House Appropriations Committee, chaired by General

William A. Richardson, U.S. Army, retired. Congressional interest centered on whether the Chief, Army Reserve, should exercise command and control over all USAR elements and the USAR budget.

Many of the panel's key recommendations, released in September 1989, were diametrically opposed to FORSCOM's. The Richardson Study Panel suggested that the Chief, Army Reserve, be elevated to the rank of lieutenant general, but that a U.S. Army Reserve Command be established as a four-star command. This proposal required removing the command of CONUS-based USAR units from FORSCOM and disestablishing the five CONUSAs. The panel further concluded that FORSCOM should have sufficient personnel to handle all mobilization planning and the land defense of CONUS. General Powell opposed the Richardson Panel's proposals. He rejected the establishment of a separate USAR command; it would violate FORSCOM's charter to provide forces to overseas commands that were trained and ready to fight as a combined arms team in joint and combined operations. Moreover, he protested that a USAR command violated the Goldwater-Nichols Act, which required that all operating forces be assigned to a combatant commander. Powell defended the role of the CONUSAs in integrating the USAR and ARNG into the Total Force. Elimination of the CONUSAs, he felt, would cause problems in the command and control of widely dispersed USAR units. The House Appropriations Committee recommended that the Secretary of the Army plan to increase the command and control authority of the CAR and also his role in formulating the FY 1991 budget. The divergent views on USAR command and control continued into FY 1990.

Manpower and Force Structure

The assigned strength of the Army's ready, standby and retired reserve components at the end of FY 1989 was 1,649,850. Of this total, the ARNG accounted for 467,086, the USAR for 594,464, and the retired reserves for 588,300. Total RC strength increased from the FY 1988 strength of 1,635,920. Guard strength increased from 464,308 in FY 1988, while the USAR declined from an FY 1988 strength of 597,392. The USAR's FY 1989 strength was divided as follows: 312,825 members in the selected reserve, 274,588 in the individual ready reserves, and 632 in the standby reserve. The FY 1989 ARNG end-strength consisted of 456,960 in a selected reserve status and 10,126 guardsmen in the IRR. The total RC shortfall from its authorized strength was 38,375 and was almost exclusively in the USAR, with shortfalls of 20,619 in paid drill status and 17,416 in the IRR. The ARNG was 340 under its FY 1989 authorized strength. In its demographic makeup, the ARNG was approximately 79 percent white and the USAR about 70 percent white; blacks constituted just over 16 percent of the Guard and 25 percent of the USAR. Almost 93 percent of ARNG members were male, while the USAR had 80 percent males. Officers constituted almost 9 percent of the ARNG and 18 percent of the USAR; enlisted personnel were 89 percent and 80 percent, respectively, with warrant officers comprising the difference. Nearly 14 percent of the ARNG enlisted force and 11 percent of the USAR enlisted personnel did not have high school diplomas. Approximately 52 percent of ARNG officers and 81 percent of USAR officers were college graduates. The IRR reflected similar demographic patterns.

Projected RC strength beyond FY 1989 indicated that the Army would not realize its RC strength goals. Reducing overstructure, improving force accounting, inactivating obsolete units, delaying unit activations and conversions, and modifying TOE and reducing TDA organizations were measures the Army contemplated to match authorized with actual end-strength more closely. In March 1989 the Vice Chief of Staff approved force structure reductions designed to align ARNG and USAR authorized with actual end-strength by FY 1995. Neither the ARNG's nor the USAR's force structure allowance was fully funded in FY 1989; the USAR received only 92 percent of its TPU positions. Even though the budgeted shortage was only a small percentage of drill-pay strength, it was unevenly distributed by grade, skill, and geographical area and had a detrimental effect on RC readiness.

Strength alone was not a true indicator of the RC's value to the Army's force structure. Fifty-two percent of the Army's total combat force was in the ARNG and USAR. Of the Army's 28 combat divisions, 10—8 infantry and 2 armored—were in the ARNG, and 6 active divisions were assigned a roundout brigade from the RC (5 ARNG and 1 USAR). All of the Army's 21 separate combat brigades were in the RC (18 ARNG; 3 USAR); 11 were infantry, 7 mechanized infantry, and 3 armored. The ARNG force structure also contained 18 field artillery brigades, 4 armored cavalry regiments, 2 separate armor brigades, 2 special forces groups, 2 air defense artillery brigades, 1 aviation brigade, and a separate infantry group (Alaskan Scouts), for a total of 179 maneuver battalions. During FY 1989 the number of ARNG armored cavalry regiments (ACR) was reduced to three when the 163d ACR of the Montana ARNG converted to the 163d Armored Brigade. Because of budget cuts, plans for activation or conversion of three ARNG and two USAR attack helicopter battalions were canceled.

The USAR contributed only 8 percent of the Army's total combat force structure in FY 1989, but it provided 27 percent of the Army's combat support, 44 percent of its combat service support, and 44 percent of the special operations forces. The USAR and ARNG had 62 percent of all combat support and combat service support assets. The USAR had all twelve Army training divisions and two brigade-size training units. These training units would be transferred to TRADOC upon mobilization, but FORSCOM held peacetime responsibility for training and equipping them. The USAR also contained all Army military intelligence (strategic research) detachments. Of the Army's expected wartime needs, nearly 55 percent of the doctors and 76 percent of the nurses were relegated to the USAR. Certain wartime medical specialties, Judge Advocate General detachments, civil affairs units, and psychological operations units existed almost exclusively in the USAR. Army Reserve units assigned an early deployment role included 5 civil affairs commands, 3 medical brigades, 3 military police brigades, 2 engineer and 2 transportation brigades, and 1 signal command comparable to a brigade. The ARNG had 13 percent and the USAR 44 percent of all Army special operations forces.

Army mobilization plans also entailed the recall of individual reservists either to replace members of the active force who deployed or to provide individuals with specialized skills. These persons, members of the IRR, must be qualified and, if possible, preassigned. With a strength of approximately 275,000 in FY 1989, the USAR (IRR) consisted of soldiers who had not completed their military service obligation following active or ready reserve duty. Questions have been raised in recent years about the IRR's value as a mobilization asset. A GAO study of the IRR released in FY 1989 noted that the Army lacked current information on the residence and availability of more than 5 percent of the IRR pool. Others estimated that 5 to 7 percent of the IRR could not be located in an emergency, and it would be difficult to locate another 10 to 15 percent.

In FY 1987 the Army began its IRR Screening Program to determine the readiness and availability of the IRR for mobilization. Federal statute (10 U.S. Code 271/672[b]), and DOD Directive 1215.6 required an IRR annual muster to active duty for one day to update records. Since the program's inception, more than 240,000 reservists have been screened. In FY 1988 approximately 187,231, or 62 percent of the total IRR pool of 293,000, were selected for screening. Less than 100,000, or 33.6 percent of the total pool, showed up for the muster. The Army took aggressive action in FY 1989 to track down those who did not comply. Because of funding limitations, the RC screened only 23 percent of the IRR in FY 1989. With a budget of about $9 million for FY 1989, the IRR Screening Program was carried out by the Army Reserve Personnel Center and the Army Recruiting Command. TRADOC was conducting a qualitative analysis of the skill qualification test data collected during screening. Despite a significant number of "no-shows," the exercise helped the Army update its mobilization data base and gave a clearer picture of IRR readiness and availability. The Army estimated that about 27,000 IRR members need skill retention training each year. In FY 1989 approximately twelve thousand Army IRR members participated in skill retention or professional development training. Another four thousand IRR members performed active duty tours for special work.

In FY 1989, 14,708 members of the USAR participated in the Army Reserve's Individual Mobilization Augmentation (IMA) program. Members of the IMA program are distinct from the IRR and are part of the Selected Reserve. IMA members did not attend weekly drills, but attended twelve days of active duty training annually with the unit to which they would be assigned upon mobilization. In FY 1989, by soliciting IRR members for possible assignment to a TPU or IMA position, the Army Reserve Personnel Center assigned 4,823 IRR soldiers to TPUs and 3,469 to IMA positions. Finally, retirees are also subject to recall to active duty. From a pool of approximately 503,000 retirees who have been classified by age, physical condition, and skill, 124,000 received assignment orders to specific duty locations in the event of mobilization. They would free active duty soldiers for deployment to more critical assignments and fill shortages.

An important factor in sustaining RC readiness is the Full Time Support Program. This support took several forms: Active Component; Active Guard/Reserve (AGR) personnel; Military Technicians (MTs); and Department of the Army civilians (DACs). The FTS assigned strength in FY 1989 was 86,484; the required number was 121,716. The ARNG had 76 percent of its required FTS and the USAR 60 percent. FTS personnel performed administrative, recruiting, planning, maintenance, and training functions and afforded part-time RC personnel the maximum time for training. The FTS program also allowed the RC to activate new units, modernize existing units, and assume new missions. The AGR consisted of full-time support by active Guard and Reserve members at units and headquarters. Active component augmentation included skilled officers and NCOs who served in selected staff positions in personnel, operations, plans, training, and logistics. Active component personnel were concentrated in key positions at the division level and in deployable ARNG units and some USAR CAPSTONE units. Full-time Department of the Army civilian technicians supported the RC from state headquarters to units and generally augmented unit maintenance programs.

The MTs were full-time civilian personnel who, as a condition of employment, were members of the USAR or ARNG and performed day-to-day sustainment tasks for the RC unit to which they were assigned. Congress took a keen interest in this program and imposed a hiring floor of 8,356 MTs. In July 1989 HQDA redefined a USAR TPU to liberalize the hiring of military technicians. In FY 1989, for budgetary reasons, the Army decided to hold AGR strength to its FY 1988 level and to reduce USAR MT strength by 397. Congress sanctioned modest increases for both and restored the 397 MTs to the USAR, without funding, and added 204 AGR (189 ARNG and 15 USAR).

The distribution of AGR personnel in the RC during the next few years would be guided by findings of the Full Time Support Task Force, established in FY 1988 by ODCSOPS. The task force continued into FY 1989 and reviewed ARNG/USAR staffing levels to revise criteria for FTS requirements. ARNG leaders, for example, believed that the number of MTs assigned to the Guard was inadequate to cope with the increased logistical requirements associated with more advanced weapons such as the Abrams tank and the Apache helicopter. The National Guard Bureau forecast a need for about eight thousand more technicians. Army leaders felt that limitations on FTS growth could hinder and possibly delay changes in the RC force structure, modernization, and assumption of new missions.

Recruitment and Retention

Manning RC units became increasingly difficult in view of regional shifts in population, a strong economy, and changing demographics. With the growing population of the sunbelt, RC units in that region were filled or near capacity, so recruiters were unable to exploit the manpower potential of the region. In other areas RC units had problems fulfilling recruiting and manning requirements as attrition rates in the RC reached historical highs in the early and mid-1980s. The unacceptably high rates of attrition were traced to conflicting personal and military obligations. Extended periods of training, such as Overseas Deployment Training or ARNG antidrug operations under state auspices, sometimes lasted six months. Reservists often were forced to choose between gainful employment and continued participation in RC units.

The RC tried to improve training, pay and benefits, and incentives. The ARNG expanded leadership training, improved sponsorship programs, established more realistic attrition reduction goals, and augmented family-oriented activities. The USAR inaugurated a revised promotion policy, employed consolidated promotion boards that allowed competition for promotion within geographic areas rather than just units, and adopted a new pay system. As the executive agent for the OSD's National Committee for Employer Support for the Guard and the Reserve (NCESGR), the Army sought to encourage greater understanding among employers, families, and RC members during FY 1989. NCESGR's goal was to develop public backing of the RC and to enlist employer support through advertising and such volunteer programs as Mission One. In this program every ARNG armory and USAR center would be supported by a community organization or business. Other Army programs, the Total Army

Career Counseling Program and RC Transition Program, both conducted by TRADOC, encouraged enlistment in the RC and the retention of personnel.

Recruiting objectives and criteria for the ARNG and USAR were governed by the Total Army Enlisted Accession Plan. The ARNG's recruiting goal for FY 1989 was 77,736, a decrease from its FY 1988 objective of 81,644. The Guard sought 42,755 recruits with no prior service, with at least 89 percent of them high school graduates and no more than 9 percent in Test Category IV. The USAR's recruiting target for FY 1989 was 77,500, 74 fewer than the previous year. It hoped to attract 30,167 non–prior-service recruits with 90 percent high school graduates and a maximum of 10 percent in Test Category IV. Despite a shrinking pool of non–prior-service men and women (persons with 180 days or fewer of active duty and not MOS qualified), the ARNG fell short of its FY 1989 authorized strength of 457,300 by just 360. Its attrition rate for enlisted personnel in FY 1989 was 17.7 percent, the lowest in several years. The ARNG also obtained a 90 percent rate of non–prior-service enlistees with high school diplomas, and only 9 percent in Category IV.

The RC's ability to attract and retain personnel with prior military service was a matter of concern. The total RC reenlistment objective was 82,324: 34,981 for the ARNG and 47,333 for the USAR. Prior-service accessions were 35,571 for the ARNG and 44,056 for the USAR. For the USAR, FORSCOM also established a first-term reenlistment objective of 10,494, and actual reenlistment amounted to 9,460. The actual career reenlistment rate was 108.2 percent. To improve prior-service enlistment in the RC, the Army examined the possibility of training active component soldiers nearing the end of their enlistment for specific RC unit vacancies to reduce problems of MOS mismatch and subsequent retraining in the RC.

The RC succeeded in attracting new officers, yet it had substantial MOS shortages for wartime requirements. The number of officers who entered the RC from ROTC declined as the number of ROTC cadets commissioned into the active component increased in 1989. The recruitment of medical personnel into the RC was a critical problem in FY 1989. (*See Table 7.*)

Incentives to reduce its medical manpower deficit included a program that allowed nurses and doctors to substitute service in a teaching hospital for weekly drills. With a recruiting goal of 1,250 nurses in FY 1989, the U.S. Army Reserve Army Nurse Corps (USAR ANC) exceeded its objective by recruiting 1,600 but still had a mobilization shortfall of several thousand. Other incentives were stipend support to continue professional training and bonuses. A disincentive was the requirement that all nurses who entered active or reserve service in FY 1989, regardless of

TABLE 7—Selected Reserve Medical Personnel Strengths by Specialty

	Budgeted	Available
Physicians		
General Surgeon	1,307	483
Anesthesiologist	227	182
Orthopedic Surgeon	427	166
All Other	3,358	2,943
Total	5,319	3,774
Nurses		
Nurse Assistant	859	360
Operating Room Nurse	1,206	680
All Other	7,555	6,312
Total	9,660	7,352
Enlisted		
Licensed Practical Nurse	8,267	4,983
All Other	46,846	44,813
Total	55,113	49,816

Source: Reserve Component Programs FY 1989, p. 110.

prior civilian experience and skills, begin as second lieutenants. The Army deleted the requirement that associate degree and diploma nurses must have one year of full-time work experience before joining the RC, and the requirement for six months of full-time employment during the year preceding application was changed to allow part-time employment. During FY 1989 Dorothy Pocklington became the first USAR nurse and the first female USAR officer to become brigadier general as an Assistant to the Chief, ANC, for Mobilization and Reserve Affairs.

The National Army Medical Department Augmentation Detachment (NAAD) offered flexible training for RC physicians and nurses in critical specialties who were unable to train regularly with a unit. Physicians and nurses could be members of the NAAD and assigned to an understrength USAR unit anywhere in the country. At the end of FY 1989, 250 medical doctors and 209 nurses were members of the NAAD.

To help RC recruitment, Congress extended the Montgomery GI Bill educational benefits to the RC in FY 1985. By the end of FY 1989, 61,722 ARNG and 38,152 USAR members, or 34 percent of the ARNG and 53 percent of the USAR eligible to apply, had applied for benefits. For RC members it was a general entitlement program for which participants must meet specific terms of enlistment, whereas active component soldiers had to contribute to their benefits. In addition, benefits for reservists could be applied only to college undergraduate programs, while active component personnel could use them for undergraduate, graduate, vocational, technical, or apprentice educational programs. Vocational training benefits for reservists were expected by FY 1991.

Full-time support for the RC's recruiting efforts was provided by AGR soldiers, civilian recruiting specialists (USAR only), and AGR In-Service Recruiters. Under the control of state adjutants general, 2,457 AGR recruiters supported the ARNG. The USAR had 1,975 AGR and 58 civilian recruiters and some support from active Army recruiters. The 177 In-Service Recruiters complemented those of the ARNG and USAR by assisting soldiers leaving active duty and joining RC units. While the long-term solution to the RC's recruiting difficulties suggested relocating units near population density, congressional approval was doubtful. As a temporary solution, the Army sought to increase its AGR recruiters in more difficult recruiting areas.

Budget Issues

Approximately 10.8 percent of the FY 1989 budget was earmarked for the reserve components. The ARNG operations and maintenance budget was $1.83 billion, of which $179 million was allotted to programmed training time. The total Department of the Army funds appropriated for ARNG procurement in FY 1989 was $1.436 billion. Approximately $440 million of this amount was for modern equipment that included 178 M1 Abrams tanks. In FY 1989 Congress appropriated $248 million for the National Guard and Reserve Equipment Appropriations (NGREA). Complementing the regular RC budget, the NGREA was designated by Congress to purchase specific equipment, with any remainder to be used at the ARNG's discretion to acquire equipment that would enhance readiness. To reduce the backlog of deferred equipment maintenance, Congress also provided $111 million to the ARNG to acquire spare parts. To fund new construction and maintain and repair existing Guard facilities, Congress appropriated $229 million. Although the ARNG completed fifty major construction projects and the USAR sixteen in FY 1989, the appropriation made only a small dent in the estimated $2.66 billion ARNG construction backlog. The lack of adequate facilities for training and storage of equipment was exacerbated by the growing backlog in maintenance and repair funding.

Congress appropriated $3.299 billion in FY 1989 for pay ($1.849 billion), training ($280 million), administrative support ($1.128 billion), and educational benefits ($40 million). Members of the ARNG trained twelve weekends per year and two weeks in the summer, with weekend pay ranging from $21 to $200 depending on rank and longevity. During 1988, for the first time, social security was withheld from drill pay. A provision of the 1988 Defense Authorization Act that became effective in FY 1989 stipulated that RC members injured on active duty would receive more liberal incapacitation pay.

The operations and maintenance budget for the USAR was $831 million, and approximately $446 million of that was slated for the training TPU forces. The USAR received $30 million of the $256 million provided by the NGREA. Congress appropriated $86 million for USAR construction projects, but a construction backlog of $1.91 billion remained at the end of FY 1989. USAR personnel costs for FY 1989 were $2.241 billion: $1.387 billion for reservists in organized units, $24 million for IMAs, $46 million for IRRs, and the remainder absorbed by the costs of active duty reserve augmentation, incentives, and recruiting.

For the past several years the USAR had experienced numerous difficulties with pay procedures. In July 1988, 91 percent of USAR personnel were paid correctly, a 38 percent improvement over a six-month period. For further improvement, the U.S. Army Finance and Accounting Center fielded two new systems to provide RC soldiers timely and accurate pay while on short tours of active duty—the Short Tour Pay System for low-volume payroll offices, and the Reserve Component Automated Pay System Support for high-volume payroll offices. The former is a computerized system that replaced manual pay procedures and was fielded during December 1988–February 1989. Deployment of the second system began in January 1989. The 6th Quadrennial Review of Military Compensation, conducted in August 1988, recommended more than seventy changes in RC pay and compensation. Many of the proposals were expensive; one would allow reservists to draw reduced retirement pay after twenty years rather than wait until age sixty. The Bush administration submitted six recommendations as separate bills to Congress in FY 1989. They included a pay increase for reserve medical officers while on active duty, a test of new incentive pay and educational benefits to curb personnel turbulence, and pay for IRR members recalled for one day to update records. Congressional action was not expected until FY 1990.

Readiness

Readiness is a combination of manpower, training, and logistics. RC success in FY 1989 in meeting many manpower requirements and attracting better qualified men and women helped raise RC readiness. In 1985 only 60 percent of ARNG units had an acceptable readiness level (C–3 or better). Unit readiness, as measured by the availability of personnel, was 80 percent by mid–FY 1989. Major combat units that reported low readiness levels included the 50th Armored Division (New Jersey ARNG), the 163d Armored Brigade (Montana ARNG), the 205th Infantry Brigade (Minnesota USAR), and the 27th Infantry Brigade (New York ARNG). These four units were being activated or reorganized in FY 1989. The 205th and the 27th suffered organizational turbulence because of their conversion from separate to organic infantry brigades. The 205th Infantry Brigade lacked sufficient equipment and training funds. Many 27th Infantry Brigade members were in a nondeployable status or not MOS qualified. The brigade's organic elements were widely dispersed and had few opportunities to conduct weapons qualification and coherent unit training. By mid–FY 1989, 1,806 of the 2,777 RC units under FORSCOM had achieved a readiness status of C–3 or better.

Throughout the year HQDA and FORSCOM devoted special attention to improving the readiness of the 200,000 Presidential Call-up Package. In addition to efforts to bring units to a minimum of C–3, HQDA authorized substitution of higher rated units for lower rated ones. For the first time, assignment of parent active component unit equipment to USAR units was also authorized to improve their readiness. Six of ten ARNG divisions had achieved a readiness status of C–2 or C–3 by FY 1989. Nevertheless, all six divisions experienced some personnel shortages and insufficient levels of MOS qualification. Although available for deployment, the divisions would require twenty-eight to fifty training days before deployment. The four lowest-rated divisions were undergoing force modernization or major reorganization. Of the RC's 21 separate combat brigades (18 ARNG, 3 USAR), 13 were deployable (C–3 or better), and 6 had a roundout status. All of the deployable brigades would require twenty-five to forty postmobilization training days to prepare for deployment. Corrective actions brought a noticeable improvement to the ARNG's equipment readiness rate in FY 1989. In the third quarter the fully mission capable (FMC) equipment readiness rate of the Guard attained the Army's goal of 90 percent. The ARNG's progress was largely attributable to Army Materiel Command (AMC) support and increased emphasis on unit maintenance by state maintenance managers.

RC logistics readiness was enhanced by distribution of the Tactical Army Combat Service Support Computer System (TACCS); the ARNG and USAR received 50 percent of the TACCS issued in FY 1989. A Reserve Unit Priority System (RUPS) equipment module that improved the ability of active and RC commands and agencies to manage equipment inventories and readiness had been developed based on a similar Marine Corps model and was being installed in HQDA and FORSCOM.

Approximately $280 million worth of equipment was transferred to the USAR and ARNG from active forces in FY 1989. Two ARNG battalions were equipped with M1 tanks, and six battalions replaced older M60 and M48A5 tanks with the improved M60A3 tank. One National Guard battalion converted from AH–1 Cobra to AH–64 Apache helicopters, and three battalions replaced UH–1 helicopters with UH–60 Black Hawks. Other major items acquired by the National Guard through either transfer from the active components or direct procurement in FY 1989 were the Bradley infantry fighting vehicle, the M112A3 armored personnel carrier, and the M901A1 improved TOW vehicle.

In the USAR all remaining armored battalions replaced M48A5 tanks with M60A3 tanks. Two aviation assault battalions received UH–60 helicopters to replace aging UH–1 aircraft, and three battalions were equipped with the AH–1S version of the Cobra helicopter. USAR units received additional M113A3 armored personnel carriers, five-ton trucks, and night-vision goggles. Budget restrictions in FY 1989 delayed the acquisition of additional automatic weapons and field kitchens for the ARNG and Bradley fighting vehicles and squad automatic weapons for the USAR. Major equipment shortages in the ARNG included five-ton trucks, tactical radios, maintenance and support equipment, chemical defense and decontaminating equipment, helicopters, and aviation night-vision devices. The USAR lacked authorized helicopters and fixed-wing aircraft, modern trucks, night-vision devices, generators, communications equipment, test and diagnostic equipment, and materials handling equipment (MHE). RC force modernization was also supported by the congressional appropriation of $286 million for RC procurement separate from procurement funds in the Army budget.

Slack maintenance was a vexing problem in the RC, evident during annual summer training and overseas deployment training (ODT) in Honduras and Panama in FY 1989. Poor maintenance led to cancellation of some training and operational activities. Setting an ARNG maintenance agenda, the Chief of the National Guard Bureau (NGB) in FY 1988 set a goal of 90 percent for equipment readiness in every ARNG unit. He stressed preventive maintenance and proper training for maintenance personnel. The fluid nature of the AirLand battlefield necessitated maintenance on the move. The ARNG formulated a concept to train General Support (GS) maintenance units at specialized regional training sites. Many training activities in the continental United States were modeled on USAREUR's Equipment Maintenance Center (EMC) at Kaiserslautern, West Germany, established in 1988. Intended as a Pershing missile maintenance facility, the site was modified in early 1989 for repair of heavy equipment by RC maintenance units. Congress determined that DOD should explore more peacetime overseas missions for the RC to enhance their training and readiness. In FY 1988 the Army submitted a concept for

RC heavy equipment maintenance companies (HEMCOs) to perform theater general support level maintenance in USAREUR while conducting ODT. Congress appropriated $2.9 million ($1.2 USAR/$1.7 ARNG) to fund a third week of ODT for the six RC HEMCOs and thirty new AGR spaces for the EMC.

In FY 1989 the following six HEMCOs rotated to Europe on an experimental basis: the 115th Heavy Maintenance Company (Utah), the 307th Heavy Maintenance Company (Kentucky), the 665th Heavy Maintenance Company (South Dakota), the 1071st Heavy Maintenance Company (Michigan), the 3670th Heavy Maintenance Company (Oregon), and the 238th Heavy Maintenance Company (USAR) from Texas. The six companies tallied 38,888 productive maintenance manhours during FY 1989 and saved approximately $700,000 in labor costs to USAREUR. The Army envisioned the participation of twelve RC HEMCOs in FY 1990 and a possible permanent annual RC rotation to support USAREUR's maintenance mission. The EMC's permanent complement of 29 personnel included 20 AGR personnel (9 USAR and 11 ARNG). The EMC became a permanent facility on 5 May. EMC training sites in the continental United States were also staffed by AGR personnel and by active component augmentation assigned to the ARNG and USAR. AMC managed the maintenance workload at the stateside sites. Each RC GS maintenance unit benefited during its annual training by working as a unit in a fixed maintenance facility using its assigned organizational equipment and also performing a meaningful maintenance mission. The construction of RC regional training sites at Tobyhanna and Sacramento Army Depots for the maintenance of high-technology equipment was completed in FY 1989. Regional sites at Fort Dix, New Jersey; Fort Bragg, North Carolina; Camp Dodge, Iowa; Camp Roberts, California; Camp Blanding, Florida; Camp Shelby, Mississippi; Camp Custer, Michigan; and Gowen Field, Idaho, also were completed in FY 1989. Regional training sites for aviation maintenance and new equipment training and sustainment training on the Deployable Medical Systems (DEPMEDS) were opened in FY 1989. Throughout the RC older training facilities needed repair and modernization. Facilities utilization at USAR training centers averaged 200 percent. A backlog of $2.3 billion existed for repair and replacement of overburdened facilities.

Training

RC readiness to assume its wartime missions rested largely upon premobilization training for both individuals and units. Army leaders and Congress identified several detractors, which included limited time to train, chronic administrative distractions due to heavy reporting loads and multiple inspections, frequent unit reorganizations, extensive mismatching of MOSes (27.3 percent in July 1989), limited access to local training areas, and a lack of equipment. HQDA's goal was a minimum of 80 percent of an RC member's drill time devoted to mission-essential training, while informal Army surveys revealed that the time varied from 10 to 90 percent. A major training detractor for both Inactive Duty Training (IDT) and Annual Training (AT) was a chain of command insensitive to the negative consequences caused by multiple administrative requirements imposed upon units. The GAO recommended that the Army introduce a full-time trainer in RC companies to stress training for mission-essential tasks. Congress responded to the RC's relaxed response with the requirement that soldiers take a Skill Qualification Test (SQT) every two years, and Army leaders promised faithful compliance.

Recognizing the time and funding constraints imposed on training, the Army formulated a comprehensive RC Training Strategy. The Reserve Component Training Strategy Task Force (RCTSTF) began work in October 1987 and addressed the five essential dimensions of training—individual, leader, and collective training; training support; and management. The RCTSTF agreed that RC soldiers and units would train to the same standard as the active component but on fewer Army Training and Evaluation Program (ARTEP) tasks. The task force made fifty-two recommendations; the most important included the need of the RC to attain and maintain an 85 percent MOS qualification rate in battalions, to obtain proficient command and staff at all echelons, and to achieve proficiency in battalions on mission essential task lists (METLs) by an emphasis on unit combat operations. General Vuono approved the RC Training Strategy concept in August 1988. ODCSOPS formulated the concept into the RC Training Development Action Plan (RCTDAP), which Vuono approved on 18 May 1989. The Army bracketed $35.5 million in its FY 1989 budget for the plan. On 9 January 1989, ODCSOPS formed the RC Training Integration Division (DAMO-TRR) in its Training Directorate as the Army Staff's focal point for the RCTDAP.

Nearly half of the RCTDAP recommendations were initiated before the plan was formally approved. Late in FY 1988 General Vuono directed the Deputy Commander, Command and General Staff College (C&GSC), to review reserve component officer education. The resultant task force completed its work in FY 1989 and recommended closer alignment between educational requirements and promotions, sharpening the focus on wartime skills, and making better use of the latest educational technology to compensate for limited training opportunities. Most of the task force's recommendations were incorporated into the RCTDAP. In May 1989 the Army published the FORSCOM/ARNG Regulation 350–2, *Reserve Component Training*. It constituted the first comprehensive guide to ARNG training and combined training objectives, strategies, and techniques for Total Army training objectives. The regulation stressed tailoring ARNG training to wartime missions and was compatible with FM 25–100, *Training the Force*, also published in FY 1989.

Reflecting recent changes in NCO training and education in the active force, the ARNG began to adopt the new RC NCO Education System in FY 1988. By FY 1989 the Guard conducted RC-PLDC and Phase 1 of RC-BNCOC training at state military academies and five regional NCO academies. The regional academies were at Fort Indiantown Gap, Pennsylvania; Leesburg Weekend Training Site, South Carolina; Camp Shelby, Mississippi; Camp Ashland, North Dakota; and Camp Williams, Utah. An arrangement between the NGB and FORSCOM directed the CONUSAs to manage Phase II of BNCOC and ANCOC training for the ARNG. During FY 1989 leadership training became a prominent element in all RC training. Several issues urged by the RC Training Strategy Task Force that pertained to RC leadership training were selected for accelerated implementation in FY 1989—transferring funds to enable an additional 1,500 USAR lieutenants to attend the Officer Basic Course, linking the RC NCO education system to training required for promotion to the appropriate grade, establishment of a Senior Sergeants Staff Course, and concentrated training for key battle staff positions. Early in 1989 TRADOC directed service schools to implement a two-week course to provide branch-specific training for RC company commander designees who had not trained in the branch of the unit to which they were assigned. The first course began at the end of FY 1989.

The RCTDAP stressed realistic tactical training, particularly for CAPSTONE and roundout units. WARTRAIN, which FORSCOM implemented at the start of FY 1989 as defined in FORSCOM Regulation 350–4, *Training Under CAPSTONE, 1 August 1988*, emphasized increased involvement of wartime commanders in training CAPSTONE-aligned combat units. During FY 1989, 45 percent (2,028) of the ARNG and USAR units trained with wartime commands during annual training. Twenty percent (874) of the USAR units trained with CAPSTONE commands during inactive duty training. The Dedicated Training Association (DTA) Program, an essential component of WARTRAIN, nurtured year-round training assistance between a host active unit and an affiliated reserve unit. The new FORSCOM regulation discontinued two earlier programs: the Partnership and Counterpart Programs. WARTRAIN's companion program, CORTRAIN, fostered similar training opportunities for corps commanders and staffs of active and reserve components. The Counterpart Contingency Training Program, sponsored by the unified commands, allowed higher echelon commanders of major Army commands and pertinent USAR commands to familiarize with mutual wartime missions and requirements. The

Pacific Command, for example, sponsored a Pacific Counterpart Contingency Training Program in FY 1989 that brought together RC leaders with commanders from WESTCOM, U.S. Army, Japan (USARJ), and U.S. Forces, Korea (USFK).

Tactical training under RCTDAP was to be as realistic and mission oriented as possible. Reserve components were encouraged to use the Battlefield Operating System (BOS), a computer-generated exercise that simulated the tempo, scope, and uncertainty of the battlefield. The best training, however, was field training such as annual training at combat training centers and Overseas Deployment Training (ODT). To enhance training further, the Army realigned the Maneuver Area and Maneuver Training Commands at each CONUSA to establish a single Maneuver Exercise Command (MEC) on a trial basis. The test MEC, established at Fourth U.S. Army, was organized into a headquarters element, a corps/division exercise detachment, and five training exercise detachments without any increase in manning. Projections for a permanent MEC program included several hundred additional spaces.

By the end of FY 1989 two ARNG infantry divisions (IDs), the 38th ID of Indiana and the 28th ID of Pennsylvania, had participated in the Army's Battle Command Training Program (BCTP). The 28th Division began its participation in the BCTP in November 1988 with in-house seminars. In April and May 1989 the division conducted two weekend Command Post Exercises (CPXes) keyed to the forthcoming WARFIGHTER exercise in August. The WARFIGHTER phase began during the 28th's fifteen-day annual training exercise at Fort Indiantown Gap, Pennsylvania. In this phase the division's battle staff engaged in realistic decision-making akin to a fluid battlefield situation.

During FY 1989 the Army instituted a new mobilization evaluation program that featured three types of exercises—Selected Reserve call-ups, mobilization station exercises, and CSS exercises. OPTIMAL FOCUS exercises tested the mobilization ability of Selected Reserve individuals and units by notifying 10 percent of those units subject to the Presidential 200,000 call-up. OPTIMAL FOCUS 89, conducted by FORSCOM from 3 through 5 March, alerted 54 RC units (17 ARNG and 37 USAR). CALL FORWARD exercises, scheduled to begin in FY 1990, would test the ability of mobilization stations to handle the surge in personnel and equipment during a call-up. Elements of three USAR training divisions conducted Mobilization Army Training Center (MATC) exercises in FY 1989. Other training exercises addressed the readiness of combat service support forces. With 70 percent of the Army's total medical strength in the RC, the USAR 8th Medical Brigade, the largest Army medical brigade in the continental United States, participated in Exercise ORCHID SAGE 89 at Fort Drum, New York, between 17 and 22 August 1989. For most of the 6,000 troops who took part, ORCHID SAGE 89 was their first field test of medical equipment and combat medical support procedures. Four deployable medical systems were used in the exercise.

Although eight ARNG and twenty-four USAR medical units received DEPMEDS new equipment training by the end of FY 1989, only two DEPMEDS sets were distributed to the RC through FY 1989, and they were at ARNG medical regional training sites. The lack of DEPMEDS among USAR medical units was a critical equipment deficiency. The Army planned to provide twenty-five DEPMEDS sets to the ARNG and ninety-four sets to the USAR by FY 1996, but expected to distribute only five sets to the USAR between 1991 and 1993. Many RC units would not receive complete DEPMEDS sets until mobilization. MEDEX 89, which involved nearly three thousand active and reserve components medical personnel from eighteen states and Puerto Rico, tested their medical capabilities for wartime conditions.

To improve individual MOS proficiency levels and to reduce the burden of individual training on RC units, TRADOC devised computerized courses which could be taken locally that focused on mission-essential wartime tasks and Skill Qualification Tests. The Training Reserve and Action Instructional Network System (TRAINS), formerly the Reserve Component Instructional Information Management System (RIMS), was incorporated into the Army's distributed training strategy. TRAINS was tested in September 1989 with transmission of a two-week language course from the Defense Language Institute to Fort Stewart and Fort Campbell where RC members participated in the course.

During FY 1989 ODT by the RC developed mutual training and planning relations with active component counterparts, enhanced readiness, and demonstrated the Army's resolve to support U.S. commitments overseas. ODT began in 1976 and grew to 3,364 units, or 55,532 reservists, by FY 1987. In FY 1988 and FY 1989 budget constraints reduced the program; 47 percent of the ARNG's requests for ODT were rejected. Reduced training money resulted in the cancellation of REFORGER in FY 1989 and a decrease in the number of reservists taking part in ODT. Reserve component units participated in numerous security assistance and humanitarian relief operations that qualified as ODT. They included the Expanded Relations Program in the U.S. Army Western Command (WESTCOM) that employed RC engineer and civil affairs elements and humanitarian assistance in Jamaica in the wake of Hurricane Gilbert, as well as specialized engineer projects elsewhere in the Caribbean. In Southwest Asia, a small number of reserve engineer units participated in the Central Command's Exercise BRIGHT STAR, and the USAR 412th Engineer Command sent elements to Egypt, Somalia, and Jordan.

Extensive ODT was carried out in Latin America, especially Honduras. Exercise Fuertes Caminos 89 fostered road-building projects in that country between February and July 1989 that involved approximately eleven thousand reservists. Exercises Fuertes Caminos 89 North and South, conducted in north-central Honduras, entailed the rotation of RC heavy engineer battalion-size task forces on overlapping seventeen-day training tours. Participating units were assigned to either Task Force 16, formed from the 16th Engineer Group of the Ohio ARNG, or to Task Force 164 under the control of the 164th Engineer Group of the North Dakota ARNG. ARNG units worked on a stretch of highway that would eventually link the Honduran capital, Tegucigalpa, with the Caribbean coast. The exercise included a medical readiness exercise, the provision of medical support for Army troops at Camp Tejas, and medical civic action programs. Other RC elements established shower and laundry points, water purification, and POL supply points. Active component forces also participated in both Fuertes Caminos North and South. Other USAR medical units trained in Panama and Bolivia in FY 1989.

Because of the controversy surrounding American military assistance programs in Central America, a suit was brought by several governors who contested the authority of the federal government to deploy the ARNG overseas for training. On 6 December 1988, a three-judge panel of the 8th Circuit Court of Appeals in St. Louis, Missouri, nullified a provision of the FY 1986 Defense Authorization Act that prohibited state governors from interfering, except in times of state emergencies, with Army plans to send ARNG units overseas for training. The appellate court reversed the earlier decision of the district court and upheld the right of the governor of Minnesota to refuse participation by his state's militia in training exercises in Central America. The Minnesota governor contended that the purpose of the deployments was to support the Contra-led insurgency against Nicaragua and that Article 1 of the Constitution gave the states supremacy in training their militias. Despite the ruling, the governor of North Dakota, whose state was under the jurisdiction of the 8th Circuit, supported the Army's authority to dispatch units of the 164th Engineer Group (ARNG) to Honduras in February 1989. On 28 June 1989, however, the full 8th Circuit Court of Appeals voted seven to two to confirm the constitutionality of the 1986 law that authorized DOD to order ARNG units to train overseas. A ruling by the 1st Circuit Court of Appeals, moreover, rejected a similar argument propounded by the governor of Massachusetts.

Antidrug Operations

The enlarged antidrug participation of both the active and reserve components in FY 1989 stemmed from provisions of the 1989 Defense

Authorization Act that made DOD the lead federal agency for the detection and monitoring of air and sea transit of illegal drugs into the United States. The Omnibus Drug Initiative Act of 1982 amended the Posse Comitatus Act of 1878, which prohibited active component forces from exercising domestic police powers and authorized them to support local police forces through the loan of equipment, personnel support, training, and sharing of information. The activities of ARNG units operating under state jurisdiction were not restricted by the prohibitions of the 1878 act. Some states have used National Guard units to eradicate marijuana and interdict drug traffic since 1977. The Army and Air National Guard have supported federal law enforcement agencies in similar tasks since 1983.

In FY 1989 Congress appropriated $400 million for DOD antidrug operations and earmarked $40 to $60 million for the ARNG. During 1988 forty-four states submitted plans to the NGB for a more active role by the ARNG in the war against drugs. By early FY 1989 thirty-one states and the District of Columbia were employing ARNG elements to support local law enforcement agencies, usually for transportation or the loan of equipment. California submitted the largest request for ARNG support, about $20 million. Operation BORDER RANGER II, conducted during a thirty-day period in FY 1989, involved ground and air elements of the California National Guard in cooperation with federal, state, and local law enforcement authorities (LEAs) from six counties. The ARNG provided an aviation battalion of more than thirty helicopters to help county sheriffs locate drug smugglers along the Mexican border. BORDER RANGER II was a sustained operation that addressed all modes of illegal drug traffic in a specified geographic area. The operation was marred by the loss of a UH–1H Iroquois helicopter and three members of the ARNG; the aircraft crashed after hitting a power line while observing a suspicious vehicle.

Florida guardsmen were used on a variety of antidrug missions. ARNG members were called to active duty for as long as six months to assist in the inspection of planes and ships in South Florida. Members of the 705th Military Police Company aided both state authorities and the U.S. Customs Service in searching for illegal drugs at the Port of Miami. The number of days of active duty service was limited to 179 to avoid recalled guardsmen from being counted against congressionally mandated active component strength ceilings. Some DOD officials argued that the Customs Service misused the ARNG by primarily assigning them manual labor tasks.

Guard units from eleven states worked with the U.S. Border Patrol and the U.S. Customs Air Service to identify and track illegal ground and air drug traffic in FY 1989. Guard units also provided aerial and infrared photo reconnaissance support and ground-to-air radar along the U.S. southern border and in the Caribbean. In urban areas the National Guard furnished military police for traffic control, information processing assistance, aircraft for command and control, and specialized training to local law enforcement agencies. Forty-seven states have loaned specialized equipment, such as night-vision devices and communications equipment, to law enforcement agencies. During FY 1989 some seven thousand Army and Air National Guard personnel from fifty-three states and territories supported 1,811 drug interdiction and eradication operations. The value of drugs and other contraband seized exceeded $12 billion. Approximately 4 million marijuana plants, 46,000 pounds of processed marijuana, 10,000 pounds of cocaine, and 39 pounds of heroin were seized.

Conclusion

At the end of FY 1989, despite improvements in manning, equipment, and training, the RC faced an uncertain future influenced by strategic changes, fiscal austerity, and nagging doubts by some critics of the RC's competency. The possibility that USAR and ARNG would acquire more missions created an uneasy tension between ends and resources. The possibilities of either a reduction or an increase in the nation's investment in the RC gave further urgency to the challenges the RC would face in the 1990s. Among the most immediate challenges were consolidating and building upon the initiatives started in FY 1989, maintaining authorized strengths with quality soldiers, ensuring that RC members were MOS qualified, improving unit training, and modernizing both USAR and ARNG units.

9

Quality of Life Issues

Introduction

As the Army's demographic composition changed during the 1970s and 1980s, so too did its quality of life (QOL) issues. The Army was one of the most socially integrated organizations in the United States; women and minorities, defined by race, constituted important segments of its strength, with minorities often exceeding their representation in society. Despite slight declines in Army strength since 1987, female and minority representation rose among new officers and enlisted personnel. This representation, however, did not always translate into full equality or satisfaction with Army policies and practices. Quality of life issues rooted in minority and gender rights and changing life-styles were prominent in the Army of FY 1989, along with the special needs of families. Drug abuse and AIDS propelled QOL issues beyond the traditional concerns of pay, housing, medical services, and benefits. The Army believed that the attention it devoted to QOL issues improved unit stability and cohesion, personnel retention and recruitment, training, individual job satisfaction, and readiness. QOL efforts embraced policies, programs, facilities, and services that influenced the living and working environment of soldiers and their dependents. In FY 1989 there were 991,035 dependents of soldiers, and the majority of them, 794,912, resided in the continental United States, Alaska, and Hawaii. The dependents of Army civilian personnel stationed overseas raised this figure to 1,006,726.

Pay and Housing

In January 1989 all active component personnel received a pay raise of 4.1 percent along with increases in subsistence and housing allowances; the basic allowance for quarters (BAQ) increase averaged 7 percent. Combined pay and allowances increases averaged about 4.3 percent. While the 1989 pay increase narrowed the difference between military and private sector pay, military salaries still averaged 10.1 percent less. A recommendation of the President's Quadrennial Commission on Executive, Legislative, and

Judicial Salaries proposed that general officers, whose basic pay had been capped at $75,000 annually, should get raises as high as 30 percent starting in 1989. The increases did not materialize because Congress rejected legislation to raise its own salaries in February 1989. Soldiers stationed overseas also received cost of living allowances (COLAs) to offset the American dollar's declining value relative to local currency. It helped soldiers and command-sponsored, or authorized, dependents maintain a standard of living comparable to residing in the United States. Dependents who did not enjoy command sponsorship lived on the local economy and did not get the COLA. They sometimes lived in costly substandard housing and endured high prices for subsistence. The number of Army command-sponsored dependents at the end of FY 1989 was 216,937; 171,136 were in Western Europe, with 162,894 of that number in West Germany. Army non–command-sponsored dependents totaled 11,991. Some members of Congress sought to restructure military pay to simplify an overly complex system and make military pay more comparable with private sector pay. While such sentiments were not new, the basic structure of military pay and compensation remained intact during FY 1989.

Housing was a major item in the Army's budget, a significant expense for many Army members, and a leading QOL issue. The Army's FY 1989 family housing budget, including the cost of new housing construction, amounted to $1.528 billion. A major portion of the FY 1989 housing budget, $597.1 million, was devoted to maintenance and renovation of existing on-post family quarters. Congress questioned the priority accorded this effort in relation to new construction and was also disturbed by what it perceived as a lack of uniform quarters rehabilitation standards among all of the armed services. Congress instructed DOD to develop common standards and a schedule for refurbishing existing housing. Army family housing strategy, in order of priority, was to partially refund basic operations and maintenance costs and reduce deferred maintenance and repairs for on-post housing, occupy additional foreign and Section 801 leases, and build more housing.

Several DOD programs helped defray housing costs for Army personnel. On the average, the BAQ paid for 61 percent of the total housing costs for all pay grades. Housing costs for some lower ranking enlisted personnel rose to almost 50 percent of their incomes in FY 1989, well above DOD's goal of limiting the cost to 30 percent. DOD's FY 1989 goal was to cover 80 percent of housing costs with a combination of the BAQ and the Variable Housing Allowance (VHA). The VHA applied in cases where base housing was scarce and off-base housing costs were high. Indexed to annual surveys of local housing costs and substantiated by actual housing expenses, the VHA helped equalize housing costs for all military personnel in the same grade throughout the United States.

In some areas with scarce family quarters and steep private housing costs some married enlisted personnel and junior officers were forced into marginally standard private dwellings. Some relief was provided in FY 1989 when Congress increased BAQ by an average of 7 percent and appropriated $114.3 million for the construction of 1,121 new family housing units at several posts that included Fort Wainwright, Alaska; Fort Irwin, California; Fort Bliss, Texas; Fort Leavenworth, Kansas; Fort Drum, New York; Helemano and Schofield Barracks, Hawaii; and Hohenfels, West Germany. Estimates of the unit cost for new housing varied from a high of $180,000 in Alaska to $73,500 at Fort Leavenworth.

While it is DOD and Army policy that off-post housing is the primary source of housing, shortages of off-post and on-post housing in several locations resulted in long delays for available housing for newly assigned personnel. To reduce waiting time and to monitor vacancies and occupancy in FY 1989, the Army expanded its use of the Housing Operations Management System (HOMES), an automated system to manage the utilization rate of base housing more efficiently. HOMES was especially valuable in Europe in identifying vacated rental units. The Installment Purchase (IP) Program, a DOD pilot program, encouraged third-party developers to construct family housing. DOD in turn would pay for the dwellings in a manner akin to a home mortgage. Congress reacted favorably to the IP Program because it encouraged private sector participation, which would compensate for decreasing military construction appropriations.

Other housing programs specifically addressed the acute housing shortage in USAREUR. Although it had a need to house about one hundred thousand families, USAREUR could accommodate only about forty thousand in on-post quarters. About twenty thousand families lived off-post in government leased quarters, some built expressly to house American dependents by German entrepreneurs. The remaining forty thousand lived in local housing. Because of shortfalls in military construction funds, the Army gave greater consideration to local housing, but the German housing market was contracting in the Frankfurt and Stuttgart areas where many Army families were concentrated. The scarcity of base and off-base housing compelled USAREUR to prohibit families from accompanying soldiers to West Germany unless housing was available. Delays in securing approved family housing sometimes caused long family separations. The Government Rental Housing Program (GRHP), the Army's first major overseas housing initiative since the build-to-lease program in the mid-1970s, sought to alleviate this situation. Under the GRHP the Army leased off-post housing for families assigned to Germany. USAREUR negotiated and managed housing contracts and assumed all costs associated with the lease. Soldiers who volunteered for the program forfeited all housing allowances and agreed to live off-post in GRHP housing for an entire tour. In FY 1989 the Army leased more than ten thousand housing units in Germany under the GRHP and expected to lease nineteen thousand by FY 1991, or enough to house 20 percent of all Army families in Europe. As FY 1989 ended the Army studied the feasibility of expanding the GRHP to other overseas theaters and the continental United States.

USAREUR also tested an elective program that aimed to facilitate access to housing and reduce the cost of permanent change of station (PCS) movement overseas. Military personnel who participated in that program were limited to either bringing 25 percent of the allowable weight of household goods based on grade or a total of two thousand pounds, whichever was greater, and USAREUR would provide additional household furnishings and appliances. To support implementation of the program, Congress included additional money in the FY 1990 budget to increase the stocks of government-owned furniture and raised the allowable weight of household goods that Army families could ship to Europe. The Quarters Cleaning Initiative (QCI) was a worldwide DOD program for which Congress authorized $30 million in FY 1989; nearly half was allocated to the Army. The funds enabled the Army to hire contractors to clean and restore vacated quarters to good order before the arrival of new occupants. Although the program contributed to the speed with which vacated housing could be reoccupied, Congress limited the QCI to $220 per unit in FY 1989. It considered the program wasteful and contemplated reducing or eliminating the program.

Army Communities of Excellence Program

In FY 1989 the Army inaugurated a major initiative, the Army Communities of Excellence program, to improve facilities and services for soldiers and their families at Army installations. When the ACOE was launched in October 1988, General Vuono highlighted its significant features. The program should foster community involvement by harnessing civilian and military resources alike to carry out local improvements largely through self-help and other low-budget approaches. A second significant aspect was to improve services. An underlying assumption of the ACOE program was that excellence throughout the total Army community—work, home, and recreation—bolstered individual morale and unit esprit and contributed to better recruitment and retention, training, productivity, and combat readiness.

Under ACOE, MACOM and installation commanders had considerable latitude in selecting projects; in setting standards for rehabilitating living, work, recreational, and other community areas; and for controlling the delivery of services. In addition to appropriated funds from construction or maintenance accounts, ACOE projects could be supported with private sector funds, conducted as self-help programs, or achieved by the use of troop labor. The Army intended to publicize successful ACOE projects as models for other Army posts, and highly successful ones would compete for special recognition by the Chief of Staff. The first ACOE awards were bestowed to Fort Monmouth, New Jersey; Fort Rucker, Alabama; the Sacramento Army Depot, California; the 20th Support Group, Taegu, South Korea; Seventh Army Training Command, West Germany; and Camp Zama, Japan.

Environmental Concerns

Environmental issues that affected the safety and health of Army personnel and their families, as well as the communities around Army installations, emerged in FY 1989 as a significant QOL concern. The Army complied with an increasing number of federal, state, and local environmental laws, but it also experienced a rise in environmental violations, litigation, and adverse publicity that sometimes affected missions. Commanders could solicit technical assistance from Army agencies such as the Corps of Engineers and the Army Environmental Hygiene Agency to improve compliance. Underscoring this concern was the conviction on 23 February 1989 of three highly regarded Army civilian employees from Aberdeen Proving Ground for violating the Federal Resource Conservation and Recovery Act. During FY 1989 the Army enlarged the responsibilities for environmental matters assigned to the Office of the Chief of Engineers and also established an Environmental Law Division in the Office of The Judge Advocate General. The Army encouraged incentive programs such as the Secretary of the Army Environmental Quality Awards. To carry out its environmental program in FY 1989, the Army budgeted approximately $323 million.

The Army's major environmental protection initiative continued to be the Installation Restoration Program that supported the Comprehensive Environmental Response, Compensation, and Liability Act. The Army was increasingly concerned in FY 1989 about the contamination of soil and ground and surface water around previous dump sites and old industrial facilities. The Army was experimenting with incineration and composting to treat contaminated soil and launched two experiments involving the biological degradation of explosives in the soil during FY 1988 and FY 1989. At the Louisiana Army Ammunition Plant contaminated soil was mixed with horse manure, straw, alfalfa, and other compostable matter to biodegrade the residue of chemical explosives. A second experimental decontamination program was carried out at the Badger Army

Ammunition Plant in Wisconsin. At other Army sites efforts centered on detection and monitoring, control and abatement, and hazardous waste disposal. In addition, the Army Environmental Hygiene Agency and the Army Medical Research and Development Command evaluated health risks at numerous Army hazardous waste sites to establish a priority list for future clean-up programs.

As public concern mounted over the dangers of exposure to the radioactive gas radon, the Army began monitoring radon levels at its facilities in response to a DOD directive. Performed by the Chief of Engineers and the Surgeon General, the Army radon measurement and mitigation program focused on family quarters, troop billets, schools, and child care and medical facilities. DOD also instructed the armed services to establish procedures to eliminate unnecessary release of ozone-depleting substances as a result of American endorsement of the Montreal Protocol of September 1987, by which many nations agreed to take measures to protect the Earth's ozone layer. The Army responded by planning a program in March 1989 to reduce its use of chloroflourocarbons (CFCs) and halons. The Army used CFCs primarily as refrigerants and solvents, while halons were employed as firefighting agents.

Medical Benefits and Health Problems

The Army provided medical services to active duty soldiers, dependents, retirees, and the reserve components. This included balancing readiness for wartime requirements with a peacetime medical practice that supported the quality of life of the Total Army Family. Balancing resources for these dual requirements was difficult in a climate of tight budgets and competition for experienced medical practitioners from the private sector, where doctors and nurses commanded higher salaries. At the start of FY 1989 the Army lacked significant numbers of doctors and nurses throughout its active and reserve medical structure. It had total peacetime requirements for 13,529 Medical Corps (MC) officers. The requirement for the active component was 5,371 MC officers to man the Army health care system, to respond to contingencies short of mobilization, and to provide an orderly transition to mobilization. With 5,248 MC officers, the active component lacked 123 officers or 2.3 percent. The reserve components needed 8,158 MC officers but had only 5,502 spread between USAR troop units, the ARNG, and the IRR and Standby Reserves. This caused a shortfall of 2,656, or 33 percent. Approximately one-third of the requirement consisted of specialists in the fields of anesthesiology, orthopedic surgery, and general surgery. The Army Nurse Corps required 30,041 in both components. Among enlisted medical specialists, shortages were compounded by the presence of unqualified personnel.

Surveying the state of Army medical force structure at the start of FY 1989, the Surgeon General considered the disparity in pay between the military and private sectors as the foremost cause for the shortages of medical personnel. Some medical practitioners declined military service because military pay was too low to maintain expensive malpractice insurance to cover their earlier civilian practice. The FY 1989 Defense Authorization Act directed DOD to study ways to make military service more attractive for doctors. The resulting Health Profession Special Pay Steering Committee recommended higher pay and bonuses to doctors who served in the armed forces. The Army pursued this goal by increasing the number of recruiters, offering educational guarantees, and employing pay differentials such as board certified, variable, and special pay incentives. Despite these incentives, the recruitment and retention of Army doctors in FY 1989 remained far below required levels. Early in FY 1989 DOD submitted to Congress proposals similar to the committee's findings that offered bonuses in amounts that varied according to specialty and length of reenlistment. DOD sought to compensate military doctors in understaffed specialties at incomes more competitive with those of doctors in private practice and also recommended higher bonuses for multiyear reenlistments in lieu of incentive pay. DOD's recommendations were incorporated into DOD's 1989 Medical Officer Retention Bonus Plan, and Congress subsequently approved many of them.

A subsequent DOD report completed later in FY 1989 dealt with the problem of attracting and retaining qualified nurses. The Army, for the first time, failed to meet its active component nurse recruiting goal in FY 1988. It mustered only 4,542, or 91.5 percent, of its authorized 4,903 active component nurse positions. The USAR recruited 520 nurses in FY 1989 and exceeded its goal, but the USAR nurse attrition rate also increased as private sector salaries became more attractive. Recruiting and retaining nurses was more difficult for the active components than for the reserves because of the absence of bonuses and special pay. DOD proposed giving active component nurses a variety of incentives similar to those afforded doctors and considered opening a uniformed services nursing school as a means of alleviating the shortage of military nurses in all the armed services. The House Armed Services Committee considered legislation to lower the educational standards of DOD nurses. The Chief of the Army Nurse Corps opposed lowering the current requirement that all active component nurses have a baccalaureate degree to one that allowed nurses with two- or three-year degrees to serve as active component warrant officers or as lieutenants and captains. Nurses lacking a four-year degree could still serve in the reserve components.

Retaining sufficient medical specialists on active duty, the Surgeon General noted, improved readiness and contributed to more responsive and less costly medical care for dependents. The rise in peacetime medical care costs was caused largely by the referral of dependents and retirees to more expensive civilian providers through the Civilian Health and Medical Program for the Uniformed Services (CHAMPUS). A GAO study found that in 85 percent of the doctor visits by dependents and retirees the patients lived within forty miles of a military hospital that was unable to provide cheaper direct care services. In FY 1989 the Army's direct care system consisted of seven medical centers, forty-two station hospitals, and numerous clinics worldwide.

The Army had difficulty staffing its major medical centers and smaller community hospitals with doctors in such civilian specialties as pediatrics, family medicine, and obstetrics and gynecology. At many posts the Army resorted to contracting civilian physicians or relying on CHAMPUS for such specialties. Contracting for higher-paid civilian physicians to work side by side with military doctors, however, had a depressing effect on the morale of some military doctors. The Surgeon General noted that family medical specialties were essential to maintaining a high quality of life for soldiers and their families, especially female soldiers. He also believed that the general medical skills of such practitioners would be significant in wartime. Obstetricians were expert abdominal surgeons, and general practitioners and pediatricians were versed in treating diseases, internal medicine, epidemiology, and related fields.

Starting in 1988 each armed service assumed responsibility for disbursing its CHAMPUS funds. Among its efforts to curb peacetime health care costs generated by CHAMPUS payments to civilian specialists, the Army began an experimental program, "Catchment Area Management" (CAM), at Fort Carson, Colorado, and Fort Bliss, Texas, in early FY 1989. A common feature of all the test programs was giving hospital commanders more direct control over their medical budgets. Under CAM, a hospital commander could use CHAMPUS funds to refer a patient to a local civilian provider or to contract for a civilian provider to deliver services at the military facility, whichever was determined to be the less costly.

All medical treatment facility commanders also could use the Military-Civilian Health Services Partnership Program to help in controlling access to, the quality of, and the cost of health care services obtained from CHAMPUS providers. Under this program, commanders negotiated memoranda of understanding with CHAMPUS providers in the local community that allowed them to provide their services on the premises of the military facility at a reduced reimbursement rate, generally 30 percent or more off the then prevailing fees. Additional savings accrued through avoidance of civilian source ancillary services and civilian institutional charges for inpatient services. At the beginning of FY 1989, six Army medical centers and twenty-four Army community hospitals had agreements with 256 individual physicians and nonphysician providers and provider groups.

Another innovation in FY 1989 was the establishment of low-cost clinics with the Primary Care to Uniformed Services (PRIMUS) program. PRIMUS was a system of outpatient clinics, owned and operated by private medical contractors, that treated minor illness and offered emergency treatment to eligible beneficiaries. The clinics were located near large military installations to relieve pressure on military hospitals. Ten clinics were operating in FY 1989—Fairfax, Burke, and Woodbridge, Virginia; Savannah and Columbus, Georgia; Fayetteville, North Carolina; Salinas and Monterey, California; and Copperas Cove and Harker Heights, Texas. A total of twenty-six clinics was planned by FY 1992.

Health care costs were increasing in both the military and civilian sectors faster than the rate of inflation. The DOD FY 1989 budget for health care was $2.449 billion, compared to $2.267 billion in FY 1988, and the entire increase went for improving direct care programs. Rising costs led the Bush administration in FY 1989 to reconsider imposing user fees on military dependents and retirees who sought care at military health facilities, a proposal that had proved highly unpopular in the past. The Office of Management and Budget, however, asked DOD to incorporate such fees in its budget estimates for FY 1990. In addition, the Army and its sister services, the Veterans Administration, and the Public Health Service formed a clearinghouse, the Federal Healthcare Innovation Network, to share innovative practices and new technologies and to participate in cooperative cost-cutting measures. Although a GAO survey of nine military hospitals found inpatient satisfaction good and outpatient satisfaction slightly lower, Congress took action to remedy certain deficiencies. GAO auditors found that many military doctors, even though competent, were practicing without a state license. Congress required all military physicians to obtain a state license during FY 1989. Inspections of several Army hospitals by DOD and GAO auditors indicated that the Army was successful in staffing emergency rooms at base hospitals with doctors certified in emergency services.

Despite screening of recruits for the AIDS virus, the Army has identified about eighteen hundred soldiers in the active and reserve components, a rate of less than 1 per 1,000, who have tested positive for HIV since testing began in February 1986. Approximately seven hundred of the HIV-infected soldiers were on active duty in FY 1989. Retesting for HIV infection was required at least every twenty-four months, but could be done more frequently for such reasons as assignment to an overseas theater, blood donation, diagnosis of a sexually transmitted disease, or as part of admission procedures at Army hospitals or substance abuse rehabilitation programs. The Army began retesting the active component in FY

1988, and by mid–FY 1989 identified 581 HIV-positive soldiers on active duty. The ARNG and the USAR also began retesting their members in FY 1989. Civilian contractors conducted the tests for reasons of economy, better quality control, confidentiality, and avoidance of interference with other patient care at military medical facilities. Testing since 1986 has revealed a higher incidence of positive HIV among blacks and hispanics in the Army than among the two groups in the general population. Constituting 27.1 percent (12 percent of the general population) and 3.7 percent (8 percent of the general population) of the Army population respectively, black and hispanic soldiers accounted for 54.7 (26.7) and 15.1 (6.4) percent of all HIV-positive identifications. The infection rate among men was twice that for women, although women under the age of twenty also displayed a high incidence of HIV infection.

Disposition of HIV-infected soldiers was a controversial and costly issue for the Army. Some favored immediate discharge, but DOD policy permitted infected individuals to remain on active duty as long as they could perform their work. Restrictions on soldiers who tested HIV-positive included assignments to units likely to deploy overseas and to ranger and special forces, COHORT units, military-sponsored education programs that resulted in an additional service obligation, and assignment to the Army Recruiting and Cadet Commands. HIV-positive soldiers have been healthy enough to work productively for several years, but they must undergo medical evaluation every six months and inform sexual partners or spouses of their condition. DOD policy provided that ROTC and USMA cadets could be disenrolled if they tested HIV-positive. Army civilian employees could be tested for HIV when working overseas if required by the host country.

Army policy had required involuntary transfer of infected ARNG and USAR soldiers from troop units to the Standby Reserves. At the request of the Assistant Secretary of Defense for Reserve Affairs, the Army began addressing HIV-positive RC personnel on a case-by-case basis in FY 1989. Infected RC personnel could continue to serve in the reserve components, but they had to pay the cost to prove their medical fitness for duty. Upon presentation of such proof, RC personnel could serve in nondeployable billets in the Selected Reserve for which they qualified. If medical fitness was not proven, RC personnel would be mandatorily transferred to the Standby Reserve unless they elected to retire (if eligible) or requested discharge under the plenary authority of the Secretary of the Army.

Because of the opportunities for long-term monitoring and treatment of AIDS patients, the Army conducted one of the nation's most advanced AIDS research programs. The expense for testing, treatment, education, and research associated with AIDS was approximately $80 to 85 million in FY 1989; the retesting program alone cost $8 million.

The tragedy of a soldier's suicide affects not only close associates, it resonates throughout a unit or command. Suicide prevention often demanded the personal attention and intervention of leaders at all levels and utilization of all available individual and family support systems. Army policy on this issue was defined in AR 600–63, *Army Health Promotion*. In 1987 the Army experienced its lowest suicide rate in many years. For undetermined reasons, suicides increased in FY 1988 and rose to ninety-three in FY 1989. The typical Army suicide victim was a white male, age 19 to 29, in the grade of staff sergeant or below. The majority of suicide victims were estranged from their spouse or girl friend, often because of financial problems. The Army's goal was to prevent all suicides, but a more immediate effort centered on reducing their number during the peak periods of January and July/August.

Family Support Programs

Many QOL issues entailed reconciling the unique responsibilities of military service with family obligations and civilian life-styles. The stresses engendered by a military career—the risk of combat, frequent moves, separation from family—often disrupt family life. These stresses can negatively affect morale and efficiency and ultimately unit readiness. Not only did family support programs raise morale, they also influenced retention, which affected the cost of recruiting and training. During FY 1989 the Army strove to ascertain the QOL concerns and needs of soldiers, their families, civilian employees, and retirees. The effort varied from formal conferences sponsored by the Army leadership, to surveys, to sensing sessions conducted by the Inspector General Assistance Division, to Unit Ministry Teams led by chaplains. The Army Family Action Planning Conference was the Army's principal forum for addressing family support programs. The keynote speaker in October 1988, General Vuono, assured every soldier that the Army's goal was to have a combat-ready force supported by families whose quality of life equaled that of the citizens of the nation they defended. Leadership training throughout the Army, Vuono insisted, must be sensitive to soldier and family issues.

Since the mid-1970s the Army has become largely a married soldier's Army. In FY 1989 nearly 75 percent of officers and 52 percent of enlisted members were married, and 60 percent of all married members had dependent children. These changes put family matters at the forefront of QOL issues in FY 1989. The Army Family Program consisted of a broad array of services that included Army Community Services, Family Employment Assistance, Exceptional Family Member Assistance, Financial Planning and Assistance, Child Development Services, Home Day Care, and programs that addressed specific educational and medical needs. Approximately $72.7 million was applied in FY 1989 to support the Army Family Program, a decrease from the $78.2 million in FY 1988. Participants in the October 1988 Army Family Action Planning Conference VI identified fifty-six issues and highlighted five of them—financial hardship of service members and their families when relocating and inadequate assistance by post sponsors; the lack of uniformly high quality health care at all Army posts and displeasure with certain CHAMPUS policies; the need for more and better programs for exceptional family members; higher VHA compensation for off-post housing; and an erosion of educational programs for dependents and educational benefits for service members. General Vuono cautioned the conferees that practical solutions had to be balanced against limited financial resources and accented the importance of the Army Communities of Excellence program.

Relocation assistance was the top priority at the Army Family Action Planning Conference. The conferees believed that relocation could be less stressful with more informative orientations about schools, day-care, family housing, and employment for spouses. Dissatisfaction with the relocation process by Army families was substantiated in surveys and sensing sessions. Discontent centered on the shortage of on-post housing and affordable off-post housing and the stress associated with living in temporary accommodations while waiting for post housing. The transition between posts traditionally was left to volunteer sponsors and depended on the active support of local commanders. Army leaders also hoped lengthening the three-year tour to four years would alleviate some of the dissatisfaction. Relocation assistance and unit sponsorship programs emerged as an area of congressional interest in FY 1989.

In May 1989 Congresswoman Patricia Schroeder introduced H.R. 2508, the Military Family Relocation Bill of 1989, framed to assist military personnel during official moves. A prominent feature of the bill was establishment of relocation assistance centers at major installations. An experimental computer network established by the Army to exchange housing information between Fort Lewis, Washington, and Fort Benning, Georgia, ended in FY 1989 because of its high cost. Nevertheless, Congress urged the services to establish family relocation assistance centers on bases with an active duty population of 500 or more, staffed by trained counselors and equipped with computer information retrieval systems. During the year the Army independently instituted several measures included in the proposed bill. In early 1989 the Army expanded its Housing Referral Services to include solicitation of home-finding assistance packages from local real estate companies. The Army revitalized two traditional programs, the Army Sponsorship Program and the Army Community Service Relocation Assistance Program, which helped departing families prepare for relocation. As unit- or post-based sponsorship programs, they were almost without cost to the Army and depended on the spirit of caring and helping among members of the Army family.

Helping Army families in financial distress was also a major concern in FY 1989. Through its Family Member Employment Program, the Army provided preferential federal government employment to spouses of service members who relocated on a permanent change of station. In FY 1989 the Army automated and centralized its placement program, which made it compatible with DOD's Priority Placement Program. The Army employed about 22,000 Army family members; 5,000 military spouses were hired in the first three quarters of FY 1989. Another program encouraged Army spouses to open businesses in their homes, such as child-care services.

A survey conducted by the Army's Community Family Support Center, the Army Research Institute, the Soldier Support Center for the National Capital Region, and Triangle Research Institute, a nonprofit research organization, found that spousal employment opportunities influenced the attitudes of spouses toward their mates' decisions to reenlist in the Army. About 19 percent of Army spouses who were unemployed were actively seeking work, the percentage being higher for spouses of enlisted personnel whose lower income often necessitated a second income. The survey suggested that families of soldiers in the four lowest enlisted grades had the least satisfaction with the quality of life in the Army, and 33 percent of the spouses surveyed felt that their mates should leave the Army. DOD policy affirmed the right of spouses to hold jobs and prohibited commanders from discouraging or impeding this right. During FY 1989, however, military family advisory groups continued to receive complaints from Army wives critical of command pressures to conform to the traditional view of the Army wife whose aspirations were subordinate to the career of her husband. Although there was a significant undercurrent for change, 70 percent of the spouses in one survey of 12,000 service wives expressed satisfaction with Army life.

The availability of both post-sponsored and private day-care programs was another pressing concern for many Army families. Long waiting lists for a limited number of spaces were common. Both on- and off-post centers had inflexible hours of operation that did not accommodate unit training and operations conducted beyond normal duty hours. During FY 1989 the Army stressed the importance of family care contingency plans and compliance with Army regulations that required single parents and dual-service couples to designate caretakers for dependent children. Day-care was a necessity for single soldiers with children, soldiers married to soldiers, and soldiers with working spouses and children, and that need inevitably raised the question of whether the large number of single parents and military couples on active duty impaired readiness. In July 1989 the House Armed Services Committee asked DOD to examine this problem.

Families with disabled children had unique day-care problems, and assistance was provided to them by the Army Exceptional Family Member Program (EFMP). That program conducted its first summer camp for disabled children at Fort Gordon, Georgia, in FY 1989. Twenty-five children who were autistic or suffered from cerebral palsy and other dysfunctional ailments attended the camp.

To ease the chronic shortage of day-care workers, Congress authorized higher pay for child-care workers employed by the Army. The pay increase was funded by charging higher fees for day-care. In March 1989 Congresswoman Beverly Byron introduced H.R. 1277, the Military Child Care Bill of 1989, to improve the quality and availability of child-care centers for all the armed services. The proposed legislation would provide additional funds for on-post facilities only; establish uniform standards for safety, staffing, and inspections; and give priority placement to children of single parents. Passage of Congresswoman Byron's bill was still pending at the end of FY 1989.

The Army participated in other programs that nurtured strong family values. The Army Troop Support Agency negotiated with many states to allow commissaries to accept state-issued vouchers for the Department of Agriculture's Women, Infants, and Children (WIC) program. WIC sought to improve the health and nutrition of pregnant, breastfeeding, and postpartum women and children under the age of five who were at nutritional risk. Eligibility for WIC was based on family income, family size, and a determination of nutritional risk that varied from state to state. At the start of 1989, fifty-three of the Army's seventy-seven stateside commissaries accepted WIC vouchers. While WIC helped provide a nutritionally adequate diet for Army families, its growing use by Army families indicated that some of them had marginal incomes. Other family programs included reimbursement of Army families for certain expenses incurred in adopting children and free yearly round-trip flights to allow children attending stateside colleges to visit parents who were serving in overseas assignments.

In FY 1989 the Army became increasingly concerned about child abuse and family violence among service members. The Army Community and Family Support Center looked to strengthen its Army Family Advocacy Program specified in AR 608–18 by the same name. The center maintained an Army central registry to collect and analyze data on family violence, trained interdisciplinary case management teams that reviewed family violence and child neglect, and sponsored medical treatment when necessary. The Health Services Command prepared a protocol for medical documentation of child abuse or neglect, and the 7th Medical Command in USAREUR devised a package to aid teams in identifying children at risk to allow early intervention. Child sexual abuse was a growing problem in the Army as it was in society. In 1988 the U.S. Army Criminal Investigation Command (USACIDC) investigated more than 860 child sexual abuse cases on Army installations. The number of reported cases during recent years did not account for cases that involved Army members who lived off post. The increase reflected heightened awareness of the problem and pointed to the need for more Army preventive and treatment programs.

Marital Status and Gender Issues

Single soldiers, female soldiers, and members of minority ethnic and racial groups have registered grievances and pressed for reforms regarding perceived inequities in their treatment by the Army. Single soldiers complained about the treatment of single soldiers who lived on base compared to married soldiers who lived off base. They pointed to a greater loss of privacy, more harassment from inspections, and more frequent assignment to details and extra duties. Army leaders responded that identical treatment would be given to single and married soldiers in assignments. The Army agreed to minimize barracks inspections and to emphasize programs that were applicable to all soldiers regardless of marital status. Single soldiers sought improvements in morale and welfare services, club operations, opportunities for self-improvement, and more coed activities. The Better Opportunities for Single Soldiers (BOSS) initiative was launched by the Army's Community and Family Support Center at seven test sites: Forts Myer and Belvoir, Virginia; Walter Reed Army Medical Center, Washington, D.C.; Aberdeen Proving Ground, Maryland; Fort Jackson, South Carolina; and Forts Benning and Stewart, Georgia. At these installations BOSS committees prepared action plans to remedy specific grievances identified during workshops.

Single parents were unable to enlist in the Army unless they gave custody of their dependent children to a legal guardian, but single soldiers who became parents while on active duty could not be barred from serving or reenlisting nor restricted in their assignments. Army Regulation 600–20, *Army Command Policy*, required single parents, pregnant soldiers, and dual military spouses with children to file a Family Care Plan (FCP) that provided for the care of their children in the event of mobilization or deployment. This policy was challenged in FY 1989 when an enlisted woman, separated from her husband, sought to block her transfer to South Korea on an unaccompanied one-year tour and sued for a hardship discharge rather than leave behind her six-month-old infant. In supporting her commanding officer's decision to deny a discharge, the Army noted that the child's father, although estranged from its mother, could care for the child. Pending a ruling by a federal court, the enlisted woman's transfer to Korea was stayed.

The Army's policy toward homosexual soldiers did not change in FY 1989, but the issue of homosexuals in the uniformed services remained lively and contentious. Homosexual behavior was a bar to enlistment, and male or female soldiers who exhibited homosexual behavior were liable for dismissal from the service. DOD policy came under renewed scrutiny and was challenged by Congress, the courts, and groups that advocated nondiscriminatory treatment of homosexuals in the armed services. The 9th U.S. Circuit Court of Appeals in San Francisco, California, on 3 May 1989, ordered the Army to reinstate a soldier discharged in 1984 for being homosexual although he had an unblemished service record. The court ruled that the Army could not enforce its ban against homosexuals in this instance because it had repeatedly reenlisted the plaintiff despite knowledge of his homosexuality. The court left moot the constitutionality of barring homosexuals from military service.

Contrastingly, the 7th U.S. Circuit Court of Appeals barred an avowed lesbian from reenlisting in the Army Reserve. The court discounted the argument that the plaintiff had a right to be in the Army because she did not display homosexual behavior while on duty and rejected arguments that the Army denied the plaintiff's constitutional rights of free speech and equal protection. DOD and the Army regarded homosexual behavior as incompatible with military service because it had potentially adverse effects on discipline, morale, and security. Congress made public two DOD studies; one of them discounted the alleged security risk posed by homosexual soldiers, and the other one suggested that homosexuals adjusted to military service on a par with heterosexuals. Despite these studies, DOD reaffirmed existing policy toward homosexuals.

Morale, Welfare, and Recreation (MWR) Program

The Army's Morale, Welfare, and Recreation Program has served as a means to improve the QOL of soldiers and their families and to lower the incidence of crime and disciplinary actions. The MWR Program reflected the changing values of American society as they were manifested in the life-styles of Army members. During the late 1980s these changes were apparent in the declining use of post recreational services for more appealing off-post recreational alternatives. The Assistant Secretary of the Army for Manpower and Reserve Affairs noted that the Army did not provide the MWR products, services, and activities that today's sophisticated soldier demanded. Military recreational facilities, he added, were struggling to maintain a dying traditional life-style. Clubs, arts and crafts centers, libraries, and similar facilities have closed or curtailed their hours of operation for lack of patronage and funds. He questioned the increasingly expensive practice of subsidizing three separate clubs—enlisted, NCO, and officer—and he argued that MWR programs should pay for themselves.

Funding for the MWR Program derived from two sources. The first was appropriated funds (APF) budgeted for operation and maintenance, personnel, and military construction accounts. The second major source of funding was nonappropriated funds (NAF) generated from sales, charges, and user fees paid by those who use the MWR activities (included are Army–Air Force Exchange Service [AAFES] operations and AAFES fast food and pay telephone concessions). AAFES profits, for example, were used to help support NAF construction projects. In FY 1988 and FY 1989 Congress enacted several measures that affected the MWR Program and reinforced DOD's efforts to manage them more like businesses. Congress imposed a ceiling on the use of APF, exclusive of military construction funds to support MWR activities. It prohibited, effective FY 1990, the use of APF to reimburse NAF for employee payroll expenses when NAF employees were doing bona fide APF functions and filling APF positions. Except to support certain MWR services at remote sites and overseas, Congress curtailed the use of APF for underwriting military guest houses, golf clubs, marinas, bowling alleys, and similar activities.

Approximately $329 million in APF (including $29.4 million in military construction funds) was designated to support Army Community and Soldier Support services—libraries, recreation centers, and sports programs. Congress stipulated, however, that in the future funds for such activities would have to come from increased user fees or larger subsidies from more profitable MWR enterprises. The Army's costs for transporting merchandise to exchanges throughout the world exceeded the service's FY 1989 estimate of $64.3 million. Unanticipated increases in commercial maritime transport costs, unprogrammed transit costs in Europe, and a weakened U.S. dollar created a shortfall of $95.4 million in the AAFES transportation account. The resultant deficit in the Army's MWR account threatened to curtail other MWR activities. The situation was eased when Congress passed the $3.5 billion Dire Emergency Supplemental Appropriations Act in the summer of 1989, which enabled DOD to transfer money from its accounts to the Army MWR accounts.

Congress devoted special attention to the construction of MWR facilities using NAF in FY 1989. In reviewing those projects, Congress eliminated several that it believed had unlikely prospects of recovering the cost of construction. Of the 106 MWR projects proposed by DOD for all the armed services in FY 1989, Congress approved 44 at a cost of about $400 million. A project deleted by Congress was expansion of winter recreational facilities at Fort Wainwright, Alaska, while Congress approved the expenditure of $65 million to construct an Armed Forces Recreation Center (AFRC) at Garmisch, West Germany. In response to congressional guidance to implement business practices at AFRCs in FY 1988, the Army transferred responsibility for the operational control of three AFRCs in West Germany from USAREUR to the U.S. Army Community and Family Support Center (USACFSC). During FY 1989, following a favorable congressional review of this management change, HQDA directed USACFSC to execute its plan for a reorganization of the AFRCs in USAREUR that would reduce management staff positions and reassess line positions to increase efficiency.

While it praised the Army for savings realized from the redesign of some MWR construction projects and for innovative financing of others, Congress criticized the Army for its $300 million backlog for nonappropriated fund construction projects. Ninety percent of them had not been designed, and Congress questioned the Army's almost total reliance on the Corps of Engineers as the construction agent for NAF projects. This practice, Congress purported, also raised construction costs by as much as 20 percent. Congress directed the Army to determine whether alternative construction procedures would cost less and to report its findings by 1 June 1989. Funds were also included in the Military Construction, Army (MCA), appropriations for FY 1989 to construct MWR facilities. The Army emphasized the construction of MWR community support facilities and projects to support force structure and restationing initiatives, especially child development centers (CDCs) and physical fitness training centers. Congress appropriated $34.5 million in FY 1989 MCA funds for the construction of thirteen CDCs and $5.8 million for a physical fitness training center. Congress agreed that these projects supported readiness and fully endorsed them. Congress added funds to the Army's FY 1989 MCA budget to construct a CDC at Fort Sheridan, Illinois, which the Army had not requested, and advanced funds for the construction of a chapel at Fort Rucker, Alabama.

Commissaries

Army commissaries provided a major compensation to military personnel. Military patrons received an average savings of 25 percent over comparable purchases in the private sector, with savings being generally greater in high-cost urban areas. Many military personnel and their dependents considered this benefit second only to medical benefits. Commissary privileges were extended to the RC in FY 1987. To increase RC patronage of commissaries, RC personnel were authorized twelve discretionary shopping days per year as well as shopping privileges during periods of active duty in FY 1989. Nevertheless, some patrons found the system wanting. Soldiers serving overseas complained of inferior quality and high prices at many of the 102 Army commissaries outside the continental United States. One survey indicated that as many as 25 percent of Army spouses who used post exchanges and commissaries were dissatisfied with them. Congress directed DOD to conduct a comprehensive survey of the military commissary system; representatives from ODCSLOG, the Troop Support Agency (TSA), and the Military Traffic Management Command participated.

The Army opposed any change in the commissary system that would increase its operating costs or decrease benefits, but the $223.8 million appropriated by Congress in FY 1989 for the operation of Army commissaries was $6 million below the amounts provided in FY 1987 and FY 1988. In addition, the 1989 Defense Authorization Bill barred the Army from testing whether private sector operation of commissaries would cut costs. TSA, however, realized a 30 percent reduction by using a commercial contractor to build a commissary at Fort Sheridan and expected to award commercial contracts for new facilities at Forts Leonard Wood and Devens.

Discipline Indicators

Army discipline indicators generally showed a slight improvement but not a pronounced trend in FY 1989. Crimes of violence increased to a rate of 2.65 per 1,000 military personnel from 2.41 in FY 1988. Crimes against property declined from a rate of 8.52 to 7.66 per 1,000. The rates for courts-martial and nonjudicial punishments declined in FY 1989 from 5.14 to 4.91 per 1,000 and from 114.42 to 103.13 per 1,000 respectively. Other indicators—separations other than honorable, AWOL, desertion, and drunk driving—all declined slightly in FY 1989. Minorities generally received a larger share of disciplinary actions under the Uniform Code of Military Justice (UCMJ) than their majority cohorts despite a steady decline in UCMJ disciplinary actions in the Army. Blacks were overly represented in special and general courts-martial. Although the number of complaints of racial discrimination and sexual harassment increased in FY 1989, the number of substantiated reports of such charges declined for the third straight year. Increased complaints reflected greater awareness of the issues, improved reporting, and the increase of ethnic and racial minorities and women in the Army. One soldier was sentenced to death in FY 1989 for a murder conviction. The prison population of the U.S. Detention Barracks at Fort Leavenworth averaged around fifteen hundred in FY 1989, close to operational capacity.

Peak use of marijuana in the Army occurred in 1981, and its frequency has markedly declined since then. The rate for marijuana use in FY 1989 was nearly 50 percent lower than the rate five years earlier, but the rate of disciplinary actions for the possession or use of marijuana increased in FY 1989 from the previous year. The possession and use of cocaine, on the other hand, grew steadily after 1979. The increased use of cocaine was not consistent with the general decline in drug use in the service, but it was consistent with the increased use of cocaine in society. Other drug offenses increased steadily from FY 1987 to a rate of 4.44 per 1,000 in FY 1989. Army-wide discipline indicators for FY 1989 are shown in *Table 8*.

TABLE 8—Discipline Indicators
(numbers per 1,000 military personnel)

Crimes of Violence	2.65
Crimes Against Property	7.66
Marijuana Use or Possession	4.57
Other Drug Offenses	4.44
Total Courts-Martial	4.91
Nonjudicial Punishment	103.13
Separations Other Than Honorable	5.93
Absence Without Leave (AWOL)	9.6
Desertion	5.0
Driving Under the Influence	15.14

Source: Army Information Book, 20 April 1990.

In its 1988 Worldwide Drug Threat Assessment, USACIDC concluded that drugs would pose a growing threat within the Army during the next several years. The USACIDC stressed a proactive approach aimed at reducing supply and demand. The Criminal Investigation Command found that the widest use of drugs in the Army occurred after normal duty hours, with the most common source being the surrounding civilian population. The typical Army drug user was a lower grade male enlistee, age 17 to 21, who usually had experimented with more than one substance.

The Army resorted to a variety of measures to combat drugs. The Army's Alcohol and Drug Abuse Prevention and Control Program (ADAPCP), with a staff of 1,100, was the largest substance abuse program in the world and had served more than one million persons—active duty personnel, their families, retirees, Army civilian employees, and reservists when on active duty. Although drug testing had been extended to the reserve components, full implementation of the ADAPCP for members of the ARNG and USAR while not on active duty was hampered by a lack of AGR personnel. By deferring drug testing from preinduction to basic training, first-time drug offenders among new enlistees could also partake of ADAPCP's treatment and counseling programs.

To deter and detect illicit drug use, the Army relied on urinalysis, intelligence operations, and aggressive information and education programs. Although generally a reliable means of detection and an effective deterrent, urinalysis could be compromised by the predictability of test schedules because of the speed with which cocaine dissipates in the body after ingestion and also by administrative errors. The USACIDC found indications of underreporting of cocaine-positive test results derived from urinalysis to appropriate investigative agencies. During the first quarter of FY 1989, for example, the USACIDC initiated 545 cocaine-related investigations, whereas the Army Drug and Alcohol Operations Agency recorded 1,816 cocaine-positive tests during the same period. As FY 1989 ended the Army prepared to test for anabolic steroids in accord with a new DOD policy issued 31 August 1989. The target population in the Army was soldiers suspected of steroid abuse for athletic competitions. While the use of steroids is not illegal in the Army, the Army intended to stress education and require treatment for soldiers who initially tested positive. Punitive action would be limited to distribution or possession with the intent to distribute anabolic steroids, offenses that violated federal statute.

Following a DOD survey of military correction facilities, the Secretary of Defense designated the Army as executive agent to develop a plan for operating a consolidated DOD correctional program. The Army planned to convene a four-service task force, under the Office of the Assistant Secretary of the Army for Manpower and Reserve Affairs, to carry out DOD's mandate.

Conclusion

Providing members of the service with the highest quality of life was a major goal of the Army's leadership during FY 1989. In addition to supporting higher pay and housing benefits, the most basic quality of life issues, Army leaders sought to enhance other aspects of Army service. Together with morale, welfare, and recreational programs, some of which were revamped to reflect changes in leisure activities, initiatives such as the Army Communities of Excellence sought to improve both a soldier's workplace and living conditions with the goals of enhancing morale and readiness. Special programs sought to better the quality of health care, especially for female soldiers and dependents, while recruiting and retaining medical personnel to meet the Army's operational needs. The Army, moreover, increasingly addressed the particular needs of the diverse constituencies that comprised the Army community. The status of women in the Army, the quality of life enjoyed by Army families, the availability of day care for single-parent soldiers and working spouses, and the special needs of unmarried service members were among the array of issues that concerned Army leaders in FY 1989. Such matters reflected similar concerns prevalent in the larger society that the Army served, as did the service's efforts to cope with such vexing issues as substance abuse, AIDS, and homosexuality. Unable to completely insulate the Army from society, Army leaders during FY 1989, by both action and words, reemphasized that the Army takes care of its own.

10

Logistics

Together with comprehensive, rigorous, realistic training, effective logistical support constitutes the peacetime foundation of readiness. In wartime effective logistical support is vital to sustain combat power and ensure success on the battlefield. Logistical support in the Army falls into several categories—manning (to include feeding and clothing), arming, fueling, repairing, and transporting the force. The Army's capacity to perform its logistical functions rests on the proficiency of its logistical manpower, the responsiveness and scope of its logistical infrastructure, and adequate funding for logistical operations and modernization. The Army's logistical infrastructure embraces HQDA, MACOMs and their subordinate elements, thousands of active and reserve component combat service support units, and a large civilian work force. It likewise consists of reserve stocks strategically positioned, a suitably funded industrial base, and a host of cooperative international arrangements to share logistical burdens. Logistical effectiveness requires both an adequate force structure compatible with current doctrine and sufficient strategic lift.

The Army's peacetime logistical base consisted primarily of active component combat service support units that conducted normal supply and maintenance missions, a civilian work force to man the sustaining base, and the large reservoir of support units in the reserve components. During FY 1989 the Army took numerous steps to increase its logistical capabilities that ranged from modifying the division support base of light infantry divisions to use of RC heavy equipment maintenance companies to reduce the maintenance backlogs in Europe. It entailed ongoing changes in the Army's acquisition process and application of state-of-the-art computerized information and command and control systems to improve logistical management at every echelon. At the same time, the logistical base had numerous shortcomings. The readiness of RC CAPSTONE units and the reliability of host nation support during wartime were questioned. America's production base lacked the capacity to support large-scale industrial mobilization. Strategic air and sealift fell short of requirements for rapid reinforcement of U.S. forces in Europe according to NATO plans.

Logistical support must be compatible with tactical and strategic doctrine, force structure, and technological advances. The range of forces—heavy, light, mixes of heavy and light, combined arms, special operations—suggested the magnitude and complexity of the Army's logistical mission. Prominent among the questions under discussion in FY 1989 was logistical support in light infantry divisions and for mixed heavy/light forces. The Army was studying ways to improve logistical activities at echelons above divisions and corps (EAD/EAC) for the fluid battlefield of AirLand Battle doctrine. Most MACOM commanders believed the conceptual models for EAD and EAC support operations contained in the Logistical C^2 Concept Study prepared by the Army Logistics Center (ALC), Fort Lee, Virginia, warranted additional testing and evaluation because the models posed a risk of force structure turbulence. Another catalyst for change in logistical concepts was rapid technological advance. Force modernization often altered the transport of supply, induced changes in maintenance procedures, and affected service support personnel training. Logistics management at every echelon has been profoundly influenced by computerized information management systems and tactical data networks. The computerization of logistical management, however, offered opportunities to the Army to manage and maintain logistical functions in the face of reduced funding.

The influence of computers and automation was apparent in Army-wide management systems such as HQDA's Logistical Data Network (LOGNET); the Army Standard Information Management System (ASIMS), formerly the Vertical Installation Automation Baseline (VIABLE); and the Logistics Applications of Automated Marking and Reading Symbols (LOGMARS). LOGMARS, which used identification markings similar to the code bars familiar to most consumers, kept track of production, distribution, expenditure, and accountability of Army ammunition in FY 1989. LOGMARS enabled the Army to assuage congressional concern about the security of Army ammunition stocks. Congress urged the Army to make wider use of LOGMARS in other logistical operations. In FY 1989 the Army pursued integration of its logistical management systems with national and joint systems. This effort extended to the Unit Level Logistical System (ULLS). ULLS automated the management of a unit's Prescribed Load List (PLL) and the functions of The Army Maintenance Management System (TAMMS). ULLS prototypes were fielded to seven divisions in FY 1989 for evaluation. Based on Army recommendations of 5 May 1989, OSD approved a two-stage fielding plan to install an improved version of the ULLS, ULLS-II, to all MACOMs. Upon completion of the first phase, it was anticipated that 12,586 ULLS-IIs would be in operation. In the second stage, scheduled to begin in FY 1993, ULLS would be converted to Army Command and Control System (ACCS) common hardware and software.

The Tactical Army Combat Service Support Computer System (TACCS), a two-person, portable microcomputer system, was the primary workstation for CSS operations from battalion to division. TACCS supported personnel, supply maintenance, medical, ammunition, and transportation missions. Approximately 10,200 TACCS had been distributed to active and reserve component units through FY 1989. Congress stipulated that half of the TACCS procured in FY 1988 and FY 1989 had to be distributed to the reserves. Systems such as ULLS, TACCS, and ASIMS were building blocks toward the goal of systems integration in the Army. ASIMS provided base operations information support to forty-seven Army bases, or distributed processing centers, and five regional data centers in CONUS. It enhanced productivity in such functional areas as personnel, finance, and logistics management and operations. In FY 1989 the Army expanded ASIMS to fourteen bases in Germany. The U.S. Army Information Systems Command (USAISC) used new technology and methodologies, such as "surround technology," to develop systems to integrate information from disparate systems. The USAISC, for example, engineered a system that made lessons learned created by Army commands, the National Training Center, and DOD agencies directly available to the Army Materiel Command.

The Army's expanding use of computer-generated information and management systems reflected a management philosophy that stressed centralized management and decentralized execution. The Army also sought to apply cost savings techniques and management policies that simplified organization and procedures and increased productivity. In FY 1989 these efforts ranged from the Army Regulation Reduction Program to the Commercial Activities (CA) Program. The former, a program managed by the Office of the Director of Information for Command, Control, Communication, and Computers, aimed to delete one-third of Army regulations by rescinding obsolete, revising out-of-date, and consolidating related regulations. By the end of FY 1989 the Army attained 77 percent of its goal of eliminating 382 regulations. Consistent with cost-effectiveness and readiness requirements, the Army relied on private sector products and services through its CA program, and logistical functions comprised about 57 percent of them.

Executive Order 12615, of November 1987, required HQDA to increase the number of positions subject to annual comparison with similar private sector jobs to at least 3 percent of the Army's civilian work force. In FY 1989, MACOMs and the U.S. Army Troop Support Agency identified more than nine hundred civilian logistical spaces in the United States for cost comparison to private industry under the CA program. These positions ranged from base operations support to commissary warehouse functions. Prominent among other management improvement programs was the Value

Engineering (VE) Program, whose goal was control and reduction of procurement costs, particularly spare parts. Under a directive from DOD, the Army prepared to adopt Total Quality Management (TQM), a comprehensive and disciplined management methodology to improve organizational effectiveness. TQM focused on total employee involvement to increase quality, reduce costs, and enhance customer satisfaction. It had particular relevance to the Army's acquisition process.

International and Cooperative Logistics

For nearly two decades the Army has participated in the Foreign Weapons Evaluation Program and, more recently, in the NATO Cooperative Test Program, both administered by DOD. American participation in the second program was authorized by an amendment to the FY 1987 Defense Appropriations Act. Their aims were to foster collaborative development and production of military arms and equipment common to all NATO forces to drive down RDA costs and eliminate duplication of effort. In FY 1989 Congress appropriated $150 million for American participation in NATO cooperative R&D projects. These projects must be enumerated in DOD's Five Year Defense Plan. They are funded by DOD for two years and then funding is assumed by an appropriate armed service. The Army participated in twenty-one coproduction projects valued at $20.23 billion in FY 1989. Joined by other NATO nations, the United States also helped draft a Conventional Armaments Planning System (CAPS), which sought to align long-range plans for weapons development and procurement with force goals.

At the start of FY 1989 the Army was engaged in NATO cooperative projects that included the multinational 155-mm. Autonomous Precision Guided Munitions (APGM), the Airborne Radar Demonstration System, the Laser Stand-off Chemical Detector, the Combat Vehicle Command and Control System, and electro-optic countermeasures. Ten items manufactured by NATO members were in various stages of comparative testing. Thirteen additional items were being assessed by the Foreign Weapons Evaluation Program for equipment produced by friendly non-NATO nations. During FY 1989 the Army received or was awaiting OSD approval for four new cooperative R&D projects—a hand-held All Agent Biological Chemical Detector, the NBC Reconnaissance System, Electromagnetic/Electrothermal Gun Technology, and Next Generation Artillery Armament System. All Army projects were adequately funded to complete their development, and HQDA instructed MACOMs to consider the NATO programs as useful methods to pursue the acquisition review process.

The APGM program involved a consortium of twenty contractors from eight nations. Referred to as a "smart bullet," the APGM is a terminally guided munition capable of being launched from an aircraft, tank, or artillery gun. When West Germany reduced its funding, NATO members made new financial arrangements in December 1989 that facilitated proceeding to the feasibility phase of APGM testing. This project was managed by the Army Armament Research, Development, and Engineering Center, Picatinny Arsenal, New Jersey. If development is successful, the APGM artillery-fired round will replace the Copperhead later in the 1990s. The NATO Future Main Battle Tank (MBT) project began in 1984, having superseded the aborted U.S.-German tank project, the MBT–70, which was dropped in favor of independent development because of rising costs and incompatible specifications. Seven or more types of battle tanks were deployed in NATO in FY 1989 and presented innumerable interoperability problems. The concept for a Future MBT, tentatively formulated in FY 1989, did not necessarily imply adoption of the same tank. It was intended that future MBTs could be rearmed, refueled, and repaired with common components at any depot in Western Europe.

Coproduction was an important aspect of international logistics. The United States and Israel reached a cooperative agreement in FY 1989 on developing a theater missile defense test bed for the Strategic Defense Initiative (SDI) to counter the short-range ballistic missile threat. The U.S. Army Strategic Defense Command managed this three-year developmental program valued at $53 million. A similar agreement made by the United States with the United Kingdom remained in effect in FY 1989. The M1A1 Tank Coproduction Memorandum of Understanding, signed 1 November 1988 between Secretary of Defense Frank Carlucci and Egyptian Field Marshal Abu Ghazala, allowed Egypt to develop local production of this tank. Under the pact, the U.S. company General Dynamics Land Systems (GDLS) would design the production line, install plant equipment, and give technical assistance so that Egypt could assemble 540 tanks from GDLS-produced kits. The United States would provide critical tank components such as special armor, power packs, and fire control but transfer to Egypt the technology to enable it to produce high-usage items such as road wheels and tracks. Egypt in turn had the option to purchase fifteen tanks. The project had important security assistance implications and was regarded as a model for future programs in other Middle East countries. On 13 June 1989, OSD approved an Army proposal to export the M1A2 tank for coproduction or coassembly on a case-by-case basis. Some sensitive items would be provided as end items to the customer by the Army, while certain advanced navigational components whose production was controlled by another federal agency would not be exported.

Two of the Army's most important international logistical programs in FY 1989 were the Wartime Host Nation Support (WHNS) Program and the Logistics Civil Augmentation Program (LOGCAP). Both programs bridged combat support and combat service support (CS/CSS) shortfalls among Army forces stationed overseas and also in areas of possible contingency operations that have austere logistical infrastructures. The WHNS program was essential to sustain combat activities in Europe, especially the planned ten divisions in ten days force. This support was acute to maintain advanced lines of communication in the United Kingdom, Belgium, Luxembourg, the Netherlands, and West Germany. The WHNS agreement between the United States and West Germany provided 100 German reserve units to support USAREUR with transportation, ammunition and petroleum, oil, and lubricants (POL) supply, casualty evacuation, engineer support, maintenance, and security. All 100 units were activated by FY 1989 but were not fully manned or equipped. Regarded by the United States as a model of allied burden sharing, the U.S.–Germany WHNS agreement was underwritten in FY 1989 by $133.36 million of U.S. Army funds and reflected an increase of nearly $41 million over FY 1988. This West German support equated to approximately fifty-thousand U.S. Army personnel.

The Army also participated in a WHNS program with South Korea that involved construction projects in that country to strengthen the readiness and warfighting capabilities of American forces. For its part, South Korea furnished paramilitary and civilian support in CS/CSS areas, provided Korean Augmentation to the U.S. Army (KATUSA), and the Korean Service Corps during peace and war. South Korean contributions equalled about twelve thousand Army troops. Through LOGCAP, the Army awarded civil contracts in peacetime to meet critical wartime CS/CSS shortfalls. The most extensive LOGCAP during FY 1989 was carried out by the Third U.S. Army (TUSA) for POL support in Southwest Asia. TUSA was also soliciting contracts for ship unloading and engineer support there that would equate to more than eight thousand U.S. Army personnel. USAREUR undertook LOGCAP planning to support its northern and southern flanks, and WESTCOM prepared LOGCAPs for the Aleutians and Guam.

Supply, Maintenance, Transportation, and Fuel

The Army central supply and maintenance program, or Program 7, supported the daily operation of major Army supply and rebuild depots and materiel readiness commands. It provided logistical support to training, sustainment, modernization, and quality of life programs. Training and sustainment were supported by spare parts, ammunition, and depot maintenance. Quality of life was supported by commissaries, post exchanges, and an orderly supply system. Funds for this program for the fiscal year totaled \$5.335 billion. Program 7 was divided into three categories: Central Supply (7S); Transportation (7T); and Depot Maintenance (7M). Central Supply supported the Army's wholesale supply system and second destination transportation for movement of supplies from production or depots to Army consumers. The \$2.913 billion allotted to Program 7 in FY 1989 represented a 7 percent decline in buying power from FY 1988. If shortfalls continued, they could impair the Army's responsiveness with wholesale supply support, cause backlogs for spare parts, and reduce the shipment of pre-positioned materiel configured to unit sets (POMCUS), ammunition, and war reserves.

The high volume of ammunition expenditures expected by modern armor, infantry, and artillery units in AirLand Battle was expected to place exceptional demands on ammunition supply and distribution systems. The Army projected that daily wartime consumption by a NATO corps would be about 15,750 short tons, 80 percent of which would be artillery ammunition. The Palletized Loading System (PLS), adopted in FY 1989, promised to improve the Army's Maneuver Oriented Ammunition Distribution System (MOADS). MOADS reduced ammunition handling at intermediate supply points by creating and distributing combat-configured loads (CCL). The PLS used a truck-trailer combination with demountable cargo beds. Each trailer could carry 16.5 short tons, and ammunition could be loaded or unloaded in only eight minutes with an on-board hydraulic system. Ammunition flatracks, carrying palletized CCLs, could then deliver their loads to division ammunition transfer points or directly to artillery units.

The Army's FY 1989 budget for materiel maintenance was in excess of \$2.2 billion. The gap between funded and unfunded requirements dropped in FY 1989 to \$381 million from \$421 million in the previous year. To support maintenance operations as well as stocking war reserves, Congress appropriated \$1.557 billion to purchase spare parts. These items ranged from nuts and bolts to aircraft and tank engines. Funded at \$2.422 billion in FY 1989, depot maintenance (7M) paid for costs associated with depot overhaul, repair, rebuilding, upgrade, and conversion of Army equipment and also maintenance support activities such as maintenance training, engineering, and publications. End-item (aircraft and vehicle) maintenance received only 63 percent of what was needed. Priority was accorded to secondary items (engines, transmissions) that contributed to near-term readiness and OPTEMPO and was funded at 100 percent of requirements. Maintenance support was funded at approximately 56 percent of requirements. The end-item maintenance backlog, \$141 million in FY 1987, could reach a half-billion in FY 1991.

The GAO questioned the Army's extensive use of civilians to maintain military equipment in stateside depots and installations in a report released in the summer of 1989. They found that this arrangement detracted from Army readiness by preventing soldiers from acquiring needed wartime skills. The GAO also reported that some Army mechanics in general support maintenance units did not spend sufficient time working on high priority equipment, such as M1 tanks, and performed too many low-level maintenance tasks more common to direct support maintenance companies. Reasons specified by GAO for this situation included a lack of diagnostic equipment and tools in some heavy equipment maintenance companies, inexperienced mechanics, and poor evaluation of individual and unit proficiency through MOS skill qualification tests. In its rejoinder, the Army made several observations. GAO examples were not representative of the entire Army, and many deficiencies were corrected before the GAO published its findings. Moreover, Army spokesmen contended, the Army's materiel condition status reports on major items of equipment depicted a more favorable portrait of equipment maintenance and readiness than the GAO. The status of missile systems and artillery weapons exceeded the Army's goal of 90 percent materiel readiness throughout FY 1989. The materiel readiness of tanks and combat vehicles ranged between 86 and 89 percent. Strategic air and sealift were vital concerns to the Army, but the Army relied on the Air Force and Navy for these services. During FY 1989, through mobility studies such as the Revised Intertheater Mobility Study (RIMS), the Army iterated shortcomings in this area. RIMS, for example, identified deficiencies in offloading men and cargo from Navy ships in areas without adequate ports or controlled by the enemy. The Army, moreover, was assigned the mission of Logistics Over the Shore (LOTS), and an Army-Navy memorandum of agreement on strategic mobility provided that the two services coordinate to preclude duplication of effort. Funding for LOTS in FY 1989 totaled $69 million, an increase of $8 million over FY 1988, and was devoted to procurement of special landing craft. The Army was acquiring the LAMP-H (lighter, amphibian, heavy lift) to offload heavy equipment such as M1 tanks and Bradley infantry fighting vehicles, but a prototype had not been tested. In the meantime, the Army had fielded two companies of Logistic Air Cushion Vehicles at Fort Story, Virginia; accepted four Logistics Support Vehicles (LSVs) from the contractor; and in late FY 1989 took delivery of a new 2000 Class Landing Craft Utility (LCU) for above-board transfer of cargo from deep-draft vessels. The Army found a similar Navy craft, Landing Craft, Air Cushion (LCAC), unsuitable for the LOTS mission, since the LCAC must be loaded from within a Navy "wet well" ship and cannot be used when cargo has to be loaded from above. The Army also lacked sufficient tugboats to maneuver ocean vessels for LOTS operations.

In FY 1989 the Army used 0.24 percent of national energy consumption. The cost to the Army in FY 1989 for POL, electricity, natural gas, coal, and other energy sources was $1.25 billion, a drop of $3 million from FY 1988. This savings was accomplished despite an increase in the unit cost of POL products between FY 1988 and FY 1989. Three-fourths of the energy used by the Army went for operating fixed plants and facilities; the remaining 25 percent was applied to vehicles and aircraft. By type of energy, 42 percent was POL, 20 percent electricity, 22 percent natural gas, 10 percent coal, and 6 percent other thermal sources. The Army's FY 1989 bill for seventeen million barrels of POL was $458 million. The Army was committed to several fuel conservation programs that ranged from developing non–gasoline-powered systems overseas to the more mundane conservation efforts of lowering thermostats and turning off appliances when not in use. Of the thirty-three Federal Energy Efficiency Awards presented by the Department of Energy for excellence in energy efficiency and management in October 1988, ten were made to the Army, including a special recognition for USAREUR's European Energy Program.

Recent legislation that deregulated the distribution of natural gas gave the Army an opportunity to procure natural gas competitively to lower utility costs at Army installations in the continental United States. The Engineering and Housing Support Center of the Corps of Engineers helped installation managers draw up contracts and identify areas of potential savings. Studies suggested that the Army could save nearly $3 million annually and apply the savings to reduce the backlog of installation maintenance and repair.

Construction, Installation Management, Base Realignments, and Closings

The FY 1989 Military Construction, Army (MCA), program supported force structure and modernization initiatives, provided funds to comply with statutory and regulatory environmental requirements, allowed only the most essential improvements in facilities, and deferred the replacement and revitalization of existing facilities. For FY 1989 MCA spending totaled $1.182 billion, compared to $1.318 billion in FY 1988.

Many construction projects undertaken or completed in FY 1989 supported the demands of major force structure changes. An example was completion of the new headquarters for the 2d Brigade, 10th Mountain Division, at Fort Drum, New York, in FY 1989. It was part of an extensive construction program at Fort Drum for the 10,000-man light infantry division, activated in 1984, that included housing for approximately fifteen thousand soldiers and dependents. The brigade complex encompassed 500,000 square feet of offices and training and housing facilities for the headquarters complement and three battalions. Total construction costs to rehabilitate Fort Drum for the 10th Mountain Division were expected to reach $1.3 billion, far in excess of $743 million, the Reagan administration's original estimate. Other construction in progress included facilities for the division's support command, combat aviation brigade, artillery, other brigade and division elements, family housing, and troop and community recreational facilities. Of the two thousand base-housing units planned, nearly one thousand were completed by December 1988. Housing construction was to be finished early in 1990 at a projected cost of $147.5 million. Under the 801 program, the Army contracted for about two thousand privately constructed off-post housing units for Fort Drum that would be leased to the Army for twenty years.

In FY 1989 the Army obligated $1.873 billion for facilities maintenance and repair, excluding $597 million for maintenance and repair of Army family housing. This amount applied to active and reserve components against a total facilities backlog of maintenance and repair (BMAR) that exceeded $2.5 billion, exclusive of the deferred maintenance and repair for Army family housing. Spending for the construction of Army family housing in FY 1989 was approximately $215 million. Nearly $228 million was obligated to lease housing units in the United States and overseas. Like other Army facilities, family housing had a backlog of deferred maintenance and repairs that reached $692 million in FY 1989.

Congress was particularly concerned about the Army's growing backlog of maintenance and repair and the revitalization of existing bases. In January 1989 the Army completed a comprehensive study for Congress that underscored the magnitude of the backlog and offered funding guidance to redress the condition for a five-year period that began with the FY 1992 budget. Real Property Maintenance Activities (RPMA) are composed of four functional accounts: utilities, maintenance and repair, minor construction (under $200,000), and engineer support. Annual recurring requirements (ARR) were dollars needed to finance the operation and maintenance of Army real property according to established engineering standards. Aggregate spending for RPMA in FY 1989 totaled $3.096 billion, an increase from $2.820 billion in FY 1988. The value of the BMAR projects, however, reached $2.545 billion, and budget projections envisioned substantial increases in the BMAR during the next several fiscal years.

With an estimated replacement value of $175 billion in FY 1989, installations and facilities were fundamental to every facet of Army operations. To improve the management of base operations, the Army participated in test programs that gave local commanders greater latitude over the expenditure of funds. Fort Leonard Wood, Missouri, and Fort Riley, Kansas, were among six installations selected by DOD to participate in its Unified Budget Test. Post commanders were given authority to shift a percentage of appropriated funds between budget accounts and to retain funds saved by economy measures for other uses. Existing regulations prohibited an installation commander from retaining unexpended funds; those funds reverted to a higher command to cover shortfalls in the same account at another installation. In the experiment, commanders shifted money to improve training, for maintenance and repairs, and for other purposes. During the first year of the test the Army reported a 3 percent increase in readiness at the two participating posts. The Army's "Model Base" Program that allowed CONUS base commanders to shift money between community activities accounts to improve them and enhance the quality of life was disapproved by Congress in FY 1989. Members of Congress believed the program's benefits were intangible and duplicated other programs.

Base realignments and closings continued as a major issue in FY 1989. On 3 May 1988, the Secretary of Defense chartered the Commission on Base Realignment and Closure to consider consolidating or closing underutilized or unneeded DOD bases. The Army supported the commission with a task force that provided information on 1,253 installations—current capacity, cost of base operations, current and future mission requirements, and the impact of selected realignment and closure scenarios on the Army. In October 1988 Congress enacted legislation that gave the commission power to detach its recommendations from the political wrangling that often undermined efforts to close installations. Upon receipt of the commission's list, the Secretary of Defense had sixteen days in which to accept or reject the entire list. If the Secretary approved the list, Congress then had forty-five days to accept or reject the entire list. If Congress rejected the commission's recommendations, its decision was subject to a presidential veto.

On 29 December 1988, the commission recommended closure or realignment of personnel and missions at 145 installations, 86 of which were to be closed fully, 5 to be closed in part, and 54 to experience an increase or decrease in units or activities. Army installations that were affected by this measure are listed in *Table 9*. The commission estimated an annual savings of $700 million. During a period of six years, the commission calculated savings that would range from $1.7 to $2.6 billion. These estimates did not include the cost of environmental cleanup and presumed the sale of installation properties. Congress enacted an amendment to the Military Construction Bill in late July 1989 that barred the closing of any base unless the costs associated with shutting it down were recoverable in six years. The Secretary of Defense approved the commission's recommendations and submitted them to Congress on 5 January 1989. Anticipating congressional approval, DOD also requested Congress to capitalize a special fund of $300 million for FY 1990 to cover the costs of closings and relocations.

TABLE 9—Base Realignments and Closures
(Based on Public Law 100–526)

Closures	
Fort Douglas, Utah	Tacony Warehouse, Pennsylvania
Cameron Station, Virginia	Hamilton Army Airfield, California
Presidio of San Francisco, California	Jefferson Proving Ground, Indiana
Coosa River Annex, Alabama	Nike Philadelphia 41/43, New Jersey
Navajo Depot Activity, Arizona	Fort Wingate, New Mexico
Nike Kansas City 30, Missouri	Nike Aberdeen, Maryland
Cape St. George, Florida	Bennett Army National Guard Facility, Colorado
Lexington–Blue Grass Depot, Kentucky	U.S. Army Reserve Center, Gaithersburg, Maryland
Pontiac Storage, Michigan	Fort Des Moines, Iowa
Alabama Army Ammunition Plant, Alabama	Indiana Army Ammunition Plant, Indiana
New Orleans Military Ocean Terminal, Louisiana	52 Housing Sites (various locations)
Army Materiel Technology Laboratory, Massachusetts	
Kapalama Military Reservation, Hawaii	

Realignments Out	
Fort Dix, New Jersey	Fort Leonard Wood, Missouri
Fort Jackson, South Carolina	Fort Bliss, Texas
Fort Benjamin Harrison, Indiana	Umatilla Army Depot, Oregon
Pueblo Army Depot, Colorado	Fort Meade, Maryland
Fort Holabird, Maryland	Fort Devens, Massachusetts
Fort Huachuca, Arizona	Fort Belvoir, Virginia
Fort Monmouth, New Jersey	

Realignments In	
Fort Knox, Kentucky	Fort Leonard Wood, Missouri*
Fort Jackson, South Carolina*	Fort Benjamin Harrison, Indiana*
Fort Lee, Virginia	Fort Carson, Colorado
Fort Belvoir, Virginia*	Fort Detrick, Maryland
Tobyhanna Depot, Pennsylvania	Redstone Arsenal, Alabama
Letterkenny Depot, Pennsylvania	Detroit Arsenal, Michigan
Picatinny Arsenal, New Jersey	Yuma Proving Ground, Arizona
Tooele Army Depot, Utah	Red River Army Depot, Texas
Fort Huachuca, Arizona*	Sierra Army Depot, California

Realignments In (Continued)	
Anniston Army Depot, Alabama	Fort Devens, Massachusetts*
Schofield Barracks, Hawaii	Fort Lewis, Washington
Fort Myer, Virginia	Fort McNair, Washington, D.C.
Fort McCoy, Wisconsin	Fort Ord, California
Oakland Army Base, California	Walter Reed Army Medical Center, Washington, D.C.
Fort Bragg, North Carolina	Fort Gordon, Georgia
Fitzsimons Army Medical Center, Colorado	Fort Drum, New York
Los Alamitos Army Reserve Center, California	Sacramento Army Depot, California
Fort Sill, Oklahoma	Fort Leavenworth, Kansas
Fort Benning, Georgia	Fort Shafter, Hawaii
Camp Parks, California	Fort Campbell, Kentucky
Savanna Army Depot, Illinois	Bluegrass Army Depot, Kentucky
Fort Irwin, California	Hawthorne Army Ammunition Plant, Nevada
Fort Monmouth, New Jersey*	Fort Indiantown Gap, Pennsylvania
Fort A. P. Hill, Virginia	Natick Research, Development, and Evaluation Center, Massachusetts
Aberdeen Proving Ground, Maryland	Harry Diamond Laboratory, Maryland
White Sands Missile Range, New Mexico	

*Posts listed under both the out and in columns are losing and gaining functions or personnel.

Congress asked the GAO to analyze the commission's findings. In a preliminary report in March 1989, the GAO contended that the commission overstated probable savings and underestimated environmental cleanup costs. Despite these reservations, the House Armed Services Committee approved the commission's proposals on 14 March 1989. Congress directed that medical personnel from hospitals and clinics at bases to be closed be reassigned to alleviate medical shortages at other bases and thus reduce CHAMPUS costs. As part of the FY 1989 Military Construction Authorization Act, Congress chartered a new multiagency body, the Commission on Alternative Utilization of Military Facilities, to identify excess military sites suitable for drug treatment centers or other uses. On 18 April 1989, the House of Representatives defeated a resolution to disapprove the Base Closure Act, making the commission's recommendations, made in accordance with Public Law 100–526 of 24 October 1988, legally binding on DOD. The House's action empowered DOD to complete all realignments and base closings between January

1990 and September 1995. The Director of Management of the Army Staff organized a task force to manage implementation of the realignments and closing of Army installations.

Immediately upon the law's enactment, the State of Illinois filed suit in U.S. District Court, Central District of Illinois. It claimed that the Defense Authorization Amendments and Base Closure and Realignment Act were unconstitutional and that the Secretary of Defense's approval of the base closure recommendations violated the Administrative Procedure Act. While general in nature, the suit specifically requested an injunction to stop closure of Fort Sheridan, Illinois. The court, however, denied the state's request. By the end of FY 1989 little progress had been made to realize the commission's goals except for planning efforts.

Subsistence and Clothing

Advances in food technology were changing the way the Army preserved, prepared, packaged, and distributed food, but the goal of providing nutritious, palatable food, or subsistence, remained a major objective. Subsistence support has adjusted to changing concepts of combat and alterations of force structure. In December 1987 the Army established a task force to evaluate current and future field rations in order to meet the needs of the AirLand Battlefield through the year 2008. After testing the Army Combat Field Feeding System (CFFS) in FY 1988, the system was approved by the Vice Chief of Staff in May. Designed by the Army's Troop Support Command (TROSCOM), CFFS, the core of the Army Field Feeding System (AFFS), incorporated a modular field kitchen, a sanitation center, a mobile kitchen trailer, a mounted ration heating device, and a flameless ration heater. It could support more mobile forces with prepackaged hot meals to supplement canned rations. An objective of the AFFS was to centralize feeding at battalions and thus reduce the number of cooks, food service specialists, and mobile kitchens needed to support maneuver elements. The AFFS reduced the number of cooks in a maneuver battalion from 24 to 6 and the number of food service specialists in the Army by 3,500.

Implementation of the new field feeding plan depended on adoption of a new operational ration composed of Meals, Ready to Eat (MREs), prepackaged individual meals that could be heated and served in the field, and T-Rations. The MRE consisted of shelf-stable ingredients configured in disposable packs sufficient to serve thirty-six meals. With the T-Ration which would replace the B-Ration, the Army expected to furnish units in the field one hot meal each day. Several problems delayed implementation of the AFFS in FY 1988, but by FY 1989 all stateside divisions had converted to the AFFS and USAREUR was proceeding to adopt it. There were problems with the quality of the MRE and T-Rations. Soldiers found that the MRE tray packs cooled rapidly upon being opened, often were hard to open, and a regimen of prepackaged and processed foods grew tiresome. The use of MRE in areas where water was scarce was also problematic.

In early FY 1989 the Chief of Staff charged TRADOC to fix the AFFS. The Quartermaster School sought to validate the utility of the new rations, MRE, the high mobility kitchen, and the high production bakery unit. Army food technicians, meanwhile, searched for ways to keep food warm, to improve the variety of meals, and to prepare food with a minimum of water. The Vice Chief of Staff halted further reductions in the number of cooks to enable units to prepare more freshly cooked meals in the field. The reassessment suggested that the number of cooks originally slated for elimination was excessive and additional field kitchen equipment and a more varied diet were needed. Cooks were to be restored to the TOEs of divisions, separate brigades, and armored cavalry regiments. In addition to retaining a mobile kitchen trailer, one company kitchen was authorized for every two companies in all heavy divisions beginning in FY 1990.

During FY 1989 the Army also worked on unique rations for extreme climates and special units. The Ration, Lightweight 30 Day (RLW 30), was prepared for special operations forces. A lightweight, high-density ration of 2,100 calories, the RLW 30 weighed under a pound and occupied less than forty-five cubic inches of space. It became a standard item in the Army inventory at the end of FY 1989. The Ration, Cold Weather, or RCW, developed at the Army Natick R&D Center, underwent field evaluation in FY 1989. As DOD's executive agent for the food research, development, test, and evaluation (RDT&E) program, the Army used its Joint Service Food System Technology Program to develop food service systems for air, naval, and space operations. Examples included a prototype food service system for the Air Force Rail Garrison Mobile Missile system and a plastic package recycling system that would allow the Navy to comply with the International Convention for the Prevention of Pollution from Ships.

Providing potable water to troops was another critical logistical mission. TROSCOM was developing 3,000-gallon water purification units to replace or supplement the Army's 600-gallon units. Both of these purifiers used a reverse osmosis process that forced water through fiber filters that removed impurities and salt. The 3,000-gallon units were to be distributed in FY 1990 for corps support.

Commenting on the Army uniform and the appearance of Army members, General Vuono pointedly stated, "Our soldiers are better than they look." In the summer of 1988 General Vuono ordered a study of the materials and designs of Army uniforms for the next century. ODCSLOG studied the design of garrison dress, service, and utility uniforms, while ODCSPER surveyed soldier opinion regarding styles and concepts of Army uniforms for the twenty-first century. Based on earlier surveys, TROSCOM introduced several new items of clothing in FY 1989—a new light jacket with a knit collar, a double-breasted and belted trench coat, and modified green dress shirts. The Army also tested the Marine Corps all-weather coat for male and female officers. TROSCOM was developing new outdoor gear from gloves to boots and items for special climatic or terrain conditions. The Army was pursuing improved chemical and ballistic protection and ways to lighten the soldier's load.

Congress stipulated in the FY 1989 Defense Appropriations Conference Report that the Army procure $50 million of the Extended Cold Weather Clothing System (ECWCS). The Army had given high priority to other clothing and individual equipment items, such as the new Individual Tactical Load Bearing Vest and the Field Pack, Large with Internal Frame. On 8 February 1989, the Under Secretary of the Army informed Congress that the Army would limit purchases of ECWCS in FY 1989 to $15 million, but would reprogram an additional $10 to $15 million for ECWCS during the remainder of the fiscal year from other accounts.

Chemical Weapons Destruction

The Army was obligated to destroy unitary chemical weapons by 1994 according to FY 1986 DOD Authorization Act (PL 99–145), but the deadline was extended to 1997 in the FY 1989 DOD Authorization Act (PL 100–456). During FY 1989 the Army continued to destroy stocks of chemical weapons at sites in the continental United States and the Pacific and to remove chemical weapons from West Germany. A May 1986 bilateral agreement between President Reagan and West German Chancellor Helmut Kohl stipulated that U.S. chemical munitions stored in Germany would be removed and destroyed elsewhere. The Army recommended on-site disposal of its unitary chemical stockpile of nerve gas, hallucinogenic agents, and mustard gas at eight storage sites in the United States: Aberdeen Proving Ground, Maryland; Anniston Army Depot, Alabama; Lexington–Blue Grass Army Depot, Kentucky; Newport Army Ammunition Plant, Indiana; Pine Bluff Arsenal, Arkansas; Pueblo Depot Activity, Colorado; Tooele Army Depot, Utah; and Umatilla Depot Activity, Oregon. Officials at three facilities—Aberdeen, Lexington, and Newport—did not favor on-site disposal. In March 1988 the Army submitted a disposal plan to Congress for an estimated price of $3.2 billion. The first stateside disposal operation began at Pine Bluff Arsenal, Arkansas, confined to weapons that contained the hallucinogenic B2 agent, and disposal continued throughout FY 1989.

The destruction of weapons at Pine Bluff Arsenal was carried out by disassembly and incineration. With the support of DOD and Congress, the Army planned to construct a new full-scale chemical disposal facility on the Johnston Atoll in the Kwajalein Islands in the Pacific. Destruction of unitary chemical munitions at Johnston Atoll would use the cryofracture method rather than disassembly and incineration. The first full-scale cryofracture disposal facility in the continental United States was constructed at the Tooele Army Depot in FY 1989, with a supporting training facility at Aberdeen Proving Ground. Congress authorized $16.3 million in FY 1989 for cryofracture research and development and the Army planned to conduct an Operational Verification Test (OVT) of cryofracture and disassembly technologies at Tooele in late FY 1989 before replicating either technology at other sites in the United States. Congress provided DOD $237.5 million in FY 1989 for destruction of chemical weapons, and $58 million of it was allocated to the Army. Completion of a cryofracture facility at Tooele Army Depot was made uncertain when DOD deleted funds for the cryofracture program in its FY 1990 budget, despite congressional pressure on the Army to accelerate its chemical weapons destruction program.

The Army was the lead DOD agency for planning the removal of U.S. chemical weapons from Europe. The USAREUR staff negotiated with the German and other allied governments regarding various issues—transportation, security, legal, and command and control. ODCSOPS was the point of contact between the Joint Staff and West German technical experts. Removal planning envisioned overland movement by modified military vans and shipment by sea to Johnston Atoll for storage and subsequent destruction. The Army envisioned continuous monitoring of the transit process with arrangements for emergency response and medical contingency measures. The Secretary of Defense stipulated that 10 percent of the unitary chemical weapon stockpile in West Germany be retained as a deterrent and for contingency purposes until adequate binary chemical munitions became available.

Conclusion

The logistical concepts and programs highlighted in this chapter illustrate the Army's efforts to improve logistical management and operations. Many managerial concepts and techniques adopted by the Army are similar to those used in the civilian corporate and industrial sectors. The influence of the Army's doctrine and tactics on logistics was manifest in field operations, in the combat service support structure, in the relations between active and reserve components, and in the ongoing modernization of Army forces. Logistical operations were also affected by fiscal constraints, changes in the strategic environment, technological advances, and other agents of change in the Army. Research and development programs were the service's cutting edge for continuous modernization of the Army. While seeking to identify and exploit technologies that will enhance the technological advantages of Army forces in the performance of their missions, research and development programs also have the potential to change doctrine, to restructure and redesign forces, to modify training, and to influence the way the Army supports itself. The Army's mandate for the 1990s is to do better with less. That mandate applied as well to all aspects of Army logistics. Its fulfillment will rest in part on the successful application of managerial systems, structural reforms, and research and development undertaken by the Army in FY 1989.

11

Modernization: Research, Development, and Acquisition

Introduction

Modernization is a continual process, driven by such factors as evolving doctrine, threat assessment, and emerging technologies. The development, production, and fielding of the latest weapons and equipment is essential for the Army to fulfill its strategic roles. Most modernization programs under way in FY 1989 began in the late 1970s and early 1980s. Some programs have been subsumed or replaced by more comprehensive modernization plans, while others have been canceled because of excessive cost or fell victim to changing budgetary priorities that resulted in their cancellation or reduction. Long neglected because of the Vietnam War and the subsequent contraction of military spending, modernization was spurred by doctrinal innovation and a studied effort to harness emerging technologies. In the mid-1970s the Army decided to maintain a relatively constant active component strength to conserve manpower costs and to increase funding for weapons modernization. The more hospitable fiscal climate of the early 1980s brought to fruition several major weapons systems: the M1 Abrams tank, the Bradley infantry fighting vehicle, the Multiple Launch Rocket System, the AH–64 Apache attack helicopter, the UH–60 Black Hawk utility helicopter, the Patriot Missile System, and the Hellfire missile.

During the early 1980s the pace of modernization quickened, and the Army planned to both upgrade and modernize its total force and used a guiding principle that units first to fight were the first to modernize. Equipment displaced in this process would be reallocated to later deploying units. Modernization in the 1980s was increasingly guided by AirLand Battle doctrine and functional areas such as aviation, armor and antiarmor, fire support, forward air defense, and combat support and combat service support. Modernization was developed using a family concept under which closely related individual projects were consolidated into a single plan. Such plans enabled Army and DOD planners to discern how individual projects fit into a comprehensive warfighting concept for each functional or mission area. The first of these plans, the Army Aviation Modernization Plan (AAMP), was approved in 1983. Other plans followed that reflected the priority that the Army accorded to modernizing its heavy forces. The Armored Family of Vehicles (AFV) Task Force, created in 1986, formulated a blueprint for modernizing armored forces that used two common chassis, heavy and medium, that obviated the production of other models, reduced testing, enhanced production efficiencies, reduced repair parts costs, and promoted common training.

Almost concurrently, the Army's Armor/Anti-Armor (A^3) Special Task Force concluded that, while the nuclear threat to NATO had subsided, the conventional threat posed by the Warsaw Pact armored forces was greater than had been estimated. The task force recommended an ambitious modernization program to enhance the lethality and survivability of armored vehicles and an accelerated effort to develop more effective medium and heavy antitank weapons. The Army adopted the Armor/Anti-Armor Modernization Plan in May 1989. In January 1989 General Vuono approved the Fire Support Modernization Plan, and four months later he endorsed the Tactical Wheeled Vehicle Modernization Plan. Throughout FY 1989, however, nearly every modernization plan was carefully scrutinized by the Army, DOD, and Congress. The momentum that the Army's modernization efforts gained in the mid-1980s slackened in FY 1989, and questions grew regarding purpose and priorities. The Congressional Military Reform Caucus, an informal bipartisan group of legislators who explore alternative defense policies, foresaw a reduction of American global military commitments and the strong possibility of a future tradeoff between modernization and force structure. The caucus agreed on the urgency of improving American conventional ground forces because of reductions of strategic forces and improvements in Soviet armor forces. The credibility of deterrence depended as much on the equipment and weapons provided American ground forces as it did on their numbers, while modernization of conventional forces was also essential to enhance America's capacity to project military power overseas.

Modernization, with its emphasis on the application of new technologies, weapons specifications, and performance, tends to overshadow the human dimension. The Army's total systems approach toward weapon performance seeks to integrate soldier performance and reliability with weapons capabilities to enhance the total system. A major step, the Army's Manpower and Personnel Integration (MANPRINT) Program established in 1986, highlights the importance of training, system safety, health hazards, and human engineering factors in the design and development of new equipment. For example, MANPRINT has succeeded in identifying desirable system design changes in the Block II version of the M1 tank and in the Forward Air Defense System. MANPRINT has contributed to lower training, operational, and maintenance costs by reducing the size of crews and identifying design changes that have minimized retraining and the fashioning of new tools.

MANPRINT is supplemented by two other programs, FOOTPRINT and CROSSWALK, that help the Army analyze new materiel systems in terms of MOS requirements necessary to train, operate, and sustain a particular piece of equipment. On 29 March 1989, Army's Acquisition Executive Policy Memorandum 89–2 approved MANPRINT's role in the solicitation and source selection processes for the acquisition and modification of major Army systems. MANPRINT supported DOD's Manpower, Personnel, Training, and Safety (MPTS) program, which also was formally incorporated into the Defense Systems Acquisition Process.

The Acquisition Process

Following the 1986 study of military procurement by the President's Blue Ribbon Commission on Defense Management (Packard Commission) and the Goldwater-Nichols Defense Reorganization Act of 1986, the Army began a reorganization of HQDA and adopted a three-tiered acquisition management chain in mid-1987. This chain consisted of the Army Acquisition Executive (AAE), Program Executive Officers (PEOs), and Project or Product Managers (PMs). These three positions were responsible for developing, procuring, and fielding new weapons systems. In the process, the Army merged the Office of the Deputy Chief of Staff for Research, Development, and Acquisition (ODCSRDA) into the Office of the Assistant Secretary of the Army (Research, Development and Acquisition) (ASA [RDA]). The DCSRDA became Military Deputy to the ASA (RDA) and served as the bridge to the Army Staff. At the start of FY 1989 the Under Secretary of the Army, Michael P. W. Stone, was the AAE. Reporting to Stone were the PEOs, who were responsible for cost and performance of specific acquisition programs. Project and product managers in turn reported to their respective PEOs. By December 1989 Stone further streamlined the Army's acquisition system by eliminating eight of twenty-five PEOs/PMs and consolidating eight PO positions into four.

The Report of the Defense Management Review, submitted by the Secretary of Defense to the President in July 1989, endorsed the recommendation of the Packard Commission to create a corps of dedicated acquisition officers. During FY 1989 the Army inaugurated measures to create a corps of about 1,350 military and civilian acquisition specialists. In January 1989 the Army aired guidelines for a Materiel Acquisition Management (MAM) program by which the Army Materiel Command

(AMC) would train members of the Army Acquisition Corps. Military officers either entering this specialty or among the 2,200 acquisition specialists already on active service would be identified with new skill codes approved on 5 July 1989. A Qualification/Validation Board convened at PERSCOM to review the records of all potential officers in the MAM program. Certification required attendance at two acquisition management courses—one at the Army Logistics Management Center, Fort Lee, Virginia, and a second at the Defense Systems Management College, Fort Belvoir, Virginia. Officers typically would enter the MAM program in their eighth year of service. The positions of project and product managers, for which lieutenant colonels and colonels were eligible, respectively, were made the equivalent of a command assignment.

The military portion of the MAM was approved by the Chief of Staff and the Secretary of the Army near the end of FY 1989. Secretary of Defense Cheney also endorsed the Packard Commission's recommendation that each service devise a similar career program for civilian acquisition specialists, the eventual goal being the merger of military and civilian specialists into a combined program. The Army Management Review Task Force recommended that the military program be the model for the civilian acquisition specialist career program. The parallel civilian program was approved by General Vuono on 13 October 1989 for implementation during FY 1990. In reforming its acquisition procedures and organization, the Army acted in the spirit and intent of Congress and DOD. Its efforts were closely scrutinized by Congress throughout FY 1989, and Congress generally approved. Some critics, however, felt that excessive bureaucratic layers remained and that the PEO chain was not properly honored.

Claims of bidding irregularities in the award of a contract to the Italian arms manufacturer Beretta SpA in 1984 for production of a new 9-mm. automatic handgun, the M9, prompted Congress to direct the Army to reopen competitive testing and bidding before purchasing additional M9s. Congress was concerned about the reliability of the pistols already delivered to the Army by Beretta, USA, the American subsidiary of the Italian parent company. Metal fatigue cracks first detected in the pistol's slide mechanism were radiating to other parts of the weapon. In tests conducted by the Navy, the pistol's aluminum frame was susceptible to rapid corrosion. On 28 April 1989, Beretta, USA, delivered 500 new production models of the M9 with a new slide capture device. In addition, during April and May the Army received 17,000 kits to modify more than 140,000 M9s already issued to the Army and the other armed services. On 22 May, following completion of the congressionally mandated competition for renewal of the M9 contract, the Army awarded a three-year contract to Beretta, USA. The performance of the Beretta M9 pistol, the Army believed, remained significantly better than models submitted by two competitors. Under the new contract the Army would purchase an additional 56,705 M9 handguns at a cost of $9.9 million, bringing the number of pistols on order to almost 378,000.

The Army experienced problems with other contractors during FY 1989. The Scott Aviation Company delivered only 1,000 of a promised 5,000 M40 protective masks by the start of FY 1989. Delivery of night-vision devices and components for artillery shells by other producers also fell behind production schedules. The BMY Company of York, Pennsylvania, failed to comply with the terms of a production contract, causing significant delays in outfitting units with new five-ton trucks. BMY was also several months behind in the production of the Armored Combat Earthmover and several weeks behind in the delivery of prototypes for the Howitzer Improvement Program. These delays prompted the Army to ask the Defense Logistics Agency to conduct an audit of BMY's contracts to ascertain the reasons for the shortfalls.

Research, Development, and Technological Change

Between 1980 and 1987 the major increase in federal government RDT&E spending occurred in the defense sector, but recent pressures to reduce the budget deficit slowed its growth. By 1989 the United States spent about 2.6 percent of GNP on research and development, a third of which was related to national defense. Army R&D funds increased during recent years, but the amount was the smallest of all the armed services: $5.117 billion in outlays for Army RDT&E.

Army research and development was guided by the Department of the Army Long Range Research, Development, and Acquisition Plan (LRRDAP), based on Army long-range planning guidance. Delineating the Army's research, development, and acquisition (RDA) strategy for FYs 1992–2006, the LRRDAP guided Army Staff agencies and commanders on modernization trends and was the basis for the Field Long Range Research, Development, and Acquisition Plan (FLRRDAP) and the RDA portion of the Army Program Objective Memorandum (POM), FYs 1992–1997. The LRRDAP was a bridge between the Army's unconstrained planning environment and the programming phase of the Planning, Programming, Budgeting, and Execution System (PPBES). Planners from the Army Materiel Command, Information Systems Command, and TRADOC met with representatives of MACOMs and Army component commands and program executive officers in late FY 1988 to draft a FLRRDAP. Identification of R&D requirements in the field, geared to battlefield mission and functional areas, was guided by the Concept Based Requirements System (CBRS). TRADOC distilled the cumulative review and analysis of battlefield needs and deficiencies into a battlefield development plan (BDP) that described future warfighting environments and the Army's modernization and combat developments needs for FYs 1992–1997.

Approved in July 1989, BDP–89 found the Army's greatest needs in aviation, close combat, fire support, and intelligence-electronic warfare. The plan served as the basis for the Army Modernization Memorandum and the FLRRDAP that was submitted to HQDA in September 1989. The FLRRDAP recommended a fifteen-year RDA strategy that stressed near- and mid-term R&D to enhance long-term modernization. This approach protected the modernization of heavy forces at the expense of more modest improvements in areas such as air defense and fire support. Historically, R&D programs have been lengthy enterprises that involved years of experimentation and testing. For example, after twenty-one years of research and testing, the Army's Antimalarial Drug Development Program, performed by the Army Medical Research and Development Command, Fort Detrick, Maryland, received a final distribution license from the Federal Drug Administration for a new drug, magloquinine, that overcame drug-resistant strains of malaria.

The Army has sought to speed up the R&D process. TRADOC's Concept Evaluation Program (CEP) and AMC's Field Assistance in Science and Technology (FAST) program addressed near-term R&D requirements in the most expeditious manner possible and often bypassed normal developmental processes. The CEP and FAST programs tested and evaluated new equipment and training concepts in the field. From these tests and feedback from troops each agency defined new R&D requirements and expedited their solution through the respective chains of command. Because CEP and FAST were similar, they were merged in March 1989 and teams from TRADOC and AMC were subsequently assigned to the commanders of MACOMs and corps. During FY 1989 the Army also sought improvement of the "Achilles heel" of developmental programs—weapons system software management. With an annual investment of about $2.5 billion in software, the Army considered its research and development programs extremely vulnerable to software failures in the developmental cycle. In September 1989 the Operational Test and Evaluation Agency established the Software Test and Evaluation Panel (STEP) to formulate procedures to assess the software in weapon and nonweapon systems throughout the development process to prevent or minimize software failures. In the FY 1989 Defense Authorization Act, Congress directed DOD to prepare a critical technologies plan. DOD's Critical Technologies Plan for the Committees on Armed Services, United States Congress, identified twenty-two technologies essential for the long-term superiority of American weapons systems and helped prioritize the allocation of R&D

resources and guided industries in focusing their R&D investments. Many of the technologies enumerated in the report applied to future Army weapons systems. During FY 1989 the Army took several steps to strengthen its technology base. The Technology Base Master Plan (TBMP) provided a top-down guidance and focus for Army R&D and modernization. It was closely linked to the Army's modernization plans through the Advanced Technology Transition Demonstrations (ATTDs) that expedited the transfer of technology from the advanced research phase to the developmental stage. The Army hoped to shorten the cycle of testing, developing, and fielding new weapons systems from fifteen to five years by more extensive use of ATTDs. Examples of FY 1989 ATTDs were the Aided Target Recognition/Multisensor Fusion and the Propulsion 21 demonstrations.

Technologies critical to the Army's near-, mid-, and long-term warfighting capabilities were also identified in the Science and Technology Objective Annex of the Army's LRRDAP. The Army also worked closely with high-tech industries through MACOM-sponsored conferences such as the FY 1989 conferences organized by the Army's Communications-Electronics Command, Fort Monmouth, New Jersey, which pursued current and emerging technologies that might apply to future C^3 systems. The Army has identified thirteen technologies that are closely allied with its five major modernization plans—aviation, heavy forces, fire support, vehicles, and armor/antiarmor. The Technology Base Investment Strategy emphasized research and exploratory development of technology with a potential of high pay-off in warfighting capabilities. It included advanced materials/materials processing, advanced signal processing and computing, biotechnology, artificial intelligence, directed-energy weapons, microelectronics, advanced propulsion, robotics, and space technology. Congress authorized $1.161 billion in FY 1989 to support the Army's technology base, divided among support for basic research, evaluation of the feasibility of advanced concepts and technologies, and demonstration tests.

Unmanned Ground and Aerial Vehicles

The development of unmanned aerial vehicles (UAVs) and unmanned ground vehicles (UGVs), formerly called remotely piloted vehicles (RPVs), combined computerized remote control, artificial intelligence, robotics, and advanced remote sensing. Some of the Army's earlier efforts, such as the Aquila RPV, were not successful. In response to a congressional mandate, DOD consolidated all UGV acquisition activity into a joint office known as the Marine Corps–Army UGV Joint Project Office (JPO) in November 1988. With a Marine Corps officer designated as program executive officer, the JPO was responsible for development of UGVs for battlefield reconnaissance, surveillance, and target acquisition (RSTA) systems and as platforms for sensors. The JPO also coordinated DOD robotics research with other federal agencies and industry. Supervision of UGV developmental programs was delegated to the Commander, Army Laboratory Command (LABCOM), of AMC. As the project manager, he reported to the UGV JPO located at the Marine Corps base in Quantico, Virginia.

Each service's UGV requirements were set forth in a Marine Corps–Army memorandum of agreement. The Army's specific requirements were contained in a draft Operational and Organizational (O&O) plan for UGVs prepared by the Infantry School that was under review as FY 1989 ended. A workshop on military uses of robotic vehicles was cosponsored by TRADOC and the American Defense Preparedness Association in May 1989. Determination of military requirements for robotic vehicles has been hampered by the lack of troop experience, but the Army believes UGVs have utility for such close combat missions as cuing weapons, breaching minefields, and performing reconnaissance, surveillance, and target acquisition. In rear areas, the Army foresaw use of UGVs to perform hazardous tasks such as monitoring sensitive areas and demolishing unexploded ordnance.

The UGV JPO assumed responsibility for two promising UGV projects: the Marine Corps tele-operated vehicle (TOV) and the Army Missile Command's tele-operated mobile all-purpose platform (TMAP). The Army's TMAP was small enough to be carried by a HMMWV and serve as a mount for remote sensors or target acquisition systems. To carry lethal payloads, the UGV JPO was also considering a family of UGVs known as CALEB whose development depended on the success of the TOV and TMAP. The JPO was studying two additional Army-initiated UGV programs—a minefield reconnaissance and detector program (Mirador) and a robotic obstacle-breaching assault tank (ROBAT). Pioneered by the AMC's Troop Support Command, Mirador was conceived as a remote-controlled multisensor system to detect metallic and nonmetallic mines. The XM1060 ROBAT, with a tele-operated M60A3 tank for a platform, was configured to clear mine fields and mark cleared lanes and also to detect chemical, biological, and nuclear agents.

Congress eliminated separate service programs for unmanned aerial vehicle programs in late 1988 along with UGVs. Congress reduced RDT&E and procurement funds for UAVs by nearly 50 percent, or to $50.3 million, and directed that service UAV programs be consolidated into a UAV Joint Project Office under the Secretary of Defense. In late 1988 DOD established the Joint Unmanned Aerial Vehicle (UAV) Project Office and established an executive committee with representatives from

OSD and each service to supervise the JPO. The 1988 OSD Joint UAV Program Master Plan, required by Congress, stressed common technology for air, sea, and land systems. It established four UAV systems: the Short Range (about three hundred kilometers) which corresponded to the Army's original Army Corps Intelligence and Electronic Warfare (IEW)/Deep UAV; the Close Range (thirty to fifty kilometers) which approximated the original Army Close UAV; the Medium Range; and the Endurance UAV systems. In December 1988 the Joint Requirements Oversight Council approved a Mission Need Statement for the Short Range UAV, based on requirements that HQDA had formulated for the IEW/Deep UAV in FY 1988. The Naval Air Systems Command was designated to consolidate and oversee the development of pilotless aircraft for all services, and the UAV JPO gave the Army UAV Project Manager responsibility for the Short Range UAV.

As proposed by the Army, the Short Range UAV would carry a day/night passive imagery payload and have an operating radius of 150 to 200 kilometers (50 kilometers behind friendly lines and 150 kilometers beyond the forward line of troops [FLOT]) and an endurance of about twenty hours. Designed for the deep battle, it would have surveillance capabilities that provided immediate day/night intelligence collection and dissemination and be compatible with Army data and other UAV systems. To hasten development and limit costs, the UAV JPO purchased the off-the-shelf PIONEER UAV Systems for use by the Marine Corps, Navy, and Army. In March 1989 the Naval Air Systems Command, on behalf of the UAV JPO and the Army UAV Project Manager, released a request for proposals from interested contractors for a Short Range UAV system. Meanwhile, the Army also decided in FY 1989 to end UAV testing at Fort Sill, Oklahoma, and Fort Lewis, Washington, and to concentrate all UAV testing at the U.S. Army Intelligence Center and School (USAICS) at Fort Huachuca, Arizona. The Army estimated that it would have to acquire eighteen Short Range UAV systems through FY 1996 at a cost of approximately $425 million.

A Close Range UAV system was intended to provide division, armored cavalry regiment, and separate brigade commanders the ability to "see over the next hill." The Army considered a Very Low Cost UAV (less than $10,000 each) transportable in two backpacks and controlled in the same manner as a model airplane. An enclosed television camera could scan a radius of fifteen miles. In January 1989 the UAV Executive Committee approved the purchase and testing of a light, unmanned scout plane for Close Range battlefield surveillance. Close Range systems were scheduled to have a radius of eighty kilometers (thirty kilometers beyond the FLOT), operating time of two hours, and a maximum altitude of fifteen thousand feet. The Marine Corps would also test and use the Close and Short Range UAVs. Priority was given to procuring the Short Range UAV. The Medium Range and Endurance UAV systems were intended for the Navy and Air Force, but their information collection would be shared with ground forces.

Directed Energy and Thermal Technologies

Directed energy weapons (DEW) research has been concentrated in strategic systems such as the U.S. Strategic Defense System (SDS). DEW research for tactical systems for radio-frequency (RF)/microwave, charged particle beams, and lasers, however, has recently increased at Army laboratories, notably at the Ballistic Research and the Harry Diamond Laboratories at Adelphi, Maryland. The Combined Arms Combat Development Activity (CACDA) at Fort Leavenworth, Kansas, was also examining ways that directed energy could be accommodated in current and future combat operations. Relying on a power supply rather than a finite magazine of ordnance, directed energy weapons had the "deep magazine" that could fire as long as the power source continued. Directed energy technology in weapons exemplified the trend toward "soft kill" weapons that destroyed enemy weaponry by exploiting design weaknesses in enemy systems.

Weapons that utilized radio frequency and microwave technologies had limited promise for the Army because of size and weight limitations of the energy source. The Army's major focus in this field was directed toward electronic countermeasures such as those systems that were small enough to be mounted on large tracked vehicles to jam enemy communications and radars or to destroy the enemy's electronic equipment. This use posed the danger of fratricide by possible destruction of friendly communications equipment through the emission of powerful electronic pulses. This danger could be reduced by highly directional antennas. Still in the conceptual stage in FY 1989 was the tactical application of particle beam technology that also was limited by the size and weight of the needed power source.

Lasers had a more immediate battlefield application than RF/microwave or particle beam weapons. They are used in weapons that can destroy enemy sensor systems, range finders, target designators, aiming devices, position locators, and communication equipment. Laser weapons have shown their highest potential in weapons that destroy or degrade other optical devices such as sensors, cameras, and optical aiming systems. The Army has experimented with the tactical application of lasers for nearly two decades. Prototype weapons systems such as the mobile test unit (MTU) and the Roadrunner, a close-combat laser weapon (C-CLAW), never proved themselves. More successful was Stingray, a vehicle-mounted self-protection system that blinded enemy electro-optic sensors. Despite cost and safety concerns, Stingray was in full-scale development in FY 1989. Cameo Bluejay, another experimental laser program, sought to perfect an airborne opto-electronic countermeasure weapon to protect helicopters, while Dazer, a portable, shoulder-fired laser weapon, was conceived to protect light infantry ground forces by detecting and jamming enemy fire control systems. Initiated by the Army Infantry Center at Fort Benning, Georgia, Dazer research was being conducted under MICOM.

Research and development of high-energy laser (HEL) technology was conducted by several federal agencies, notably the Strategic Defense Initiative Organization (SDIO) and the Defense Advanced Research Projects Agency (DARPA). In FY 1989 the Army and the other armed services participated with DARPA in research on tactical HEL—the multipurpose chemical laser (MPCL), the mid-infrared advanced chemical laser (MIRACL), and the ground-based free electron laser (GBFEL). These projects searched for laser weapons that possessed power sources strong enough to enlarge the tactical application of lasers. Testing of many HEL projects was performed at the HEL Systems Test Facility, located at the Army's White Sands Missile Range in New Mexico.

The U.S. Army Strategic Defense Command (USASDC), Huntsville, Alabama, studied the use of lasers with ultrawideband radars that are used to identify and locate incoming missile warheads. Such radars were easily overloaded with peripheral electronic signals. Decoding and processing the signals picked up by the radar requires an extremely fast computer. The Dynetics Corporation was developing for the USASDC an acousto-optic printer in which laser beams and sound waves interact to process random noise signals as they occur.

The most common use of lasers in the Army was in tactical rangefinders, which measured distance by calculating the difference in time between the transmission and reflection of a directed beam of light. Such devices were commonly used on the Abrams main battle tank and by Warsaw Pact armored forces. The AN/GVS–5 rangefinder, currently mounted on the M1 and M1A1 tanks, was scheduled for replacement by a more efficient carbon dioxide model, designated the AN/PVS–6, also known as the MELIOS. As target designators, lasers paint both fixed and small moving targets with a beam more powerful than the one used by rangefinders. Target designators were frequently installed as components of missiles and other projectiles such as the Hellfire and Maverick missiles, the Copperhead 155-mm. artillery round, and the Merlin mortar projectile. The most commonly used version of a ground- or vehicle-mounted laser target designator in the Army was the AN/TVQ–2, or Glid. Related to target designators were laser markers. Under development during FY 1989 by the Night Vision Laboratory of the Communications-Electronics Command (CECOM), laser markers could illuminate only large fixed targets.

The Army also employed lasers as aiming lights in aiming devices. With an effective range of about one hundred meters, the AN/PAQ–4 laser aiming system has been mounted on several weapons, including the M16 rifle, the M203 grenade launcher, and the AT–4 antitank missile launcher. Laser aiming systems were more effective when combined with starlight electronic light amplification night-vision equipment. The AN/PAQ–4, for example, emitted an invisible infrared laser-generated beam visible only with the aid of night-vision goggles (NVG) such as the improved AN/PVS–7. Position locators, such as the modular azimuth positioning system (MAPS) in full-scale engineering development by the Army in FY 1989, employed lasers. It utilized a ring laser gyroscope to provide inertially derived positioning data; the Army intended to purchase 2,100 MAP systems for vehicles and aircraft. A similar ring laser gyroscope positioning device used in the Army Tactical Missile System proved extremely accurate.

Adaptation of lasers to tactical military communications was the least developed use by the Army. Laser communications had the potential to provide secure point-to-point communication, but they required line-of-sight transmission often difficult to acquire in combat. A more promising application of semiconductor lasers was to drive fiber-optic cable systems that were expected to replace wire systems.

The potential of lasers as a combat multiplier, combined with evidence of the use of laser weapons by Soviet forces in Afghanistan, buttressed the Army's commitment to them. It also spurred development of protective and defensive countermeasures such as laser-protective goggles, laser-resistant sensors, and antilaser missiles to shield or protect both operators and equipment from hostile lasers. Laser technology has aided training and war games, as with the multiple integrated laser engagement system (MILES). Several factors worked against further development of lasers for military use during FY 1989. Congress expressed concern about hazards to the eye presented by laser devices like the Stingray and Dazer. In June 1989 the United States and the Soviet Union announced their intent to limit the use of non–eye-safe lasers and barred the jamming of each other's command, control, communications, and intelligence systems.

Thermal imaging technology offered a means to see through a battlefield clouded by darkness, rain, dust, foliage, smoke, or haze. Two promising thermal programs, the short range thermal sight (SRTS) and the thermal weapons sight (TWS), had a direct bearing on improving infantry weapons and were applicable to other tactical weapons. The lightweight, day/night, self-contained passive SRTS was intended for the M16A1/M16A2 rifle, the M203 grenade launcher, and the AT–4 antiarmor weapon. The sight passed several tests by FY 1989, but fielding was not expected for several years. The TWS, a lightweight thermal imaging system, was designed for crew-served automatic weapons and the Stinger antiaircraft missile. It will replace the AN/PVS–4 mounted on the M249 squad automatic weapon, the M60 machine gun, and the M24 sniper weapon.

Armor/Antiarmor

Several factors caused the Army to give its highest priority to modernizing its heavy forces—adoption of the AirLand Battle doctrine, a reevaluation of the Soviet armored threat, and the significant growth of armored capabilities among several regional powers. The Abrams main battle tank is the Army's principal weapons system to close with and destroy the enemy, to exploit success, and to serve as an antitank system. Lethality, mobility, and protection from enemy fires allow armored forces to lead offensive operations by ground forces. The modernization of armor and antiarmor systems is guided by two major Army modernization plans: the Heavy Forces Modernization (HFM) Plan and the Armor/Antiarmor Modernization Plan. The plans evolved from studies undertaken by the Armored Family of Vehicles Task Force and the Armor/Antiarmor Special Task Force, respectively. The HFM Plan replaced the earlier Armored Family of Vehicles (AFV) Modernization Plan, which was slow in getting Congress' approval because of its cost and a reluctance by legislators to cancel production of older-model tanks.

The HFM Plan was the Army's blueprint for future heavy forces that could match or exceed the perceived Soviet threat into the 1990s. It included a new version of the Abrams tank (the Block III MBT), an advanced field artillery system, a future infantry fighting vehicle, a combat mobility vehicle, a line-of-sight antitank weapon, and an armored utility vehicle. Army planners intend to incorporate a high degree of commonality among subsystems of its modernization plans and to upgrade systems through interim product improvement changes and to adopt the AFV Task Force idea to use only two chassis, heavy and medium. The Army also envisioned the use of common transmissions, engines, and modular armor. Congress, however, has demanded that the Army provide more detailed analysis of the HFM Plan to develop just two chassis before it fully funds their development. To accelerate full-scale development and to minimize costs, the Army planned to telescope traditional demonstration/validation phases of development with Advanced Technology Transition Demonstrations.

The Army's modernization strategy for its main battle tank is to enhance the Abrams fleet through evolutionary improvements and selected upgrading of recently fielded and older equipment. The goal is to distribute the best tank possible to forward-deployed units and those first to mobilize (M+10). The program emphasizes armored weapons that are lethal and survivable and manned by well-trained personnel to defeat numerically larger Soviet armored forces. Despite constrained budgets projected over the next five years, the Army sought to maintain a responsive production base while also taking a cautious approach to foreign military sales and to licensing foreign production of Army materiel. As part of the HFM program supervised by the Army's Tank and Automotive Command in Warren, Michigan, the Army has developed two approaches to modernizing its armored vehicles. For the short term, the Army is making evolutionary changes in the M1 and M1A1 tanks such as replacing the 105-mm. main gun of the M1 with a 120-mm. cannon on the M1A1 and installing a better fire control system. During FY 1989 the life of all M1A1 120-mm. gun tubes was extended from 500 rounds to 750 rounds. In June 1989 the Project Manager, Tank Main Armament Systems, and Watervliet Arsenal began tests to develop a 1,000-round gun tube. The Army in FY 1989 also tested a 120-mm. gun modified to use a high-energy charge that could penetrate the reactive armor being employed on Soviet tanks. The Armament Research and Development Engineering Center, Picatinny Arsenal, New Jersey, was exploring a 140-caliber tank gun.

In FY 1989 the Defense Acquisition Board conditionally approved the Army's plans for the M1A2, or Block II version of the Abrams tank, and authorized limited production. The DAB also asked the Army to clarify the relation of the modifications planned for Block II Abrams with the Block III. For the Block II version, the Army planned to add a commander's independent thermal viewer that allowed the tank commander to search for new targets while the gunner was engaging another, an improved laser range-finder, a thermal viewer for the driver, and enhanced computers and navigational systems. The Army estimated that these improvements would double the number of rounds the tank could fire on target. In August 1989 the DAB authorized full-scale production of the M1A2, but set a limit of $300,000 on upgrades of the M1A1. The cost of the Army's preferred improvement package was $570,000, but by eliminating several modifications the Army reduced the figure to $475,000. The improvements will increase the cost of each M1A2 to approximately $3 million, compared to $2.6 million for the upgraded M1A1. Full production of the M1A2 is expected to begin in FY 1991.

In early 1989 the Office of the Secretary of Defense approved funds for the continued production of the M1A1 and M1A2 models of the

Abrams tank through FY 1994 and called for fielding M1A1 tanks to all heavy divisions in USAREUR by the end of FY 1990 and their distribution to POMCUS in Europe. The 3d Armored Cavalry Regiment at Fort Hood, Texas, was the only CONUS-based unit equipped with M1A1 tanks in FY 1989. Distribution of the M1A1 to other active component units and selected Army National Guard units was scheduled to begin in FY 1991. The 5th Infantry Division (Mechanized) completed its transition from the M60 to the M1 during the fiscal year. During FY 1989 the 1st Cavalry Division, the 4th and 24th Infantry Divisions (Mechanized), and the 1st Battalion, 69th Armor, replaced older MBTs with the M1. The fielding of M60A3 tanks to reserve component units also continued during FY 1989.

During FY 1989 the Army also evaluated the results of the Abrams Live Fire Test program that investigated the vulnerabilities of the M1 and M1A1 tanks and crews to enemy antitank munitions as part of the Army Test and Evaluation Command's Abrams Battlefield Damage Assessment and Repair program at the Aberdeen Proving Ground. The tests demonstrated that the special armor used on the Abrams tank, although not impervious, was adequate, that the compartmentalization of crew and ammunition bays confined damage and reduced casualties, and that the tank's automatic fire suppression system (AFSS) successfully extinguished fuel and hydraulic fires quickly. Among the areas deemed in need of improvement were the tank's electrical system, crew communication, and repair procedures designed to gain maximum self-recovery capability.

The Army adopted a more radical approach for the development of the M1 Block III version of the Abrams tank. Regarded as necessary to combat future Soviet armor, the Army planned to equip the Block III tank with an automatic gun loader; a new high-energy gun and electronic fire control system; advanced target acquisition capabilities; improved chassis, power pack, and suspension; advanced armor protection; and a vehicular information system that would be able to convey vehicle status reports and diagnostic information to the crew. Its automated command and control systems would include a position navigation system that would display unit locations, indicate direction and speed of movement, and locate distant targets for indirect fire. The Army planned to initially field the Block III tank in FY 1998, barring future funding shortfalls and assuming timely development of an advanced power system and the common chassis envisioned in the HFM Plan. Congress, however, was increasingly concerned about the development costs of both the Block II and Block III tanks. The Block III alone was estimated to be about $1 billion.

To enhance command and control of maneuvering armored vehicles, the Army proposed an improved intertank communication system to replace the AN/VIC–1 system developed in the 1960s and used on older model tanks and other armored vehicles. It has separate radios to transmit and receive communications. The new Vehicular Intercommunication System (VIS), developed by the Army's Communications-Electronics Command, will improve intertank communication by increasing the number of circuits available and simplifying the entire system. The Army requested 9,500 VIS, but Congress denied funds for the VIS in FY 1989.

The HFM Plan, if totally fulfilled, would field twenty-eight types of heavy vehicles and eventually replace thirty thousand armored vehicles in the FY 1989 force structure. Budget pressures compelled the Army to reduce its plans and concentrate on six major armored vehicles—the Abrams tank, an antitank vehicle, a future infantry fighting vehicle, the future armored resupply vehicle, an engineer vehicle akin to a battlefield backhoe, and a howitzer. HFM Plan cost estimates were $4.3 billion for a twenty-year period, and about one-third of it was devoted to the Abrams Block III tank. The second most likely armored vehicle to receive start-up funds was the Line-of-Sight Antitank (LOSAT) Vehicle. The LOSAT will utilize the same chassis as the Bradley infantry fighting vehicle and replace the M981, a version of the M113 troop carrier equipped with a TOW missile, but will have a hypervelocity missile more powerful than the TOW.

FY 1989 was the tenth year of production and the third year for procuring the improved M2A2/M3A2 Bradley fighting vehicle system. By mid–fiscal year the Army's inventory of Bradleys was about 4,300, 48 percent of the total procurement objective of 8,811. The unit production cost for each vehicle in FY 1989 was $1.238 million.

Managed by the Army Tank and Automotive Command in Warren, Michigan, the heavy vehicle modernization program sought to develop a family of new heavy vehicles to support heavy mechanized forces developed by the HFM Plan. At the start of FY 1989 the vehicle that had the highest priority was a Heavy Equipment Transport, a tractor and trailer able to transport the Abrams tank. The Army sought separate bids on the heavy trailer and specified that it be compatible with the proposed tractor. In 1988 Congress had called for competitive tests for an armored recovery vehicle strong enough to retrieve a disabled seventy-ton Abrams M1A1 tank. Congress was also concerned that the M88, the existing armored recovery vehicle, relied on two recovery vehicles in tandem, front and rear, which presented a safety hazard to troops. In March 1989 the Army canceled work on an M88A1E1 model because of a shortage of funds. In a related development, the LAMP-H (lighter, amphibian, heavy lift), with 100 short tons capacity, the only amphibian vessel capable of delivering the Abrams tank from ship to shore, entered its full development phase in December 1989.

Production of the M2A2 Bradley began in May 1988 and continued throughout FY 1989. It featured an antispall liner, improved ammunition stowage, better protection against kinetic energy weapons, and provisions for additional armor. In FY 1989 an improved 600-horsepower power train was introduced for M2A2s, and the Army began to upgrade all M2A1/M3A1 Bradleys to the M2A2/M3A2 configuration. For the Bradley Block III, the Army planned a Bushmaster 25-mm. gun capable of using improved ammunition and also possessing improved "swim" capabilities. The Future Infantry Fighting Vehicle is expected to replace the Bradley. It will have the common heavy chassis envisioned as part of the HFM Plan, a TOW missile, a 25-mm. automatic cannon, and space to transport seven soldiers.

In the meantime, the Army expected to retain the M113 armored personnel carrier until 2020—a life span of almost sixty years. The M113 family included about thirteen thousand troop carriers, as well as M113s configured as mortar carriers, ambulances, command posts, engineer vehicles, antitank vehicles, and smoke-generating vehicles. An improved version, the M113A3, upgraded with a new engine, transmission, suspension, and armor plating, was being fielded in FY 1989 to reserve component units and USAREUR. The Advanced Field Artillery System will also employ the HFM Plan's common heavy chassis for a 155-mm. self-propelled gun with a range of about thirty miles. This vehicle will replace the M109A3 self-propelled howitzer, repeatedly upgraded during past years with new fire control systems and survivability features.

In 1985 a Defense Science Board study group headed by retired General Donn A. Starry, former Army Armor Center commander, warned that the Soviet Union was fast outstripping the United States in the development of armored vehicles, protective armor, and antitank weapons. By FY 1989 the Soviet T–64B and T–80 tanks that faced NATO forces in Germany were refitted with appliques of reactive armor. This development questioned the efficacy of the Army's principal antitank weapons, the TOW missile and the M47 Dragon, a medium-range antiarmor missile introduced in 1973. The Russians also revamped their tanks with more powerful cannons capable of penetrating the protective armor of American tanks. The Army reacted by installing 120-mm. cannon on some earlier models of the M1 tank, by modifying the TOW missile with tandem-charged warheads that could penetrate reactive armor, and by refitting some forward-deployed tanks with modular protective armor.

Early in FY 1989 the Army decided to apply protective reactive armor to its older M60 tanks. Consisting of tile appliques that prevent a projectile's explosive charge from penetrating a tank's underlying armor plate, the reactive armor is placed around the tank's exterior. The appliques are in the shape of a square metal box, 12 by 12 by 2 inches, and contain reactive explosives and armor plates. About ninety-five tiles are applied to each tank, adding almost three thousand pounds to its gross weight. Refitting the Army's fleet of 8,800 M60s was scheduled to begin in 1990. Researchers at the Army Materials Technology Laboratory in Watertown, Massachusetts, were experimenting with passive-composite armor applique that can shield armored vehicles from shaped-charged munitions and kinetic-energy rounds. This material weighs much less than the metal boxes used on the M60s and can also be used for overhead protection.

A new family of advanced antitank weapons systems (AAWS) had two major developmental programs in progress in FY 1989—the Advanced Antitank Weapons System–Medium (AAWS-M) and the Advanced Antitank Weapons System–Heavy (AAWS-H). The AAWS-M program sought to eventually replace the Dragon missile systems, while the AAWS-H program will replace the TOW antitank missile. A warhead development improvement to the laser-homing Hellfire continued in FY 1989. This program entailed modifying the Hellfire antitank missile mounted on the Apache attack helicopter. Equipped with two, or tandem, warheads, the modified Hellfire had an explosive charge in the first warhead that activated the reactive armor while a subsequent charge propelled the second warhead, which penetrated the armor plate. During FY 1989 the Army also experimented with using the M1 tank and the Bradley infantry fighting vehicle to launch the Hellfire.

The Army Missile Command conducted various tests—portability, force-on-force, countermeasure, warhead, and battlefield tests under obscured or obstructed conditions—on three prototypes of an enhanced Hellfire missile. Until a new heavy antitank missile is developed, the Army planned to use the TOW 2B antitank weapon, more lethal than the basic TOW, as an interim Advanced Missile System–Heavy. The TOW 2B will replace the TOW 2A used on the Bradley infantry fighting vehicle and the Cobra attack helicopter.

The Army was pursuing other initiatives as a replacement for the TOW. The most promising approach centered on the development of kinetic energy missiles (KEM), formerly known as hypervelocity missiles (HVM), as an Advanced Missile System–Heavy. Traveling at about five thousand feet per second, the KEM can propel a heavy metal rod through the most advanced protective armor. Together with the Air Force and the Marine Corps, the Army is engaged in predevelopment testing of ground- and air-launched versions of a KEM. During FY 1989 a rocket-powered KEM was tested by the Army Missile Command at the White Sands Missile Range in New Mexico. The Army also envisioned mounting the KEM on the medium-weight chassis of the LOSAT weapons system in the mid-1990s.

For several years the Army has sought to replace the M47 Dragon, a man-portable, medium-range antitank missile. Despite an improved warhead and other changes, the Dragon remained awkward to use. Congress had insisted that the Army test two European weapons for a possible interim replacement—the Franco-German Euromissile Milan 2 and the Swedish Bofors RBS 56. In March 1989, after eight months of testing at Fort Benning, Georgia, by the Operational Test and Evaluation Agency, the Army rejected both European weapons and opted for a second-generation Dragon. Dragon II was as accurate, lighter, and less costly than the European rivals. Congress contended that the Army's tests were not convincing, and DOD's Office of Operational Test and Evaluation believed the Swedish Bofors missile was the most effective of the three antitank missiles tested. The Army maintained that Dragon II was the best interim replacement.

The Army invited industry teams to compete for AAWS-M. The Army specified that a new medium antitank weapon had to be man-portable and lethal at a range of two kilometers against the most advanced Soviet tanks. After proof-of-principle demonstrations were concluded in late 1988, the Army, on 9 February 1989, selected a prototype that relied on infrared imaging sensors in the missile to home in on its target. Unlike the Dragon, which required the gunner to guide the missile to its target, the prototype's internal guidance sensors allowed the gunner to take shelter after launching the missile. In April 1989 the Army Systems Acquisition Review Council recommended full-scale development of the missile, and in June the DAB directed the Army to conduct early operational tests. Full production of the new medium antitank weapon, which the Marine Corps will also purchase, was not expected until 1992.

Action occurred on several other antiarmor weapons in FY 1989. The Wide Area Mine (WAM) served as an antitank and antivehicle weapon. Equipped with seismic, acoustic, and infrared sensors, WAM detected, tracked, and destroyed vehicles with its armed warhead. The mine can be emplaced by hand, helicopter, ground vehicle, or the multiple launch rocket system. The Army was also exploring the use of robotic vehicles armed with antitank devices. In the early stages of development, a small robotic vehicle called the Fire Ant can be maneuvered by remote control to destroy targets at a distance of 500 yards. In January 1989 the Army indicated it would end its purchase of the Swedish AT–4 lightweight antiarmor weapon, and it would no longer support research for its proposed replacement, the Multipurpose Individual Munitions (MPIM). Effective against light armored vehicles, personnel carriers, and fortifications, the portable, one-shot AT–4 was ineffective against most Soviet tanks. Reversing an earlier decision to cancel the M72E4 light antiarmor weapon, the Army resumed testing it at the U.S. Army Infantry School at Fort Benning, Georgia, in September 1989 because of strong pressure from Congress.

Air Defense

Conceived in the mid-1980s, the Army's Forward Area Air Defense System (FAADS) is expected to furnish a protective umbrella over combat forces in the forward battle area. Soviet military doctrine has newly emphasized the use of fixed-wing aircraft and attack helicopters in low-level, close air support roles in the forward battle area and to interdict rear echelon supporting forces. Soviet attack helicopters also pose an antiarmor threat at stand-off range. As a system of systems, FAADS will operate as part of a theater-wide air defense system under a concept that calls for a layered defense against high-, medium-, and low-level air threats. It addresses significant aspects of the AirLand battlefield, protecting forward combat forces from air attack and contributing to the close battle by enhancing the maneuverability of the force, and can be used to protect Army forces against air threats in non-European combat settings. FAADS consists of five complementary systems that are compatible with Air Force air defense assets that provide high- and medium-altitude defense. FAADS development is governed by the three-phased Air Defense Modernization Plan. In the first phase, division air defense units in FORSCOM, Eighth U.S. Army in Korea, and the U.S. Army Western Command in the Pacific Theater are being reconfigured to conform to FAADS. The second phase will affect other FORSCOM units, USAREUR, and the National Guard. The third phase will entail the worldwide fielding of FAADS among the active component, all of the National Guard, and war reserve stocks. The estimated cost of the Air Defense Modernization Plan will be about $11 billion.

The Army's acquisition strategy for FAADS has sought to avoid the lengthy and costly research and development cycle for a completely new system by upgrading some existing air defense weapons and selecting commercially produced, nondevelopmental items. The likelihood of substantial reductions in conventional forces in the future, more austere military budgets, and a ceiling of $2.5 billion for FAADS research contributed to this approach. Existing systems that the Air Defense Modernization Plan will utilize are the Patriot, HAWK, Chaparral, and Stinger missiles and the Vulcan gun. The critical developmental effort has centered on the design of a command, control, communications, and intelligence (C^3I) network to unite all elements of FAADS; work began on C^3I in 1986, before the acquisition of any associated weapons systems.

FAADS will have five elements. The first is the Air Defense Anti-Tank System (ADATS), the line-of-sight–forward, heavy (LOS-F-H) component of FAADS that has missiles and a 25-mm. cannon mounted on an armored vehicle. It has been designed to protect armor and mechanized infantry forces against enemy aircraft. ADATS has replaced the Sergeant

York Division Air Defense Gun. An advance procurement contract was awarded in October 1988 to produce the LOS-F-H. The Army accepted the first fire unit for testing in February 1989. Low-rate initial production began later in FY 1989 for five fire units and sixty missiles for production verification testing. Following a candidate evaluation test at the White Sands Missile Range in New Mexico in May 1989, the Army selected an ADATS model for further testing. A Component Force Development Test and Experimentation II for the ADATS was conducted in the summer of 1989 to examine platoon-level tactics and procedures. It was followed by Force Development Test and Experimentation II in September conducted in a field training exercise by the 6th Air Defense Brigade coordinated in a simulation network (SIMNET) training exercise with the 3d Armored Cavalry Regiment. The Army planned to produce 562 ADATS units and more than 10,000 missiles at a cost of $5.7 billion. Budget cuts delayed the expected fielding of the first ADATS unit until May 1993 and reduced the number of fire units planned for each heavy division from thirty-six to twenty-four.

The Avenger served as the FAADS line-of-sight–rear (LOS-R) weapon to protect the brigade and division rear and corps command post against hostile aircraft. It consisted of eight Stinger missiles, pedestal-mounted on a High Mobility Multipurpose Wheeled Vehicle (HMMWV), together with a .50-caliber machine gun and a fire control system. The Avenger was also slated to provide air defense for light infantry divisions. The system entered low-rate initial production in November 1988. One platoon was fielded in April 1989 for further testing and evaluation. Following the completion of initial tests and evaluation in the summer of 1989, the Army awaited a decision by the Defense Acquisition Board, expected in FY 1990, regarding full-scale procurement.

The Army was experimenting with a fiber-optic guided missile (FOG-M) as its non–line-of-sight (N-LOS) weapon for use by brigades against enemy aircraft and armor either masked by terrain or located at extended ranges. Equipped with a sensor linked by a self-dispensed thin fiber-optic cable to the gunner's station, the gunner can observe the battlefield on a monitor to select an air or ground target. The gunner can then guide the missile to its target or release it for automatic terminal homing. A multiple missile launcher may be mounted on either an MLRS vehicle or a light HMMWV. Designed and tested at the U.S. Army Missile Command's Research, Development, and Engineering Center at Redstone Arsenal, Alabama, FOG-M was approved for full-scale development in August 1988. A cost-effectiveness review by DOD of the FOG-M missile caused minor delays in awarding of a full-scale development contract. Plans called for the development of two versions of the FOG-M—one that sought targets by televised images, and a second that used infrared imaging for operations at night. Operational prototypes were not expected until 1991, and first delivery of the FOG-M to the field was slated for September 1992. Initial fielding was scheduled for 1993.

The HAWK and Patriot missile systems were the Army's major N-LOS air defense weapons. Introduced in the Army in the 1960s, the HAWK system was in Phase III of the HAWK product improvement program in FY 1989. The improved HAWK was distributed to the 2d Battalion, 1st Air Defense Artillery, starting in January 1989 and was continuing at the end of the fiscal year. Using Automatic Data Link, the modified HAWK batteries enhanced their ability to share target information, thus reducing the time a battery needed to prepare for firing. Fielding of Patriot missile systems continued in FY 1989, with the 3d Battalion, 43d Air Defense Artillery, receiving its authorized missiles.

The heart of FAADS is its automated digital command, control, communications, and intelligence network, which will interconnect all FAADS elements and be compatible with Air Force air defense command and control systems. The network contains six major subsystems: the air-battle management operation center, the Army airspace command and control liaison officer subsystem, a sensor command and control subsystem, the battery command post subsystem, the platoon command post subsystem, and the fire-unit subsystem. FAADS will also field an array of ground and air sensors and radars to aid target acquisition and selection and for sophisticated dissemination of data. Initial test and evaluation of the hostile identification technology began in March 1989. To disseminate hostile target data, FAADS will use the enhanced position location reporting system network, which is compatible with similar Air Force reporting systems. When fully operational, FAADS can alert any fire unit within twelve seconds after a target is detected and send a fire mission order to appropriate fire units within sixty seconds of target identification. The FAADS C^3I network will also connect with the Army's Tactical Command and Control System (ATCCS) and the Army Data Distribution System (ADDS) and thereby inform area commanders on Army air defense operations. Through the ATCCS maneuver control system (MCS), FAADS can disseminate warnings to infantry companies and armored maneuver forces. A prototype of the FAADS C^3I system was integrated with other elements of FAADS in the spring of 1989, when the Army organized its first FAADS battery at Fort Bliss, Texas.

The Army is enhancing the fifth component of FAADS—its low-level air defense umbrella—through a variety of combined arms initiatives to improve self-protection air defense capabilities. The M242 Bushmaster 25-mm. cannon of the Bradley infantry fighting vehicle, for example, will be outfitted with an air defense sight. In addition, the AH–64 Apache and OH–58 Kiowa helicopters will be armed with the air-to-air Stinger missile for both air defense and antiarmor capabilities.

The Army was also investigating modifications and replacements for the Stinger. A program at the Army's Air Defense Artillery Center at Fort Bliss, Texas, the Army Counter Air Weapons System envisioned a new missile capable of destroying enemy aircraft at ranges up to ten kilometers in all weather conditions and in a dense electronic warfare environment. Technical problems associated with its infrared seeker delayed the fielding of the advanced version of the surface-to-air Stinger missile, the Stinger RMP (reprogrammable microprocessor), a successor to the Stinger-POST missile deployed in 1987. These problems prevented the missile from hitting high-speed, low-flying helicopters at long ranges in an electronic countermeasure environment. After an evaluation of the Stinger RMP's software by the Army Science Board and a subsequent review by the DAB's Conventional Systems Committee, the Army sought funds to continue developing the weapon. The Army planned to conduct additional tests at the White Sands Missile Range that would be monitored by DOD's Office of Operational Test and Evaluation. In FY 1989 the Army planned to purchase 6,750 Stinger missiles at a cost of $241.3 million, an increase from the $172.7 million appropriated in FY 1988. In May 1989 DOD released funds for multi-year production contracts to two manufacturers. Under these contracts the Army planned to procure approximately 5,780 additional Stinger missiles.

Because of the difficulties encountered with the Stinger RMP, the Army also considered developing a complementary laser-guided, surface-to-air missile with a range of six to eight kilometers that would be less susceptible to the infrared countermeasures that had plagued the advanced Stinger. The Army also wanted to test a new missile, the Starstreak, being developed by a British manufacturer as either a replacement or an adjunct to the Stinger.

Although each element of FAADS was being developed separately, program management for all five elements was exercised by the air defense program executive officer at the Army Missile Command, Redstone Arsenal, Alabama. Development of the electronic and communication equipment essential to FAADS' command, control, and intelligence network was directly controlled by a PEO at the Army's Communications-Electronics Command, Fort Monmouth, New Jersey, as part of ATCCS. To ensure that all components of FAADS are deployed on schedule in a synchronized manner, the Army Chief of Staff in November 1988 gave the FAADS PEO complete budgetary control over all elements of the system. While the ATCCS program officer will continue to develop hardware and software for FAADS C^3I equipment, he will be guided by requirements established by the FAADS PEO.

Air defense program executives in June 1989 projected fielding three of FAADS' five components by 1996—ADATS, Avenger, and FOG-M—but budget constraints threatened to reduce and delay the fielding of FAADS. Congress restricted procurement until the Army obtained various certifications and approvals for FAADS components, while rising costs caused the Army to scale back its planned purchases of ADATS in FY 1989 from fifteen to five, and likewise to reduce Stinger procurement. The Army also reduced the number of ground-based radars it planned to field in each division from eight to six.

Army Aviation

Revised in 1988, the Army Aviation Modernization Plan (AAMP) was a thirty-year modernization blueprint for Army aviation. Its main goal was to give the Army a competitive battlefield advantage with fewer but more agile and lethal Army aircraft. During FY 1989 the Defense Resources Board (DRB) reduced funds for AAMP, causing the Army to modify its acquisition goals. For the complete life of the AAMP, the DRB had authorized the purchase of 807 AH–64 Apaches, 2,253 UH–60 Black Hawks, 207 OH–58D Kiowas, 472 CH–47 Chinooks, and 2,096 LHX helicopters. The AAMP provided for specially modified aircraft for special operations forces. It envisioned retiring approximately six thousand Vietnam-era helicopters during a twenty-year period and developing a new armed reconnaissance and attack helicopter, the Light Helicopter Experimental (LHX). Costs of the AAMP were estimated at $38 to $40 billion for the next decade, while funding for research and development and procurement to support the AAMP in FY 1989 amounted to about $3 billion. The estimated cost for each LHX in FY 1989 was $8.2 million, with a multiyear program goal of $7.5 million per aircraft.

The centerpiece of the AAMP is the LHX, slated to replace the older AH–1 Cobra and OH–58D Kiowa helicopters and to complement the AH–64 Apache. With its advanced avionics and weapons systems, the LHX would also be compatible with the Navy A–12 and the Air Force ATF for joint capability. Congress and DOD kept the LHX program under intense scrutiny in FY 1989 because of its cost and to evaluate its relationship to other Army aviation modernization programs. Early in FY 1989 the Secretary of Defense was predisposed to eliminate the LHX, but he relented after strong appeals by the Army leadership. In part, the LHX's rising costs reflected the Army's desire to optimize its capabilities. The Army planned to use the LHX for battlefield reconnaissance and as an attack helicopter against enemy tanks. It also could be used to strike artillery positions behind enemy lines or to engage hostile helicopters in air-to-air combat. DOD reduced the Army's request from 4,000 to 2,096 LHXes.

To stay within a preferred 7,500-pound empty weight limit, the Army considered eliminating selected features or including them on a limited number of aircraft. One feature was the Airborne Adverse Weather Weapons System (AAWWS), which had an advanced target acquisition system and Hellfire antitank missiles. To hold down development costs further on the LHX the Army adopted a telescoped acquisition strategy that eliminated test and evaluation of the full LHX prototype before awarding a contract for full-scale development. In November 1988 the Army began its demonstration/validation phase, which entailed design and engineering concepts and the refinement of various prototypes prior to deciding on full-scale development. A GAO report issued in FY 1989 questioned this approach, but Congress appropriated $124.7 million for the demonstration/validation trials and $55.8 million to develop 1,200-horsepower T800 engines.

The AAMP provided for the purchase of helicopters in addition to the LHX and for the modification of certain models for special operations. The UH–60 Black Hawk was being modified to the MH–60K with improved capability in adverse weather and difficult terrain, altered for in-flight refueling, and equipped with infrared radar, a more powerful engine, and advanced communications. The Army planned to procure twenty-three modified MH–60Ks. The Army was also developing a new version of the medium-lift CH–47 Chinook, the MH–47E, for special operations. In FY 1989 the Army upgraded many of its older Chinooks. The CH–47D was receiving new fiberglass rotor blades and a stronger drive system. The Army planned to refurbish 144 Chinooks. The Special Operations Aviation Program called for modifying 17 MH–47Es, 23 MH–60Ks, and 2 Combat Mission Simulators in its first phase. Other modified Chinooks and Black Hawks would be acquired in Phase Two. The heart of special operations aircraft modernization was the Integrated Avionics Subsystem (IAS). It provided advanced navigation systems that allowed special operations helicopters to maneuver at night and under severe terrain and weather conditions. Tests of IAS hardware and software were completed in February 1989.

Two other Army helicopters, the AH–64 Apache and the OH–58 Kiowa, were also targeted for improvements. The Army planned to add two Stinger air-to-air missiles to the Apache, along with radiation-hardened electronics and improved vision and navigational devices. Tests of the Stinger in an air-to-air defense role were conducted in the spring of 1989 at the Yuma Proving Ground, Arizona. Beginning in 1992 the Army intended to install a more sophisticated radar on the Apache to detect targets in poor weather and to guide its Hellfire missiles. The improvements for the latter version of the Apache, known as Longbow Apache, had not been fully approved at the end of FY 1989. They were funded for RDT&E, but not for procurement.

The AHIP called for upgrading the OH–58D Kiowa scout helicopter. In addition to replacing its main rotor and engine, the Army intended to install advanced avionics and to arm the OH–58D with Stinger missiles to provide air-to-air combat capability. The Secretary of the Army decided to upgrade the Kiowa's armament on 6 December 1989 and directed that it be used primarily for scouting and armed reconnaissance. In March 1989 the armed Kiowa underwent an inconclusive test to ascertain its deployability by C–130 aircraft to enhance the forced entry capability of the 82d Airborne Division. Although the LHX is expected to replace the OH–58D, Congress emphasized the Kiowa's complementary role with the Apache as an effective hunter-killer team and boosted Kiowa production from twenty-four to thirty-six per year in FY 1989. Army OH–58D helicopters had performed outstandingly in the Persian Gulf since 1987 in protecting surface ships at night from Iranian gunboats.

During FY 1989 the Army decided to replace the older T–63–A–700 engine used on the OH–58 with the more powerful T–63–A–720 engine. The older engine lacked sufficient horsepower for the OH–58 to perform its missions most effectively, and repair parts were difficult to obtain. In addition to increased power, the T–63–A–720 engine would standardize engines of the entire OH–58 fleet, improve readiness, and reduce support costs. In FY 1989 the Under Secretary of the Army approved sole-source procurement of 652 replacement engines, with delivery expected to begin in September 1989.

The modernization of the SOA during FY 1989 received special attention. The CINCSOC had identified insufficient SOF airlift to insert, resupply, and extract forces as one of the most critical deficiencies of U.S. SOF. Joint Army–Air Force Initiative 17, 22 May 1984, transferred responsibility for SOF rotary-wing airlift support from the Air Force to the Army. In FY 1986 Congress directed DOD to develop a plan to satisfy SOF rotary-wing airlift requirements by the end of FY 1991. The Defense Resources Board noted that funds were not available to meet Congress' deadline. The board proposed resorting to a mix of SO-modified aircraft and conventional military aircraft and a compromise to Initiative 17 that would continue to divide SOF rotary-wing support between the two services. Based on DOD guidance, the Army established program goals of 23 MH–60K and 51 MH–47E helicopters, modified versions of the standard Black Hawk and Chinook helicopters. During FY 1989 DOD released additional funds to double the Army's acquisition of modified Chinooks to thirty-four MH–47E helicopters. Funds allocated to the Army for SOA in FY 1989 included $96.8 million for RDT&E and $120.5 million for procurement, compared with $117.4 million for RDT&E and $63.6 for procurement in FY 1988. Believing that the SOF communications program was underfunded, Congress authorized additional procurement funds in FY 1989 for that program.

The Army also sought ways to reduce detection of its aircraft by enemy radars and sensors and to minimize catastrophic damage from enemy weapons with its Aircraft Survivability Equipment (ASE) program. The

ASE program manager focuses on active measures to lessen susceptibility to detection for current and future systems. The most common measures included jamming, the use of chaff munitions and decoy flares, and radar and laser warning systems. The Army's Aviation Systems Command was also correcting several maintenance and safety-related problems with the Apache. These problems were jamming or burning out of the Apache's 30-mm. gun, which also caused excessive vibrations that affected sensitive circuitry. Other failures were exploding shaft drive compressors, debonding of main rotor blades, faulty hydraulic lines, and a high electrostatic charge that increased the helicopter's vulnerability to detection by enemy sensors. The Army has also tried to constrain operation and support (O&S) costs by product improvement and better diagnostic equipment that contributed both to enhanced capabilities and less costly maintenance. As a general trend, technological improvements and expansion of aircraft missions were expected to drive O&S costs higher. The O&S annex to the AAMP estimated flying hour costs of improved helicopters as $2,229 per hour for the AH–64 and $860 for the AH–1, compared to $363 for the older UH–1.

The Army was the leading service in a tri-service effort to develop advanced boresight equipment (ABE) for all DOD aviation weapons systems. A common ABE would not generate economies in the fielding of aviation weapons systems but would enhance close air support in a joint combat environment. Designed by the Army's Aviation Applied Technology Directorate, the ABE concept consisted of gyroscopically stabilized weapons systems and video and digital readout of the relationship between fixed reference lines and aircraft sighting stations, sensors, and weapons. During FY 1989 work on the ABE concept progressed to the advanced development phase, and a test of the ABE concept was conducted using an Army AH–1 helicopter in April 1989. The Army anticipated testing completion and a production decision by FY 1993.

First fielded in 1977, night-vision goggles for both air and ground operations emerged as aviation safety and modernization issues. By the end of FY 1989 the Army had procured 124,000 ground goggles and 6,500 ANVIS, which amounted to 40 percent of the Army's objective for ground goggles and 31 percent for ANVIS. Some contractors had difficulty meeting production schedules. Congress fully funded the procurement of goggles in FY 1989 at $138.1 million, but it insisted that the Secretary of the Army certify the contractor's ability to meet production goals. The Army met this requirement in May 1989.

Field Artillery and Missile Systems

In September 1988 Army Chief of Staff General Carl Vuono approved a master program for the modernization of Army artillery, the Fire

Support Modernization Plan (FSMP), derived from Azimuth, a plan prepared by the Army's Field Artillery Center at Fort Sill, Oklahoma. Azimuth reflected the findings of 1988 study prepared by the Defense Science Board (DSB), "Countering Soviet Fire Support Systems." That study, together with similar findings by Supreme Allied Commander, Europe (SACEUR), and CINCUSAREUR, warned of a growing gap between Soviet and American fire support systems. The DSB proposed doubling annual production of the MLRS from 44 to 87 launchers and purchasing an additional 12,000 rockets per year, accelerating fielding of the M109A6 howitzer (the Accelerated Howitzer Improvement Program), developing Search and Destroy Armor Munitions (SADARM) for both weapons, and a new field artillery cannon. In addition to improving offensive and counterbattery fire, the DSB stressed that the Army must improve its deep operations to destroy Soviet ammunition stockpiles and to disrupt enemy fire control and target acquisition systems. For this purpose, the DSB recommended early fielding of the Army Tactical Missile System (ATACMS) Block I and II, the Army/Air Force Joint Surveillance and Target Acquisition System (JSTARS) project, an unmanned aerial vehicle (UAV) for use as sensor platform and target acquisition, the development of the FOTL missile, and the deployment of the Tacit Rainbow system. These systems would be linked together by the Advanced Field Artillery Tactical Data System (AFATDS).

At a projected cost of $5.6 billion over five years, the Army's Fire Support Modernization Plan was a blueprint to carry out most of the DSB's proposals. The plan embraced near- and long-term modernization programs to upgrade all Army artillery. It would increase lethality and range, install more sophisticated computerized fire control and target acquisition systems, and enhance the Army's ability to conduct AirLand Battle by improving close-range, counterfire, and deep-attack capabilities. An additional goal was to reduce the man-to-weapon ratio. The Lance, for example, has a man-to-weapon ratio of 75 to 1, and an 8-inch howitzer battalion has a ratio of 28 to 1. In their place the Army preferred the MLRS because each launcher has a crew of three.

Modernization of artillery fire control was a key element to compensate for the Warsaw Pact's numerical superiority over NATO in artillery pieces, estimated at 7 to 1. The U.S. Army's current artillery fire command and control systems, the Tactical Fire Direction System (TacFire), employed outdated technology that restricted its use solely to field artillery, had limited mobility, and did not allow a rate of fire fast enough for effective counterfire. To replace TacFire and the Light Tactical Fire Direction System (LTACFIRE), used by the 9th Infantry Division, the Army was developing AFATDS. AFATDS' computerized processing capabilities would improve target selection, help direct the most appropriate fire support or counterbattery fire, and improve and enhance the survivability of fire support command and control from the forward observer through corps headquarters. As one of the five battlefield automation systems of the Army Tactical Command and Control System (ATCCS), AFATDS will facilitate the coordination of artillery fire with other supporting fires such as close air support, naval gunfire, and attack helicopters. AFATDS will mesh with maneuver, intelligence and electronic warfare, air defense, and combat service support elements of ATCCS.

Hardware for AFATDS was being acquired commercially as part of the ATCCS Common Hardware/Software procurement initiative. An evaluation of the AFATDS concept was successfully completed in April 1989. In September 1989 the DAB recommended full-scale development of the AFATDS, and the Marine Corps decided to join the Army in developing the system. The Army expected to begin distributing AFATDS to its light divisions in FY 1992 and to the remainder of the force the next year. The Army hoped to acquire sixty-five complete systems by FY 1994. In the interim, the Army would continue to acquire LTACFIRE for its light infantry divisions.

The Army continued to field artillery fire support equipment in FY 1989. The Fire Support Team Vehicle and Ground/Vehicular Laser Locator Designator were distributed to the 4th and 5th Infantry Divisions, the 194th Armored Brigade, and the 197th Infantry Brigade. Fielding of the AN/TMQ–3 Meteorological Data System to the 24th Infantry Division was suspended in late FY 1989 because of a shortage of 5-ton trucks and 100-ampere kits.

During FY 1989 the Army was also upgrading artillery weapons as part of its Howitzer Improvement Program (HIP). HIP was the first modernization program to use the Army streamlined acquisition process that cuts the normal development time from seven or eight to four years. HIP is also a cooperative effort with the government of Israel. Israeli and U.S. howitzers were not identical but had many common design features. The main beneficiary of HIP is the M109A2/A3 155-mm. self-propelled howitzer, an improved version of the M109A1 155-mm. howitzer that was introduced in the 1960s, which was the standard fire support artillery weapon in armored and mechanized infantry units. Under HIP the Army was developing the M109A6, named the Paladin. The improved version featured an advanced automatic fire control system, an on-board computer, and the Modular Azimuth Positioning System that gave the howitzer the ability to "shoot and scoot," thus reducing its vulnerability to counterfire. The automatic fire control system eliminated the need for surveyed artillery firing points, aiming circles, and landlines. It also improved command and control by allowing artillery commanders to delegate command functions to platoons or fire units. Other features included improved target acquisition systems, a more powerful cannon that could fire smart munitions, better armor protection, and improved radios. Six prototypes of the M109A6 were tested during FY 1989.

The Army was also upgrading the M102 105-mm. towed howitzer with a more powerful and durable howitzer. Now called the M119, it will provide light divisions with more effective direct fire support. During FY 1989 the Army began replacing M101A1 and M102 howitzers with the M119, a lightweight 105-mm. towed howitzer. The M119, with its increased range and lethality, was suitable for direct support battalions of light infantry, airborne, and air assault divisions. It was also the first Army artillery weapon to be evaluated, tested, and type-classified under a concept of buying commercial off-the-shelf items. The first active component unit to receive the M119 was the 7th Infantry Division at Fort Ord, California.

Fielding of the M198 155-mm. towed howitzer continued in FY 1989 in accordance with the Army's earlier decision to standardize on the 155-mm. caliber in all field artillery units except the direct support battalions in the light divisions. When completely fielded, the M198 will be the standard weapon in the corps general support battalions. As active component units replaced the older M114A1 155-mm. towed howitzers with the M198, the former will be transferred to reserve component units. The Army also continued to improve the M110A2 self-propelled eight-inch howitzer in FY 1989. This full-tracked heavy artillery weapon was undergoing a product improvement program to strengthen its crew shelter and to provide better protection against nuclear, biological, and chemical contamination; to enhance fire control; to install improved navigational and positioning instrumentation; and to eliminate all vulnerable infrared light emissions to enhance its survivability.

Related to, but independent of, the FSMP was replacement of the 4.2-inch mortar with a 120-mm. mortar in heavy divisions. Two variants of the new mortar were contemplated—towed and carrier-mounted. In 1989 Congress adopted Watervliet Arsenal's proposal to produce the 120-mm. mortar and limited offshore procurement to quantities required to outfit the 9th Infantry Division. The Army then terminated the 120-mm. mortar program in its amended FY 1989 budget request. After a review of a reduced cost structure and consultations with senior commanders, the Army restored a modified 120-mm. mortar program to its FY 1990 budget request. Designated a special interest program by Congress in FY 1989, a revised Mortar Master Plan would be submitted to the Secretary of the Army. The Army's plan called for procurement of 840 mortars to field forward-deployed forces in Europe and Korea and to the 9th Infantry Division.

AirLand Battle deep operations include maneuver actions, supporting fires, and deception directed against enemy forces not directly engaged in fighting, designed to influence future close operations by upsetting the enemy's coordination of forces and tempo of operations. The effectiveness of deep fires depends on close interaction of sensors, processors, communications, and command and control. The Army's Deep Battle System of Systems provided a family of conventional long-range missiles and munitions that can attack enemy follow-on forces at 100 or more kilometers beyond the forward edge of the battlefield. Key Army components of the system are the MLRS, the ATACMS, the means to integrate target acquisition, and C^3I. These functions are embodied in the Joint Surveillance and Target Acquisition System, GUARDRAIL Common Sensor and the All Source Analysis System. JSTARS, a joint program with the Air Force, has computers that link long-range weapons to sensors on aircraft, satellites, or ground stations that can detect, classify, and track moving or fixed targets forward of the battle zone.

For long- and mid-range artillery fire support, the Army relied primarily on the MLRS. The Terminally Guided Weapon System envisioned the use of a missile with a terminally guided warhead to enhance the lethality and range of the MLRS. To attack the enemy's second echelon forces up to 100 kilometers behind the front line, the Army planned to expand its production of the Army Tactical Missile System. The ATACMS is a conventional semi-ballistic missile fired from the MLRS launcher (M270); each launcher can carry two ATACMS missiles. The ATACMS Block I carried approximately one thousand antipersonnel or antiequipment bomblets. ATACMS Block II was being designed to attack second echelon armored elements with antiarmor smart submunitions. Following earlier malfunctions, the ATACMS Block I completed a successful engineering design test flight at White Sands Missile Range in December 1988, and in February 1989 the Army System Acquisition Review Council awarded a low-rate initial production contract for sixty-six missiles. The first test flight for the development testing phase was conducted successfully in March 1989, with a decision on full-rate production expected in 1990. The Army planned to procure about twenty-eight hundred Block I ATACMS. In FY 1989 the ATACMS Block II program was in its proof-of-principle stage for evaluation of its infrared terminally guided submunition.

The Army also was modifying the MLRS to fire short-range, radar-guided, multiple warhead, terminal guidance warhead (TGW) missiles that have a fire-and-forget capability against moving or stationary targets. An MLRS/TGW system was being jointly developed by domestic and European contractors as part of an international antiarmor development program. Its key technological breakthrough was the perfection of a millimeter wave radar that discriminated between military targets and ground clutter. Each of the warhead's three submunitions was equipped with an extremely small antenna that enabled it to locate its target.

The modernization or replacement of the Army's Lance short-range tactical nuclear missiles in Europe had a high priority because of the removal of Pershing missiles from Europe and the limited shelf life of deployed Lance missiles. Army planners envisioned a new missile, the FOTL, with a range of 250 to 270 miles, considerably longer than the 70-mile range of the Lance missile, but within the limits for short-range missiles allowed under the INF Treaty. FOTL would fill the gap created by elimination of the ground-launched cruise and Pershing II missiles and the range of improved nuclear-capable 155-mm. artillery. NATO planners believed either an air- or ground-launched FOTL would help maintain NATO's nuclear and deterrent credibility and allow the alliance to continue a strategy of flexible response. The West Germans, however, had reservations about the deployment of nuclear missiles on their territory. Late in FY 1988 DOD approved a program acquisition strategy for FOTL. The Army also considered placing second-generation Lance missiles on MLRS launchers. By making the MLRS a conventional/nuclear system, it would be exempted from arms control deliberations and also enhance the survivability of the nuclear-capable Lance.

As the lead agency for modernization of binary chemical weapons, the Army was responsible for production of the 155-mm. GB–2 Binary Chemical Projectile and the Binary Chemical Warhead (BCW) for MLRS. DOD had also nominated the Army to produce a chemical bomb, BIGEYE, for the Air Force and the Navy. Congress mandated that binary modernization be completed by 1997, but it reduced funds for the 155-mm. projectile and the BCW pilot facility. Production of the 155-mm. chemical binary projectile at the Pine Bluff Arsenal was delayed when the manufacturer of its M20 and M21 canisters fell behind. Development of the MLRS Binary Chemical Warhead was set back about two years when Congress failed to appropriate FY 1989 funds that it had authorized earlier. Delays encountered in binary chemical weapons production threatened to preclude the removal of unitary chemical munitions from West Germany by the end of 1992. It could lead to DOD reconsideration of its policy to retain only a residual 10 percent stock of unitary munitions beyond 1992 and contribute to the added expense of keeping unitary chemical munitions disposal plants open beyond 1992. In mid–FY 1989 the Army contended that its stockpile of unitary chemical weapons was inadequate because the proliferation of chemical munitions in the Third World required the maintenance of a credible chemical deterrent.

The Army also believed that the modernization of artillery-fired atomic projectiles (AFAPs) had fallen behind requirements. In 1985 Congress set a limit on the total number of W–79 8-inch and W–82 155-mm. AFAPs that could be modernized at 925 and also limited the Department of Energy's (DOE) funds for this purpose. Modernization efforts to date have produced an imbalance of AFAPs. DOE completed production of the W–79, but moved more slowly with the W–82.

Command, Control, Communications, and Intelligence (C^3I) Systems

Advances in computer technology have affected nearly every aspect of Army weapons and equipment modernization and constitute the foundation for the development of command, control, communications, and intelligence systems. Historically, commanders have sought all possible information about battlefields, and the evolving automation of many battlefield systems has contributed toward this elusive goal. Many of the earlier automated systems were not integrated with one another, and the Army has searched for one all-encompassing system. A major mission of the Computer Engineering Center of the U.S. Army Information System Engineering Command has been to coordinate the work of project managers, contractors, and vendors to standardize components of the Army Information Architecture (AIA).

Guided by the Army Command and Control Master Plan, the Army was developing the Army Tactical Command and Control System, formerly the Army Command and Control System. The goal of the ATCCS was to mesh five battlefield functional command and control (C^2) systems for commanders from corps to battalion, and to improve interoperability among Army, joint, and allied C^2 systems. ATCCS was an integration of five Battlefield Functional Area (BFA) systems—the Maneuver Control System (MCS) for infantry and armored forces; the Forward Area Air Defense Command and Control System ($FAADC^2$) for air defense; the Advanced Field Artillery Tactical Data System for fire support; the All Source Analysis System for the collection, analysis, and dissemination of intelligence and electronic data; and the Combat Service Support Control System (CSSCS) to manage critical logistical functions. Management for the ATCCS was vested in a PEO at the Communications-Electronics Command (CECOM) in Fort Monmouth, New Jersey. Funds for each of the five BFA program areas are controlled by individual program managers for each of the functional modernization programs. A separate program manager for common hardware and software also reported directly to the ATCCS PEO; this PM also coordinated modernization measures with the functional program managers.

ATCCS will also rely on three tactical communication systems: the Mobile Subscriber Equipment (MSE), the Single Channel Ground and Airborne Radio System (SINCGARS), and Army Data Distribution System (ADDS). ADDS was critical to the ATCCS, since it provided the communications path for battlefield command and control systems such as AFATDS and FAADC^2. ADDS consisted of two subsystems, the Enhanced Position Location Reporting System and the Joint Tactical Information Distribution system. The former is an Army system based on the joint Army/Marine Corps Position Location Reporting System. JTIDS applied primarily to air defense and provided secure, jam resistant, high volume communications for air defense command and control data. The two systems worked together to supply critical, instantaneous data communication and position, navigation, and identification reporting information to tactical commanders. In developing the ATCCS, the Army sought to reduce the proliferation of unique hardware and software and to procure commercially produced common hardware and software when possible. Hardware options were contemplated for units that ranged in size from hand-held ones to those suitable for wheeled and tracked vehicles. A contract for common hardware/software was awarded in August 1988, and initial deliveries began early in FY 1989.

The Maneuver Control System would offer commanders of infantry, armor, and combined arms task forces a computerized tactical decision support system. At brigade, division, and corps, most MCS functions were to be handled by the AN/UYQ–30 tactical computer terminal and the AN/UYQ–43 (V) processor that interacted with other elements of the ATCCS and could extend to battalions. The addition of specialized subsystems to the MCS, such as West Germany's Combat Vehicle Command and Control System, was expected to enhance the MCS. As a system of systems, the full potential of ATCCS cannot be realized until all other BFA systems are in place and interoperable.

Modernization of intelligence–electronic warfare systems is connected with the modernization of command, control, and communications systems. Several facets of the Army Command and Control Systems will enhance intelligence operations and also benefit from the development of more responsive intelligence systems. For example, a completely fielded ADDS will enable subscribers to locate precisely any unit equipped with an Enhanced Position Location Reporting System User Unit (EPUU) or an EPUU-equipped remote reporting station. With approximately six hundred EPUUs in a division, each EPUU can collect battlefield intelligence. Other modernization efforts will enhance operations by more sophisticated collection and target acquisition, more secure communication and antijamming devices, or other complementary capabilities. The catalysts for the modernization of IEW systems are changes in doctrine, threat, and technology. The most promising technologies are computerization, miniaturization, the processing of digital data, artificial intelligence, infrared and electrical optic techniques, robotics, and the use of unmanned aerial vehicles.

The Army Intelligence Modernization Master Plan and the Theater Intelligence Architecture Plan address the Army's needs while also supporting the intelligence requirements of unified and specified commands. For the battlefield of the future, intelligence systems will have to be more fluid and mobile. Potential foes may employ intelligence and communications security techniques heavily encrypted and transmitted over a wider range of frequencies. Using a myriad of passive and active countermeasures and "stealth" technologies, enemy vehicles and aircraft may also be harder to detect.

Throughout FY 1989 the Army continued to modernize all phases of tactical IEW operations, a responsibility vested in the Deputy Chief of Staff for Intelligence and guided by the Army IEW Modernization Plan. Two systems, the All Source Analysis System (ASAS) and the Imagery Processing and Dissemination System, will address two key requirements of the CINCs, intelligence fusion and the dissemination of national imagery. A labor-intensive activity, intelligence processing is also amenable to quantitative and qualitative improvements provided by computers and appropriate data base software. Advances in collection techniques and communication systems have saturated the processing of intelligence. To develop a joint automated intelligence processing system, DOD established the Joint Tactical Fusion Program (JTFP) Management Office. The Army element of the JTFP was the ASAS, a powerful computer system that can correlate and construct reports from tactical and strategic intelligence. ASAS, a BFA system under ATCCS, is compatible with the Air Force element of the JTFP, the Enemy Situation and Correlation Element.

ASAS users will have ready access to high priority target information from sensors, radars, and other Army, sister service, and national intelligence assets. With this information ASAS will furnish tactical commanders with intelligence pertinent to their specific battlefield situation, the larger operation, and the deep battle. ASAS also helps commanders manage organic IEW assets and assists in providing operational security support. Its major hardware components were its portable work station, the primary user interface to the communications control set that receives and transmits information from multiple sensor systems, and the data processor set that processes intelligence data. To facilitate use of ASAS in the field, the Army was exploring the use of small, mobile, tactical vehicles similar to those tested for the Standard Integrated Command Post Systems in FY 1989. The development of ASAS' hardware has outpaced its software, the most complex software development program ever undertaken by the Army. In FY 1989 TRADOC sponsored an ASAS test in a limited capabilities configuration by the 522d Military Intelligence Battalion, 2d Armored Division, at Fort Hood, Texas, that would continue into FY 1990. It constituted the field portion of the force development and test and evaluation of ASAS' organizational and operational concepts and the adequacy of the emerging hardware and software.

Army doctrine requires that combat net radio systems, area common-user communications systems, and data distribution systems be integrated to provide reliable communication systems and to provide tactical commanders with the most current information. When fully fielded, SINCGARS will be the Army's principal means of command and control at brigade and lower echelons and will replace the AN/VRC–12 series of radios. The Mobile Subscriber Equipment will provide area communications for divisions and corps. MSE will mesh with the Tri-Service Tactical Communications (TRI-TAC) system that will serve EAC and major subordinate commands. TRI-TAC also provides the corps access to theater headquarters and access to systems operated by the Defense Communications System to lower echelon units in the theater. Instantaneous data distribution will be provided by a computer-based communications system, the Army Data Distribution System. The umbrella program for improved Army command, control, and communications at corps and above is the TRI-TAC Block III Communications Upgrade Program, the successor to the Joint Tactical Communications Program, in which a 25-year-old manual switching system will be replaced by MSE equipment between FY 1989 and FY 1994.

The introduction of the Mobile Subscriber Equipment began in FY 1989 and was expected to continue until 1993. Using mobile cellular-type telephones, MSE can transmit and receive voice, data, and facsimile communications throughout the battlefield. MSE consists largely of off-the-shelf equipment "ruggedized" for tactical use. The Army initially planned to acquire MSE equipment for the Total Army force of five corps and twenty-eight divisions, but budget cuts in FY 1989 reduced the plan to twenty-six divisions. As a corps area communication system, the MSE can cover approximately 23,000 square miles and link as many as five divisions with 1,900 mobile and 10,000 fixed terminals. The MSE was successfully tested by the 13th Signal Battalion, 1st Cavalry Division, at Fort Hood, Texas, between February and December 1988. Division commanders and staff found the MSE better for AirLand Battle doctrine than current systems. In December 1988 the Under Secretary of the Army approved production of the MSE with contracts expected to furnish MSE equipment to the III, V, and VII Corps and the XVIII Airborne Corps by FY 1992. Fielding of the MSE will entail reorganization of division and corps Signal Corps battalions, retraining of 30,000 signalmen, and reclassification of numerous MOSes. Division signal battalions will be reduced from 625 spaces to less than 500, but the corps signal battalion will increase slightly. Approximately 5,000 communication specialists will be transferred to other functional areas. MSE training will be conducted by the prime contractor at the Signal Center, Fort Gordon, Georgia, and at the Field Artillery Center, Fort Sill, Oklahoma.

At echelons below division, the Army is distributing the Single Channel Ground and Airborne Radio System (SINCGARS), a family of new tactical radios. As a single-channel, jam resistant, VHF-FM radio system, SINCGARS will be the primary combat net radio. In 1987 SINCGARS received limited distribution to U.S. Army units in South Korea and the communications training base, and a limited number was also fielded to Army units in Panama in FY 1989. On 5 January 1989, the Army Systems Acquisition Review Council approved acquisition of an additional 13,600 ground SINCGARS, and Congress also authorized 2,400 SINCGARS for the Navy and Marine Corps. More than 9,000 of these 16,000 sets will have an internal communications security capability that reduces the weight of each set by seven pounds. Radios with this feature will be distributed to units in USAREUR. On 3 April the SINCGARS Program Office awarded a contract for 1,200 Airborne SINCGARS radios. The Army intended to acquire a total of 198,227 ground and 11,070 airborne SINCGARS. During FY 1989 the Army also developed a version of SINCGARS, the Integrated Communications Security/SINCGARS, that had improved communication security. The Army proposed that production start in FY 1991 before the completion of field testing, but DOD questioned this approach because of concern about quality control. Uncertainties also existed regarding what funding levels Congress would approve.

The Army continued to equip squads with the new lightweight radio, the AN/PRC–126, during FY 1989. This new radio was distributed initially to the 82d Airborne Division, the 1st Special Operations Command, infantry units in USAREUR, and USSOUTHCOM. Weighing about three pounds, the AN/PRC–126 can handle communication between small tactical units with a range from 500 meters to a mile and is compatible with SINCGARS. In March 1989 the Army began fielding the AN/PRC–126 radio to the 2d, 7th, and 25th Infantry Divisions. Army-wide fielding of the Lightweight Digital Facsimile A/N/UXC–7 was completed in early FY 1989, for a total of 2,040 machines. Early in 1989 the U.S. Army Signal Center analyzed the service's battlefield communications requirements for Congress. The center extolled the Army's current voice communication systems but reported that in the profuse electronic environment of the Army's Battlefield Automation Systems in the mid-1990s the MSE would need packet switching. In April 1989 an MSE packet switching contract option was signed, with fielding scheduled to start in January 1991.

Communications between allied forces in combined operations usually produce problems that relate to both different languages and incompatible communications systems. Operational coordination between American and West German armor units in NATO exercises, for example, had used radio communication between tanks that relied on commanders' either knowing each other's language or having translators on board. To obviate time-consuming translations, the Army developed the Combat Vehicle Command and Control System. Using digital communications, it automatically translated transmissions by commanders who spoke different languages. Each tank's monitor can also display common tactical information. To further enhance interoperability, the United States and West Germany signed a memorandum of understanding in June 1989 that provided for a common combat net radio by 1994. A related initiative was the development of bilingual command and control systems for use in South Korea. The Theater Automated Command and Control Information Management System (TACCIMS) will portray information on troop dispositions, logistical data, intelligence, and maps in a bilingual format on computer terminals located in major American and South Korean Army headquarters. TACCIMS is scheduled to be introduced in the early 1990s.

An important element of IEW modernization is the Combined Arms Reconnaissance, Intelligence, Surveillance, and Target Acquisition (RISTA) System designed to provide Army commanders with target data and intelligence. It consists of common multimission and mission-specific sensors, processors, and data links and communications. The RISTA System concept statement was developed during FY 1989 and presented to TRADOC for review in FY 1990.

One of the Army's goals is to perfect a generic intelligence correlation system that can process information and prepare combat information products derived from different sources—electronic (ELINT), signals, and imagery intelligence. For maneuver and combat aviation brigades and fire support and intelligence units, the Army is developing the common ground station (CGS), which will receive and process data from ground or airborne collection platforms including UAVs and other sources such as the commander's tactical terminal. Ground stations will also have enhanced ground collection capabilities that make each CGS a major IEW node. Vehicle-mounted modules linked to ground and air-based sensor systems will enhance the mobility of intelligence support. CGSs at division, corps, and EAC will link tactical air sensors with the ASAS. At corps and EAC, the CGS can receive data directly from national intelligence systems.

Characteristic of the trend toward use of multisource sensors was the development of MASINT (measurement and signature intelligence) sensors. MASINT sensors will detect potentially hostile emissions from acoustic, chemical, biological, nuclear, and directed energy sources. Like the new generation of communications intelligence (COMINT) and signals intelligence (SIGINT) sensors, MASINT sensors will have plug-in/plug-out capabilities. The adoption of common sensors and the CGS concept will reduce the number of intelligence personnel needed for specific collection systems.

During FY 1989 the Army examined several possible configurations for its ground-based common sensor (GBCS) and its airborne sensor systems. For the former the Army considered mounting sensors on the MLRS chassis and distributing eight GBCS systems to each heavy division. Containing both ELINT and COMINT sensors, the GBCS will supplant the AN/TSQ–114 TRAILBLAZER, the AN/MSQ–103A TEAMPACK, and the AN/TRQ–32(V) TEAMMATE systems. The Army, in FY 1989, also improved its ability to detect and collect electronic emissions. It was developing a lightweight man-portable radio direction finding system to replace the AN/PRD–11 RDF system and to outfit its light infantry divisions. For use at EAC, the Army was developing TRACKWOLF (AN/TSQ–152), an interim SIGINT collection system composed of a large, mobile console with high-frequency intercept and direction-finding capabilities.

The Army was also modernizing its aerial electronic collection surveillance and target acquisition capabilities under the program executive officer for IEW, assisted by the Army Aviation Systems Command's program manager for Special Electronic Mission Aircraft. Several fixed- and rotary-wing Army aircraft are specially equipped for surveillance and electronic collection—the RV–1D and OV–1D Mohawk, the RV–12D Guardrail V, and the EH–60, a specially configured Black Hawk helicopter. The OV–1D Mohawk, used in the Vietnam War, was being upgraded by replacing its AN/APS–94 side-looking airborne radar (SLAR) with a system that had higher imagery resolution and improved moving target indicators. Congressional concerns about cost resulted in an Army decision to modify about one-third of its ninety-eight OV–1Ds and to retire the others. The 1989 Intelligence Authorization Act prohibited procurement of more than three aircraft and sensors until the Army presented a plan that assessed the contribution of UAVs and other reconnaissance assets in support of its electronic collection requirements. The Army's newest SIGINT sensor system, the GUARDRAIL Common Sensor, was tested in the United States during FY 1989. Possessing both COMINT and ELINT capabilities, it will replace the AN/ALQ–133 QUICKLOOK II system carried by the RV–11 Mohawk and also will be carried on the RC–12H/K aircraft. The latter's remote relay system can relay SIGINT data collected by satellites to any processing station capable of receiving satellite transmissions. This capability will reduce by half the number of GUARDRAIL systems that would normally be deployed to an operational area.

The Army benefited in FY 1989 from an earlier SEMA effort. The GRISLEY HUNTER, equipped with a forward-looking infrared radar system, an infrared line scanner, and a low–light-level, high-resolution television camera supported the U.S. Southern Command's intelligence collection requirements in Central America during FY 1989.

JSTARS, an Army/Air Force project, will provide division and corps commanders with wide-area surveillance and moving target imagery that locates first and second echelon enemy forces. JSTARS's airborne radars, operated by the Air Force, can extend surveillance and target acquisition 100 kilometers beyond the forward edge of the battle area. This rapidly transmitted data will furnish targeting information for fire support systems. In December 1988 DOD approved the Army's part of JSTARS, its ground station module (GSM). Production of the first nine interim GSMs was under way, with fielding anticipated early in 1990. The interim GSMs would access and process imagery acquired by the OV–1D SLAR and JSTARS aircraft. An upgraded ground station, GSM Block 1, was also tested in FY 1989. Unmanned aerial vehicles constituted another airborne intelligence collection platform. The Army planned to evaluate two models: the UAV-Close (formerly UAV-Maneuver) and the UAV-Corps (or UAV-Deep). The UAV-Close had electro-optic and infrared sensors and all-weather capabilities and will be linked to a CGS. The UAV-Deep, with a range of 200 kilometers, can gather imagery intelligence for the corps and will be linked to a CGS either directly or by relay via an airborne relay station.

In FY 1989 the Army expressed an urgent operational requirement for a mobile nuclear, biological, chemical reconnaissance system (NBCRS), especially for USAREUR. Studies by the Army Chemical School concluded that a chemical platoon equipped with an NBCRS would have a markedly greater detection capability on a contaminated battlefield than current detection systems. In mid–FY 1988 the Army had decided to fulfill this requirement by adopting the German Superpanzer Fuchs (Fox) and to terminate its XM87 research and development program. Congress, in its FY 1989 Joint Authorization Conference Report, mandated that the Army conduct competitive trials of the German system with ones commercially produced in the United States because Congress believed the program was too large for sole procurement from the Germans. Congress, however, did not appropriate funds for the competitive tests, so the Army held its own NBCRS trials in FY 1989, with the results not expected until FY 1990.

To secure friendly communications and disrupt hostile ones, the Army was improving its electronic countermeasures. The expendable artillery-delivered jammer was in full-scale engineering development along with a hand-emplaced expendable jammer. Together with the current AN/MLQ–34 TACJAM system, a ground-based electronic countermeasure set, these jammers offered the Army highly deployable tactical jamming capabilities. TACJAM, already distributed to TRADOC, FORSCOM, and USAREUR, was fielded to forces in Korea during the year. An improved version of TACJAM, TACJAM–A, was entering engineering development, and UAV-mounted jammers were also being considered.

Using computers and digital data processing techniques, the Corps of Engineers topographic units have automated the terrain analysis process. The Combat Terrain Information System, with a digital topographic support system, enabled topographic units to analyze, prepare, print, and disseminate multicolor maps and graphics in the field. Using an array of simulators over a given geographical area, the Army's Engineer Topographic Laboratories and the Defense Advanced Research Projects Agency created a simulation network to prepare digital terrain data bases.

Medical Support

The Army's recent need for a new family of field hospitals stemmed from serious deficiencies that were identified in mobilization exercises in the early 1980s. The Defense Resources Board directed the Army in 1984 to accelerate the procurement and fielding of a new generation of equipment to increase medical readiness and efficiency. The Army identified a need for 156 new hospital units, in addition to training-base requirements. To fulfill the mandate, the Army developed the Deployable Medical System (DEPMEDS) family of hospitals, a modular and highly mobile field hospital. DEPMEDS hospitals have seven configurations that range from forward-deployed mobile army surgical hospitals to general hospitals in the communications zone. Each has a different mix of standard modules, such as operating rooms, x-ray suites, and wards, and is equipped with the latest medical technology and climatic controls. Each DEPMEDS hospital has more than four hundred beds, three operating rooms, and a network of tents and collapsible buildings spread over a five-acre area. The hospitals can accommodate the most sophisticated and complex medical procedures in nearly every medical specialty and will handle even the most seriously wounded soldiers. Depending on the volume and nature of the casualties, modules that contain various specialties can be moved and reerected to adapt to rapidly changing battlefield situations.

Of the 156 DEPMEDS hospital sets the Army planned to procure, 16 sets were to be distributed to the active components and 94 to the Army Reserve. Remaining sets will be stored as primary mobilization equipment, designated as Pre-positioned material configured to unit sets (POMCUS) Uncovered Residual Equipment, or supplied to medical regional training sites. By the end of FY 1989 twenty-four sets had been fielded—four to CONUS active component hospitals and twenty to the Army Reserve. Active medical units will receive DEPMEDS sets either at their home stations or as part of POMCUS. Certain Army Reserve hospital units were scheduled to receive Minimum Essential Equipment for Training for DEPMEDS training at their home stations. Because of higher priority funding requirements in FY 1989, the Army recommended deleting 41 of the 156 sets, but the DRB directed the Army to procure all 156 of them. The largest procurement program ever undertaken by the Army Medical Department, DEPMEDS' total cost will approximate $2 billion.

Starting in FY 1989, all Army squads, crews, teams, or elements of equivalent size will have a soldier designated and trained as the Combat Lifesaver. This individual will perform far-forward lifesaving care as a secondary mission when the battle ends. To assist the Combat Lifesaver in performing his mission, the Academy of Health Sciences, Fort Sam Houston, Texas, developed a Medical Equipment Set, Combat Lifesaver, that consists of seventeen first-aid items. Approximately 80,000 sets have been ordered, 38,657 for the active component and the remainder for the reserve components. Fielding began in the spring of 1989, and the bulk of it was expected to occur in FY 1990. The first units to receive the sets were the 6th and 10th Infantry Divisions.

Tactical and Nontactical Wheeled Vehicles

For several years the Army has experienced acute shortages of tactical and general purpose vehicles. The vehicle in shortest supply was the M939A2 Series five-ton truck. The FY 1989 Defense Authorization Act directed the Army to provide a Tactical Wheeled Vehicle Modernization Plan (TWVMP) to Congress that addressed requirements through the late 1990s. Elements included the useful life of the existing fleet, details on proposed procurement and rebuilding efforts, the impact of current acquisition strategies on the domestic production base, and an assessment of the cost-effectiveness of using more than one production source. The Tactical Wheeled Vehicle Requirements Study of December 1988 concluded that the Army's truck fleet was outdated and its replacement would boost readiness and lower operation and maintenance costs. On 24 February 1989, the Chief of Staff approved the Army's TWVMP that was submitted to Congress in April. The TWVMP envisioned equipping the Army with a combination of newly designed vehicles and available resources distributed to units on the first-to-fight basis. The plan encompassed a Service Life Extension Program to begin in FY 1993 for 2 1/2-ton vehicles and a program to eliminate vehicles such as the heavy GOER and the 1 1/4-ton GAMA GOAT.

Under the TWVMP the Army will adopt a single vehicle for each of the light, medium, and heavy fleets. For the medium family of vehicles, the Army planned to develop new 2 1/2-ton and 5-ton trucks. Following consideration by the Defense Acquisition Board early in FY 1989, the Army awarded several contracts for competitive prototypes. Congress prohibited the testing of commercial medium tactical trucks, contending that the commercial production base was inadequate. The Heavy Expanded Mobility Tactical Truck (HEMTT) was conceived as a heavy transporter for fuel, ammunition, and cargo. Through FY 1989 the Army expected to procure nearly 11,500 HEMTTs of a 13,139 programmed total. The Army tried to cancel the remaining HEMTTs because of budget constraints and higher priorities and requirements, but Congress denied the request. The Palletized Loading System would give the HEMTT a self-load/unload capability and the potential to decrease the number of vehicles and personnel needed for logistical tasks, to improve the ammunition supply distribution system, and to increase interoperability in NATO. In January 1989 the Army awarded contracts for PLS prototypes to three manufacturers. To avoid any appearance of Army bias in the final source selection, Congress delegated that authority to the Under Secretary of Navy for Acquisition. Prototype testing of the PLS was scheduled for FY 1990.

The Army's Nontactical Vehicle (NTV) Program has been perennially underfunded, and 35 percent of the existing fleet was eligible for retirement in FY 1989. The NTV fleet consisted of commercially designed vehicles that ranged from sedans to trailer trucks used for such missions as training, security, intelligence, criminal investigation, recruiting, medical, sanitation, facilities maintenance, and other missions. The Army's Intelligence Support Command, for example, depended totally on NTVs for OCONUS intelligence gathering missions and felt seriously restricted because of the shortage of funds for NTV replacement. In FY 1989 only $18 million was appropriated for NTV procurement, while there was a requirement for nearly $75 million, according to Army officials. These large budget shortfalls have caused the aging NTV fleet's operational and maintenance costs to increase, and the cost of leasing commercial vehicles has grown. Tactical vehicles were also being used to perform many administrative missions. In 1986 Congress required all federal agencies to pool vehicles within the General Services Administration's Interagency Fleet Management System for greater economy. To comply with the law, the Army in FY 1989 was transferring its stateside passenger and general purpose fleet and other special purpose vehicles—about 55,000 of them—to GSA.

Engineer Equipment

Two divergent force development trends in the 1980s were the introduction of heavier armored vehicles and the activation of light infantry divisions. The Army has been reexamining its equipment requirements to facilitate cross-country mobility, and transportable tactical bridging is one of them. The development of new bridges included the fabrication of stronger, longer, and less cumbersome tactical bridges and the development of a light assault bridge for light divisions transportable in a C–130 Hercules. Existing tactical bridges had a capacity of sixty tons, a length of forty-five meters, and required seven trucks for transport and a crew of thirty-three to emplace them. The Army hoped to increase capacity and length to seventy tons and fifty-four meters and to reduce transport and crew to four trucks and eight soldiers. One approach was to replace metal bridges with ones made of lightweight and extremely strong composite materials. New tactical bridges were being designed to use the M1 tank chassis instead of the older M48 chassis.

During FY 1989 the T–9 Model D7–G Production Bulldozer was fielded throughout FORSCOM, but the M916 tractors and M870A1 trailers needed to transport the bulldozer were not available. Fielding of the M9 Armored Combat Earthmover was resumed in FY 1989 after Congress restored funds for its procurement. HQDA also decided to retain rock crusher and quarrying sections in eighteen engineer battalions and postponed the conversion of five combat engineer battalions to airborne status. The Army Troop Support Command continued to field new air-transportable well-drilling rigs to engineer detachments to standardize this item throughout the Army.

Electrical generators have been ubiquitous with Army units in the field, and many of them were commercial models. The Army was developing a new family of tactical generators and tested them at Fort Hood, Texas, during FY 1989. The new generators will be more mobile, reliable, easier to maintain, and quieter, thus obviating the need for noise suppression kits. During a ten-year period the Army expected to buy 86,000 new generators.

Individual Weapons

The Army's Advanced Combat Rifle Program, managed by the Close Combat Armaments Center, Picatinny Arsenal, New Jersey, underscored the enduring importance of the rifle to close combat. In August 1989 the Army and the Air Force began testing the first of four prototypes of rifles to assess whether improvements in rifle design and technology warranted replacing the M16A2 rifle. The Army wanted a rifle that would significantly improve the average soldier's ability to hit the target under battlefield conditions, or at least to double the number of hits per trigger pull. With the M16A2 the probability of a battlefield hit is 20 percent at 100 meters, 10 percent at 300 meters, and 5 percent at 600 meters. Two American and two European manufacturers submitted prototypes that represented the latest in rifle design, technology, and ammunition. Three of the rifles used 5.56-mm. ammunition, the size currently used by the Army, and the other used 4.92-mm. ammunition. In addition to conventional ammunition, most of the weapons could fire highly lethal ammunition that included rounds containing flechettes and double bullets. The tests, which were being held at Fort Benning, Georgia, were slated for completion in mid–FY 1990.

Conclusion

The Army's force modernization plans that had evolved, come to fruition, or were approved in FY 1989 served as a disciplined approach to modernizing weapons systems and equipment. Those plans offered Congress and DOD a framework in which to assess Army materiel and budget requirements in major functional areas. The plans helped project costs into the out-years of the developmental process and aided the Army in obtaining level funding to protect major programs from the vagaries of the budget process and to sustain modernization. The adoption of overarching modernization plans also complemented reforms in the Army's acquisition process. Modernization efforts in progress or begun during FY 1989 reflected a decade of developmental initiatives. Their impetus was derived largely from an appreciation of the near and mid-term threat, technological innovation, and the effect of doctrine. A modernization strategy that emphasizes heavy forces reflected America's concern with the Warsaw Pact threat and the imperatives of AirLand Battle doctrine and combined arms operations. By the end of FY 1989 the Army had realized many of its modernization goals for heavy forces and deep combat capabilities with initial and improved versions of the Abrams tank, the Bradley fighting vehicle, attack helicopters, and other weapons systems. Budgetary constraints and changing strategic conditions, however, reduced the Army's hopes for many longer-term developments and caused some reductions in near-term modernization programs.

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Training

Introduction

Training is the process by which organization, manpower, and materiel are merged within a doctrinal framework to achieve institutional goals. Beginning in the mid-1970s with the all-volunteer force, the Army's approach to training shifted from an emphasis on training for victory during a long period of mobilization to maintaining highly trained and mobile forces that could deter aggression or achieve combat success on short notice. The emphasis on training was further spurred by the widely held view that the Soviet Union had closed, and in some cases even surpassed, the technological gap with the United States.

Army leaders sought to offset Soviet advantages in both technology and superior numbers with better training. Training in the Army during the 1970s and 1980s ranged from a basic introduction to individual warfighting skills to unit training that involved joint and combined exercises. It embraced acquisition of highly specialized technical skills and imbuing soldiers with the qualities of exemplary leaders. The application of technology to training techniques became a hallmark of all Army training. By the end of the 1980s interactive computer-based teaching, wargaming by computer to simulate tactical problems and force-on-force maneuvers, and distributive training, or providing computer-generated training at home stations, had become essential ingredients in training the force. Training doctrine was increasingly centralized within TRADOC and the proponent schools, while the conduct of training became more decentralized throughout the Army.

By FY 1989 most aspects of Army training had been recast from the pre-1970 mold. The mobilization-based Army Training Program (ATP) was replaced by the Army Training and Evaluation Program (ARTEP). A performance-oriented program for unit training, the ARTEP required squads through battalions to perform to a standard, not simply to train for a specified period of time. It required units to train as they would fight, achieving proficiency for specific missions through the mastery of individual and unit tasks. The development of national training centers was the apex of the Army's unit training strategy. If the ARTEP reflected the Army's quest for standardization and realistic assessment of unit training, adoption of the Skill Qualification Test (SQT) became the means to evaluate individual proficiency. TRADOC's operating budget for FY 1989 was 15 percent less than in FY 1987. During FY 1988 and 1989 shortfalls in TRADOC's training budget were partly compensated by the diversion of funds from its base operations account, but the practice exacerbated the backlog in facilities maintenance and repair. Higher costs for training ammunition drove up training costs, and environmental concerns impinged on training initiatives. At Fort Riley, Kansas, and other posts, local residents objected to the Army's plans to acquire additional land to expand maneuver areas and firing ranges. As FY 1989 began, the Army had culminated a year of training initiatives that were part of the FY 1988 Year of Training. During FY 1989 General Vuono stated that the Army would adhere to its training philosophy, which emphasized the attainment of standards rather than simply putting in time. A major step in institutionalizing this approach was Vuono's approval on 15 November 1988 of FM 25–100, *Training the Force*, a manual that espoused a training doctrine that prepared soldiers for AirLand Battle. General Vuono formally introduced FM 25–100 to CONUS commanders at the Senior Leader Training Conference (SLTC) at Fort Leavenworth, Kansas, in November 1988. He made a similar presentation at a USAREUR senior leader conference at the Seventh Army Training Center, Grafenwoehr, West Germany, in January 1989.

At both conferences General Vuono reinforced the themes that emerged from the Year of Training. Prominent among them were the needs to have realistic training, to align individual and unit training with the Mission Essential Task List (METL), and to emphasize leader development. The Chief of Staff and the conferees extolled the virtues of the realistic live-fire training conducted at the combat training centers (CTC) but recognized that the opportunities for units to train there were limited. The conferees agreed on the importance of conducting training at home stations that most closely approximated CTC training and that emphasized combined arms training. They were unanimous in stressing that NCOs must play a major role in individual training that supported a unit's METL. The CONUSA Commander's Conference, held a week after the first SLTC, centered on reserve component training. The CONUSA commanders stressed the importance of obtaining at least 85 percent Military Occupational Specialty Qualification in RC battalions and ensuring that RC personnel maintained their critical skills. Most importantly, they underscored the need to stabilize missions and CAPSTONE assignments for RC units to enable them to train properly for mobilization and deployment requirements.

Operating tempo, or OPTEMPO, measured the operating and sustaining resources associated with a particular training strategy to predict readiness levels. OPTEMPO included funds for all aspects of training—procurement of spares, fuel, maintenance, and other support functions. Ground OPTEMPO was expressed as a yearly rate in miles/hours for major items of equipment, such as tanks. In FY 1989 the Army restored ground OPTEMPO from 725 miles in FY 1988 to 850 miles. Air OPTEMPO reflected the number of hours flown per month by a crew in rotary-wing aircraft to sustain training and mission support. For FY 1989 the Army sought an air OPTEMPO for active and reserve component units of 15.8 and 9.8 hours a month, respectively. While preserving the rate for active forces, the FY 1989 budget reduced the RC rates to 8.8 for the USAR and 7.8 for the ARNG. The Army's long-range training plan, approved by General Vuono in late July 1989, reflected the impact of reduced funding, environmental concerns, and the need to exploit technologies to restrain training costs without losing realism. The cost to fire one cannon round from the M1 Abrams tank was $135, while the cost to fire a round from the M1A1 tank was seven times greater. Transportation costs to move troops to and from training centers continued to rise. The Military Traffic Management Command estimated that the Army spent approximately $30 million in FY 1989 to move personnel and equipment by rail to the National Training Center at Fort Irwin, California.

Individual Training

Several developments during FY 1989 highlighted the Army's commitment to leadership training. A major step was General Vuono's approval on 30 June 1989 of the final draft for FM 22–100, *Military Leadership*. In May 1989 the Chief of Staff approved implementation of the Leader Development Support System, which sought to accommodate leader development to changes in the Army. Its three functional components were an advisory board to the Chief of Staff that consisted of senior Army leaders; the Leader Development Office, Fort Leavenworth, Kansas, which would assess and formulate leader development initiatives; and the Leader Development Decision Network, composed of representatives from many Army organizations who would examine leader development issues for the LDO.

Throughout FY 1989 the Center for Army Leadership at Fort Leavenworth pursued implementation of fifty-two initiatives that stemmed from the Officer Leader Development Study completed in FY 1985 that were subsequently incorporated into the Leader Development Action Plan. Thirty of the fifty-two initiatives had been implemented by early FY 1989, and the remaining twenty-two were in various stages of implementation. Examples included the assignment of all lieutenants to TOE or equivalent units following completion of the Officer Basic Course and assignment of a functional area skill designator in the fifth, rather than the seventh year of active service.

Two additional leader development studies were conducted in FY 1989. The NCO Leader Development Study, conducted by a task force at the Sergeants Major Academy, Fort Bliss, Texas, resulted in the NCO Leader Development Action Plan, signed by General Vuono in October 1989. Another study, undertaken by TRADOC's Civilian Training Directorate, addressed civilian leader development. Both studies were slated for completion during the fiscal year. To hone leadership skills of new field grade combat unit commanders, the Tactical Commander's Development Course, a two-week course that followed the precommand course at the Command and General Staff School, was introduced. Staff rides and computer simulations of combat using the Army Training Battle Simulation System (ARTBASS) were examples of other measures available in FY 1989 to enhance leader development. General Vuono stressed self-development for leadership with professional reading guided by the *1988 Contemporary Military Reading List*, dated 1 October 1988, or maintaining competency in a foreign language. The proliferation of professional reading lists by branch schools and service journals led the Chief of Military History in FY 1989 to advocate a consolidated Leader Development Reading List for Military History.

Since 1945 the Army has conducted seven major studies that addressed officer education and training, the latest being the leader development study initiated in FY 1985. All of these studies have pointed to the necessity of adapting education and training to the changing needs of the Army and the nation. They also reaffirmed the three fundamental pillars of officer training and education—formal education, operational experience, and self-development—grounded in current doctrine and operations, the lessons of military history, constitutional and democratic values, and professional military ethics. According to General Vuono, the Army's objective was to produce professional soldiers and leaders who were skilled in staff functions and combat at every echelon of command, attuned to the requisites of joint and combined activities, and able to advise decision makers at the highest policy and strategy-making levels.

The officer education system was structured to match the increased responsibility of higher command assignments. It was grounded in the Military Qualification Standards (MQS) system, which was being revised to accentuate combat skills. The first level, MQS I, encompassed precommissioning training; MQS II, revised in FY 1989, applied to an officer's first three years of commissioned service and stressed company-level duties. Still being developed, MQS III would apply to the fourth to tenth years of an officer's career. Each MQS was divided into a set of military tasks, derived from applicable METLs, and other military education components.

Precommissioning training was provided at the U.S. Military Academy (USMA), in college Reserve Officer Training Corps (ROTC) programs, and at Army officer candidate schools. Cadet enrollment at the USMA in FY 1989 totaled 4,543, with 1,011 cadets graduating in the Class of 1989. The ROTC program was the source for most newly commissioned lieutenants in both the active and reserve components. To increase opportunities for enlisted men to become officers, TRADOC's Cadet Command devised a program, "Green-to-Gold," which allowed enlisted soldiers to pursue a commission through ROTC. Under this program soldiers are discharged from active duty to enroll in Army ROTC in an accredited college program. By virtue of their earlier Army experience and education, participants received credits toward a college degree and had to complete only the final two years of ROTC training. The eight-year obligation incurred through enrollment in the program could be served on active duty or in the reserves.

Advanced officer training began with selection to the Command and General Staff Officers Course (CGSOC), designed to develop general staff officers and field grade commanders. From a pool of 6,379 eligible majors and promotable captains, the Army selected 913 officers to attend the CGSOC at Fort Leavenworth, Kansas, or an equivalent military college of a sister service or of an allied military power during the 1989–1990 school term. During the 1988–1989 term an introduction to joint planning and operations was introduced for all students in the CGSOC, along with electives for officers preparing to become joint specialists. In addition to resident students, approximately fifteen thousand additional officers were enrolled in CGSOC correspondence courses. In FY 1989 the number of officers selected to attend the CGSOC or an equivalent school during the next term increased to 1,279, reflecting General Vuono's decision in January 1989 to increase resident enrollment at the CGSOC by 20 percent. The increase was needed, in part, to compensate for the influx of officers who in the past attended the Armed Forces Staff College (AFSC) as an equivalent to the CGSOC. Under the new joint education program the AFSC would constitute the second phase of joint training.

The zenith of institutional officer training was attendance at the Army War College at Carlisle Barracks, Pennsylvania, or one of several similar courses. In the 1989–1990 academic year, 363 Army lieutenant colonels and colonels were selected to attend senior service colleges—178 for the Army War College, 37 for the National War College, 55 for the Industrial College of the Armed Forces, 27 for the Naval War College, 17 for the Air War College, 46 for various fellowship programs, and 3 to attend an equivalent foreign service college.

Specialized individual training often supplemented institutional training. Army officers were prominent among students at the Defense Language Institute Foreign Language Center and the Foreign Area Officer (FAO) Program. Approximately 130 to 140 officers were enrolled in this rigorous program in FY 1989. More than 60 percent of Army officers who had received FAO training eventually occupied joint, combined, or DOD staff positions. Twenty FAOs have served with the Intermediate Nuclear Forces on-site inspection teams in the Soviet Union. The revival of interest in staff rides and battlefield tours to supplement and complement institutional instruction continued in FY 1989. During FY 1989 the Center of Military History conducted Civil War battlefield staff rides for members of the Army Staff and also for students at the Army War College. A unique example of this genre of training was the battlefield tour of Iwo Jima conducted jointly in the summer of 1989 by USARJ/IX Corps and the History Department of the Japanese Ground Defense Force.

The task of transforming civilians into soldiers begins with initial entry training for which TRADOC expended about 50 percent of its FY 1989 training funds. Basic and advanced training were carried out at seven installations in the United States—Forts Bliss, Dix, Jackson, Knox, Leonard Wood, McClellan, and Sill. A total of 68,900 members of active component and 43,142 members of the reserve enlistment program received basic combat training. One-station unit training was conducted at five bases—Forts Benning, Knox, Leonard Wood, McClellan, and Sill—and given to 32,607 active component and 12,185 reserve enlistees. During FY 1989, 17,851 active component and 14,350 reservists received advanced individual training. During the year 130 training companies supported basic training, and 102 companies carried out one-station unit training.

For the past several years the Army has reduced attrition among recruits during the first six months of military service. In part, this success was attributable to changes in recruit training adopted by TRADOC in the mid-1980s. These changes included more emphasis on positive leadership and encouragement rather than high-stress leadership that focused on recruits' weaknesses, greater attention to the physical conditioning of recruits, and the assignment of more experienced drill sergeants to training units. While physical fitness standards were unchanged in FY 1989, the Army sought to maximize physical training. Examples were modifying training regimens to minimize injuries and using aerobic exercises to develop endurance rather than relying solely on long road marches.

In response to recommendations from its MACOMs, HQDA also clarified certain policies pertaining to the Army Physical Fitness Test (APFT) in FY 1989. HQDA retained the requirement for two tests a year, but changed the interval from every six months to at least four months. Commanders could administer the APFT as often as they wished, but had to tell troops when the test was for record purposes. During FY 1989 the Army was revising AR 350–15, *The Army Physical Fitness Program*, to conform to the principles contained in FM 21–20, *Physical Training*, and to reflect changes in the standards and frequency of testing. To improve physical fitness throughout the Army, TRADOC considered adding the master fitness trainer program to all Army professional schooling for officers and NCOs. The four-week master fitness trainer course taught at the Army Physical Fitness School located at Fort Benjamin Harrison, Indiana, during FY 1989 was attended by about one thousand active and five hundred reserve component personnel. Course graduates, upon returning to their units, would inject new training principles and techniques into unit training programs. The school also sent military training teams to Europe and Korea.

Underscoring the importance of marksmanship, General Vuono, in October 1988, stated that, "The ability to fire our weapons accurately is a fundamental requirement in our business." He noted a wide disparity in Army marksmanship training standards. The crux of the problem, in his view, was to teach junior leaders to impart marksmanship skills and to make better use of training devices. In response to General Vuono's concern, TRADOC formulated a program to train officers and NCOs at advanced schools to become expert marksmen and also to teach them to organize training programs for their units. A pilot program developed at the Infantry School, Fort Benning, Georgia, utilized the resident Army Marksmanship Unit, which also sent training teams to other posts. Three additional marksmanship teams were formed by FORSCOM in each CONUS corps to conduct similar training. Within units, instruction would concentrate on detecting and correcting poor firing techniques using means that varied from the traditional "dime test" of balancing a coin on a rifle barrel to insure a steady hand to sophisticated electronic equipment that simulated firing under battlefield conditions.

As projected in the Army Training Requirements and Resources System, the service planned for an enrollment of 559,714 trainees that included all training centers, service schools, NCO courses, and drill sergeant schools. Actual attendance was 451,545. Branch and other specialized schools operated by TRADOC accounted for most non-IET training. School enrollment varied from 34,473 at the Infantry School to 74 at the Army's Polygraph Institute. At branch proponent schools, school commandants were responsible for meshing combat and training developments, formulating training strategies that encompassed all branch-related individual and unit training, and providing for distributive training. The introduction of new or improved weapons and equipment, such as the MSE, spurred the initiation or expansion of training programs. The U.S.

Army Communications-Electronics Command for example, started a resident school at Fort Gordon, Georgia, in FY 1989 to train soldiers to operate and maintain the MSE, with instruction being provided by GTE, the prime contractor.

Impending budget cuts and base realignments and closings also caused changes in the Army's training establishment. Looking to FY 1990, TRADOC directed schools that offered MOS Level–1 training programs of ten weeks' duration to reduce the course length by 10 percent. The Army leadership decided to consolidate intelligence training at the U.S. Army Intelligence Center and School at Fort Huachuca, Arizona, when Fort Devens, Massachusetts, site of a major portion of the Army's intelligence training, was nominated by Congress for closure. The Army also considered closing FORSCOM's Air Assault Schools at Forts Hood, Ord, and Drum, retaining only the FORSCOM-sponsored air assault school at Fort Campbell, Kentucky, and TRADOC's Air Assault School at Fort Rucker, Alabama. A decision was still pending at the end of FY 1989.

Unit Training

Army units trained as they expected to fight; this varied from the home station annual training plan to joint and combined exercises. Units could also engage in special area training for varied climatic and terrain conditions. This training entailed the rotation of battalions for training at the Jungle Warfare Training Center at Fort Sherman, Panama; the Northern Warfare Training Center at Fort Greely, Alaska; or winter training at Fort McCoy, Wisconsin. More realistic and intensive unit training occurred within the Army's Combat Training Center program.

The CTC program had four sites—the National Training Center at Fort Irwin, California; the Joint Readiness Training Center (JRTC) at Fort Chaffee, Arkansas; the Combat Maneuver Training Center (CMTC) at Hohenfels, West Germany; and the Battle Command Training Program (BCTP) headquartered at Fort Leavenworth, Kansas. The program was created to meet the Army's need for realistic combined arms training for battalions and brigades. The training strategy sought to train battalion task forces in joint and combined scenarios that replicated combat from low to high intensity and to provide advanced training through command post exercises for corps and division staffs. From its opening in FY 1980 to FY 1989, the NTC trained 143 battalions. Each center provided force-on-force training by an opposing force (OPFOR) that employed Soviet tactics and techniques and integrated all elements of AirLand Battle doctrine through field training and in its wargaming program. Congress has strongly endorsed the CTC program and increased its funding from $192.5 million in FY 1988 to $259.1 million in FY 1989.

Following the Chief of Staff's decision in January 1987 to bring the CTCs under a unified training umbrella, the Army continued to develop a Combat Training Center Master Plan. On 31 May 1989, General Vuono indicated that the CMTC, JRTC, and BCTP should be fully operational before expanding the NTC. Environmental impact statements and a stationing study had to be completed prior to any decisions to create new sites or expand existing ones. He also wanted to improve the quality of the opposing forces and directed AMC and TRADOC to explore the feasibility of acquiring better vehicles to replace the OPFOR's aging ones.

General Vuono insisted upon a high priority to fielding standardized tactical engagement simulation and simulator devices such as MILES-PIP, the Intelligence Electronic Warfare Training Evaluation Center, the Air Ground Engagement Simulation, and Simulated Area Weapons Effects, which interacted with MILES to assess casualties caused by indirect fire at all CTCs. Teams from the Center for Army Lessons Learned (CALL) at the Combined Arms Center, Fort Leavenworth, Kansas, and the Army Research Institute (ARI) collected and analyzed data at the CTCs on battlefield performance and the effectiveness of training and doctrine. ARI researchers at the NTC, for example, found that casualty exchange ratios had a strong correlation to OPTEMPO and training that a unit undertook to prepare for its NTC rotation.

The NTC, operated jointly by FORSCOM and TRADOC, trained mechanized infantry and armor battalion task forces in scenarios of mid- to high-intensity conflict and was the only CTC site under FORSCOM's command. During FY 1989 twenty-eight heavy and four light battalions trained at the NTC, including two ARNG roundout battalions. The 4th Division completed a roundout rotation with elements of the North Carolina ARNG. Fourteen of the rotations involved two battalions, and several included a third, usually of light infantry, to test heavy-light force mix. Each training cycle lasted about three weeks. The Army intended to expand the NTC program to brigade rotations and to increase the mix of heavy, light, and special operations forces. For more realism, AH–64 Apache attack helicopters were added to the training program for the first time in FY 1989. Eighteen Apaches from the 1st Battalion, 227th Aviation, 1st Cavalry Division, from Fort Hood, Texas, arrived at the NTC early in 1989 to test and perfect combined arms tactics and techniques with units training at the NTC. Valuable experience was gained in employing the Kiowa OH–58D scout helicopter and the Apache as a hunter-killer team. The scout helicopter scanned the battlefield for suitable targets and relayed information to the Apache, which launched a laser-guided Hellfire missile that the Kiowa helped guide to target.

Created in 1983, the JRTC trained nonmechanized battalion task forces in low- to mid-intensity conflict scenarios. Most JRTC exercises were conducted at Fort Chaffee, Arkansas, but the Operations Group and OPFOR were stationed at Little Rock Air Force Base, Arkansas, 150 miles distant. Depending on the nature of the exercise, training could be conducted at other specialized training areas. During FY 1989 nine battalion light infantry task forces trained at the JRTC. Elements of the 6th, 7th, and 25th Infantry Divisions (LID); the 101st Airborne Division (Air Assault); a ranger battalion; a light-heavy force composed of elements of the 82d Airborne Division and the 194th Armored Brigade; and two ARNG battalion task forces trained at the JRTC in FY 1989.

The JRTC FY 1989 Decision Study set forth a concept for a new training center for light infantry and airmobile operations. Four possible locations—Fort Stewart, Georgia; Fort Lewis, Washington; Fort McCoy, Wisconsin; and Fort Chaffee, Arkansas—were being considered. The prospective training center would provide low-intensity conflict training opportunities for light infantry, airmobile, parachute, ranger, and special forces in which Air Force participation was fully integrated. The preferred basing strategy called for one permanent site that could support three battalion/brigade operations. A final decision was not expected until FY 1990. TRADOC was studying a concept for mobile training teams to export JRTC-type exercises to home training station sites as part of its distributive training efforts.

The Combat Maneuver Training Center, located at Hohenfels Training Area, West Germany, was intended to provide training similar to the NTC for USAREUR battalion task forces. During FY 1989 the Army continued to prepare the facility by installing a sophisticated instrumentation system, establishing an OPFOR, and organizing a permanent Operations Group. The first unit rotation was anticipated in September 1989 and full operation by FY 1991. Congress had delayed funding because it found that some allies would use it and not pay their share. Funds were released after DOD adopted a policy that restricted its use to U.S. forces.

The Battle Command Training Program (BCTP) was designed to improve the warfighting skills of corps and division commanders and staffs in all conflict scenarios. Established at Fort Leavenworth, Kansas, in 1987, the BCTP was modeled after programs offered to unit commanders at the NTC. Ideally, the BCTP should be scheduled within six months of a change of command. The BCTP program had three phases: seminars and workshops at Fort Leavenworth, a warfighting exercise, and a post exercise sustainment package. Using the Joint Exercise Support System (JESS) developed by NASA's Jet Propulsion Laboratories, the BCTP could simulate a corps exercise through compatible computer equipment at the home station of a participating unit. Phase one of the BCTP was a five-day seminar in which the commander and his battle staff engaged in an intensive review of AirLand Battle doctrine and wargaming in workshops and decision-making exercises. Normally lasting nine days, the warfighter segment, or phase two, included a five-day CPX conducted against a simulated OPFOR driven by the Corps Battle Simulation system based at Fort Leavenworth. The final phase was an assessment of the warfighter exercise by the BCTP staff and a lessons learned package to sustain the level of proficiency achieved during the CPX. During FY 1989 the CALL published a summary of lessons learned derived from BCTP exercises.

TRADOC proposed in FY 1989 that all corps and divisions undertake the BCTP every two years. Army training policy, as defined in AR 350–50, *Combat Training Center Program*, called for division and corps commanders to receive the BCTP sometime during their command tenure. General Vuono stipulated that participation in the BCTP should come during the first year of each corps and division commander's tour. This required five corps and eighteen active component divisions to undertake BCTP every two years and ten ARNG divisions every four years. With only two mobile training teams available to conduct BCTP seminars and warfighter exercises (WFXes), adherence to these policies was impossible. Actual participation in the BCTP in FY 1989 was as follows: the 1st Armored Division (USAREUR), 25th Infantry Division (WESTCOM), I Corps, and the 82d Airborne Division participated in seminars; the 3d, 5th, and 25th Infantry Divisions and the 1st and 3d Armored Divisions held WFXes. The 3d Armored Division's WFX in November 1988 was the first to be conducted in USAREUR. Elements of the C&GSC at Fort Leavenworth participated in phase one of the BCTP as part of Exercise WARRIOR 90.

Army Exercise Program

The Army Exercise Program included unilateral, or Army only, exercises conducted at corps level or below as well as participation in joint and combined exercises sponsored by the JCS or one of the unified or specified commands. These exercises allowed the Army to conduct total force training in its wartime missions, joint operations, and interoperability training with allied forces. Every major joint exercise included a significant RC presence. The basic objective of the JCS Joint Exercise Program was to maintain the wartime readiness of forces assigned to the unified commands. Joint exercises, both command post (CPX) and joint field training exercises, have assumed greater importance since passage of the DOD Reorganization Act of 1986. A comprehensive Joint Training Plan mandated by the 1986 act, which derived from training requirements from joint mission essential task lists and appropriate operation plans, was scheduled for completion in FY 1990. During FY 1989 proponency for

Army participation in JESS was transferred from FORSCOM to HQDA. In FY 1989 the Army participated in about fifty JCS exercises.

Among the more significant training exercises in FY 1989 was Project ARCTIC WARRIOR. One phase was Operation BRIM FROST, a joint/combined CPX and cold weather field training exercise (FTX) sponsored by FORSCOM. Conducted between 3 January and 1 February 1989 in Alaska to train elements of Joint Task Force–Alaska, BRIM FROST involved about twenty-six thousand American and Canadian troops. U.S. Army participation included elements of the 6th and 7th Infantry Divisions (Light) and ARNG and USAR units. These forces engaged in Arctic Light Infantry Training and received cold weather indoctrination. Other parts of ARCTIC WARRIOR were WESTCOM's participation in Exercise FORTRESS GALE 89–1, along with Army air defense units of the Alaskan North American Defense Region in Exercise FENCING BRAVE. These exercises tested command relationships and joint interoperability of two separate joint task forces from two unified commands, the Pacific Command and FORSCOM, in the defense of the Aleutian Islands and Alaska.

Ground forces of the ABCA nations—American, British, Canadian, and Australian—joined in Exercise CALTROP FORCE '89 during March 1989 at Forts Ord and Hunter Liggett in California. The quadripartite FTX and conference were hosted by the 7th Infantry Division (Light) and brought together battalion task forces from each of the four nations as a multinational brigade for the first time since the Korean War. Joining U.S. Army and Marine Corps elements were the British 1st Battalion of the 1st Parachute Brigade, the 6th Battalion, Royal Australian Regiment, and the 3d Princess Patricia's Canadian Light Infantry. Its purpose was to gain experience in coordinating procedures, equipment, and tactics in a low- to mid-intensity scenario. Highlights of the exercise were an amphibious assault, a night parachute drop, and an airmobile assault. As the combined force headquarters, the 2d Brigade, 7th Infantry Division (Light), provided command and control for the total force of about eight thousand. The most important finding regarding standardization was the lack of interoperability between the combat radio nets of each country.

Notable among the JTXs that entailed Army and Air Force cooperation was Exercise BLUE FLAG 89–1, an Air Force sponsored CPX held in January 1989. It trained participants in the concepts of AirLand Battle coordination using the U.S. Central Command's Southwest Asia campaign plan as the exercise scenario. Major Army participants included Third U.S. Army in its role as U.S. Army Forces, Central Command, and I Corps and XVIII Airborne Corps. The largest air defense field exercise ever held in the United States, ROVING SANDS, was conducted 14 through 23 August at Fort Bliss, Texas, and White Sands Missile Range, New Mexico. A joint Army, Air Force, and Marine Corps exercise, it involved about eight thousand troops. Major Army participants were the six battalions of the 11th Air Defense Artillery Brigade assembled from Fort Bliss; Fort Bragg, North Carolina; and Fort Stewart, Georgia, along with ARNG air defense units from Florida and New Mexico. Most Army air defense weapons were employed, including Patriot, HAWK, Chaparral, and Stinger missiles and Vulcan 20-mm. guns. Marines manned ground radar command and control centers and provided air cover with Harrier AV–8 aircraft. Air Force participation was confined largely to the role of the aggressor.

Exercise TEAM SPIRIT, conducted annually in South Korea as a joint/combined exercise sponsored by the Commander in Chief, ROK–U.S. Combined Forces Command, took place between 13 and 23 March 1989. Its purpose was to increase combat readiness and interoperability of ROK and American forces in combined operations and to demonstrate American resolve to deter aggression in Korea. American and South Korean participation in the ground phases of the FTX involved two field army headquarters, four corps headquarters, six active divisions, two reserve divisions, and one mechanized/armor brigade. Ground operations allowed for large-scale maneuvers using a full array of tactics, combat and combat service support, and an operation that linked up with an amphibious force.

American participation included elements of the 2d, 7th, and 25th Infantry Divisions and sixty-seven USAR and forty-nine ARNG units. TEAM SPIRIT tested mobilization, emergency deployment and logistical readiness, and strategic mobility. The I Corps at Fort Lewis, Washington, for example, mobilized and deployed more than twelve thousand troops, half of them from the reserve components. The USAR 164th Support Group and the AC 45th Support Group functioned as subordinates of the USAR 311th Corps Support Command (COSCOM) to provide supply, service, and maintenance support to approximately twelve thousand troops of I Corps and the 25th Infantry Division (Light). The logistical play of TEAM SPIRIT suggested that more effective combat service support could be achieved by organizing the corps support group into multifunctional forward support battalions similar to the division support command.

For the past twenty years the most significant training exercise in Western Europe was REFORGER (Return of Forces to Germany), an annual exercise to reinforce NATO. Because of unanticipated increases in transportation costs and the weakening of the dollar relative to European currencies in FY 1989, REFORGER 89 was canceled and combined with REFORGER 90, scheduled for early 1990. Exercises that entailed computer simulation by satellite links to players in the continental United States helped to compensate for the cancellation of REFORGER. Examples were COURAGEOUS GUARDIAN 88, conducted by NATO's Northern Army Group and III Corps in October 1988 and 6 Allied Tactical Air Force CPX DISTINCT JAVELIN in

April 1989. These exercises sought to replicate REFORGER training at a fraction of the maneuver and environmental impact costs. The REFORGER Enhancement Program allowed allied commanders in Europe to conduct interactive free play down to corps level from home bases. In addition, NATO held its biennial command post exercise, WINTEX-CIMEX (Winter Exercise–Civil Military Exercise), in early 1989. A JCS-directed, Supreme Headquarters, Allied Powers, Europe (SHAPE), and European Command (EUCOM) sponsored, NATO-wide CPX, it was held in February and March 1989 to train civil authorities and military commands in the use of operation plans and to test procedures and communications for NATO command and control functions in time of crisis.

Exercise CARAVAN GUARD 89 was conducted in September 1989 by V Corps to test USAREUR's REFORGER Enhancement Program. It used computers to simulate battlefield conditions and to integrate command post and field exercises. CARAVAN GUARD 89 conducted selected unit U.S. Army Training and Evaluation Program tests; provided division, brigade, and battle staff training; and evaluated new training concepts that made extensive use of computer simulation. The SHAPE commander emphasized the benefits of repetitive exercises by small units, rather than one large exercise, to increase combat readiness. Nevertheless, CARAVAN GUARD entailed about 200,000 troops including West German, French, and Canadian troops. All major Army headquarters under USAREUR took part in the exercise, and the 10th Mountain Division (LID) from Fort Drum, New York, was the major stateside participant in the computer-simulated CPX of CARAVAN GUARD 89.

Growing cooperation between American military forces and the armed forces of neighboring Latin American and Caribbean nations was also manifested through joint and combined training exercises. Exercise TRADEWINDS 89, the third in a series of annual exercises that involved the participation of selected Caribbean countries, was conducted during May and June 1989. Active component SOF and elements of the Virginia ARNG took part in the exercise. The exercise tested mutual and internal defense security arrangements; examined operational concepts, particularly those of SOF elements; evaluated military training provided through American security assistance programs; and offered area orientation to American participants.

During FY 1989 deployment for training (DFT) took place in Latin America, primarily Honduras. Sponsored by USSOUTHCOM and managed by U.S. Army, South, DFT was a small-unit deployment program of teams, companies, and battalions from the active component that sometimes worked with reserve component units in overseas deployment training. DFT's goal was to support a U.S. presence in the region that promoted regional stability, improved American capability to conduct combat operations, and provided humanitarian assistance. During the fiscal year there were thirty-eight DFTs of three principal types—medical, engineer, and infantry.

Training in Honduras was conducted under the umbrella of Exercise FUERTES CAMINOS 89 North and South, a joint training exercise that entailed Army and Air Force elements. Army heavy engineer battalion-size task forces constructed roads and other projects. In FUERTES CAMINOS South the 62d Engineer Battalion, Fort Hood, Texas, augmented the road improvements and repair efforts of the reserve units by upgrading an existing 850-man base camp. In FUERTES CAMINOS North the 46th Engineer Battalion, Fort Rucker, Alabama, built a 750-man base camp, while reserve engineer units built and improved roads in the Jora, Jacon, and San Lorenzo regions of Honduras.

Deployment for training in other Latin American countries in FY 1989 included the following: The 47th Engineer Company, Fort Wainwright, Alaska, in February 1989 constructed culverts and headwalls in Panama in connection with road construction by the 536th Engineer Battalion. Elements of the 36th Engineer Brigade, Fort Benning, Georgia, participated in Exercise CAMINO DE LA PAZ, an unscheduled JCS exercise conducted in the first half of 1989 on the Osa Peninsula of Costa Rica. The 30th Engineer Group, Fort Benning, Georgia, served as the command and control element of units that included the 43d Engineer Battalion (Combat) (Heavy) and Air Force construction teams. Well-drilling teams were sent to Costa Rica and Guyana.

In FY 1989 the ODCSLOG prepared the Army Long Range Logistics Training Master Plan, which stressed training for individual technical proficiency and underscored realistic unit training, especially for CAPSTONE units. The plan also highlighted civilian training, leader development for CSS officers, and marksmanship training for CSS soldiers. LOGEX 89, an annual joint logistical CPX developed by the Army Logistics Center, was conducted from 4 to 16 June 1989. Participants were the Fifth U.S. Army and the 13th COSCOM's CAPSTONE units from USAR and ARNG (75 percent of the units were RC). In addition to nearly eighteen hundred Army players, there were elements from all services, including the Navy's Military Sealift Command and the Coast Guard, 33 related DOD logistical agencies, 16 theater headquarters, and 19 allied nations. The exercise tested the integration of combat support and combat service support functions in joint and combined scenarios and logistical concepts in support of AirLand Battle doctrine.

Exercise SOLID SHIELD 89, sponsored by U.S. Commander in Chief, Atlantic (USCINCLANT), was a joint field training exercise conducted at various East Coast facilities by an estimated six thousand Army personnel that sought to improve joint operating procedures for over-the-shore operations. AMMOLOGEX, a field training exercise conducted from 20 to 28 May 1989 by the Ordnance Missile and Munitions Center and School, Redstone Arsenal, Alabama, was the first field deployment of the Tactical Army Combat Service Support Computer System (TACCS) to operate a field ammunition supply point. Held biennially in accord with AR 50–6, *Chemical Surety*, the Service Response Force Exercise–1989 conducted 12–16 June at Pine Bluff Arsenal, Arkansas, tested the Army's ability to respond to a chemical accident. Approximately 350 persons from AMC, FORSCOM, Health Services Command (HSC), USAISC, the Environmental Protection Agency, and state and local organizations participated.

Range Modernization

Since 1984 the Army has pursued an aggressive range modernization program by upgrading existing facilities or building new ones. The program consisted of standardized ranges for individual and unit training equipped with computerized targetry such as the Remote Engaged Target Systems which portrayed a realistic opposing force. Work continued in FY 1989 on construction of the military operations on urban terrain (MOUT) training facility at the Hohenfels Training Area in West Germany, and funds were provided for a similar training complex at Fort McClellan, Alabama. Sixteen MOUT complexes were under construction in FY 1989, and completion of five was expected by the end of the year—the Hohenfels site; Fort Pickett, Virginia; Fort Hood, Texas; Fort Ord, California; and Fort McClellan. At Fort Rucker, Alabama, work continued on the Army's first Aerial Gunnery Range for evaluating AH–64 Apache and AH–1 Cobra helicopter gunnery, expected to be operational in FY 1990.

The Multipurpose Range Complex (MPRC) was the Army's principal facility for weapons training and gunnery exercises by armor and mechanized infantry platoons as well as for dismounted infantry and attack helicopter scenarios. Of 18 planned MPRCs, 12 AC and 2 RC were completed or under construction during FY 1989. MPRCs at Fort Campbell, Kentucky; Fort Hunter Liggett, California; and the Yakima Firing Center, Washington were completed in FY 1989. Ranges at Forts Hood, Irwin, Riley, Bliss, Bragg, Stewart, and Carson and Camp Casey, South Korea, were upgraded to state-of-the-art MPRC–Heavy ranges. Despite these efforts, the Range Modernization program had ongoing problems with declining construction funds and growing maintenance costs.

Congress had been concerned that training ammunition requirements were not objectively supported by clearly defined training standards. The Army sought to improve its management of training ammunition through more realistic requirements and the use of simulators. In FY 1986, for the first time, computer models were used to develop training ammunition requirements. The models were revised in FY 1987 and FY 1988 because expenditures were less than authorizations. Expenditures and authorizations were more closely aligned in FY 1989; expenditures for tank, Bradley, artillery, and mortar systems were computed at 110 percent of historical usage and all other systems at 105 percent.

Training Devices, Simulators, and Simulation

The Army regarded training devices, simulators, and simulation (DSS) as the key to overcoming constraints on training imposed by austere funding, time, safety, and environmental concerns. Gunnery proficiency training for the TOW and Dragon missiles, the AT–4 antitank weapon, and the Hellfire missile mounted on the Apache helicopter relied heavily on DSS. For example, the Unit Conduct of Fire Trainer for fire training has enabled soldiers to train by firing fewer rounds. Computer modules were used increasingly to facilitate instruction of complex tasks and for maintenance training on major weapons systems. About fifteen hundred Electronic Information Delivery Systems (EIDS), personal computers combined with interactive videodiscs, were delivered to Army schools in FY 1989. EIDS made it possible for soldiers stationed anywhere to avail themselves of realistic training.

The Simulation Networking-Training (SIMNET) and its successor, the Close Combat Tactical Trainer (CCTT) Simulator System, were major elements of DSS. SIMNET was a group of simulators with networked data bases that allowed a combined arms force to conduct maneuvers on a simulated battlefield. It was the ground force portion of an Army/DOD project, the Combined Arms Tactical Trainer. By FY 1989 the SIMNET system was 85 percent fielded to active and reserve forces in the United States and overseas. When completely fielded, SIMNET will consist of 236 simulators deployed at eleven battalion-company sites worldwide. The CCTT, an extension of SIMNET, will add such elements as the effects of heavy artillery, terrain, and weather to simulated combat scenarios. AIRNET, a variant of SIMNET for flight training, was operational at Fort Rucker, Alabama.

During FY 1989 work progressed on fielding the Army's Family of Simulators (FAMSIM) Concept that extended training simulation from battalions to echelons above corps. FAMSIM could link widely dispersed units into one interactive exercise through satellite links to the Joint Warfare Center and the BCTP Warrior Preparation Center. Simulations generated by the Warrior Preparation Center could be distributed to unified and Army commands in Europe through the Defense Advanced

Research Projects Agency's Distributed Wargaming System (DWS). DWS's ability to simulate REFORGER exercises was demonstrated in V Corps' Exercise CARAVAN GUARD 89. Six corps FAMSIM sets that included one dedicated as the base for the National Simulation Center at Fort Leavenworth, Kansas, were programmed. FAMSIM and SIMNET were complemented by the Battalion/Brigade Simulation (BBS) system, a derivative of the earlier Army Training Battle Simulation System (ARTBASS). Eleven ARTBASSes had been fielded by the end of FY 1989; and the BBS allowed staffs to engage in operational and logistical planning and play from brigades to platoons. The first of eleven BBS systems was delivered in December 1988 to the 25th Infantry Division in Hawaii, while others were installed at Fort Richardson, Alaska; Fort Riley, Kansas; and Fort Stewart, Georgia. Initial distribution to the RC was made to the Battle Projection Center at the USAR 75th Maneuver Area Command in Houston, Texas.

Force-on-force engagement DSS technology, such as that used by the Multiple Integrated Laser Engagement System (MILES) and the Simulated Area Weapons Effects, can simulate the most realistic training short of actual combat. The system was used extensively at the CTCs. MILES is a laser transmitter that simulates live ammunition from direct fire weapons and also laser detectors affixed to opposing troops and weapons systems to record hits. By FY 1989 MILES detectors were used on hand-held and large weapons systems. The Air-Ground Engagement System (AGES) is a laser-compatible assessment system for helicopters. AGES I was used on older helicopters such as the AH–1 Cobra. The AGES II enlarged AGES I coverage to additional air and air defense weapons to enhance simulation of the combined arms battle. The AGES II readiness test conducted at Fort Hood, Texas, in March 1989 revealed numerous defects, and the use of AGES II prototypes with the Apache during the 1st Cavalry Division rotation at the NTC in July 1989 indicated persistent problems in accurately replicating Hellfire missile engagements at ranges of seven to eight kilometers. AGES II worked better at shorter ranges with the Kiowa helicopter operating as a remote designator for the Apache.

Conclusion

The important human element in Army training has often been obscured by the emphasis on technology in training systems. Technology, nevertheless, has been a potent catalyst for change in the Army, not only in how it trained but also in how it organized, equipped, and planned to fight. The relationship between weapons and training development was becoming more crucial than in the past. The Secretary of the Army emphasized to project managers that equipment to train troops and simulate the operation of a weapon must be in place when the hardware enters the field. The Heavy Forces Modernization Program illustrated the nature of future training. Units that received new heavy equipment would use "embedded" training equipment, and separate training systems and devices would further accommodate training for forces deployed overseas. Moreover, because the Heavy Forces Modernization Program would be a "family" of weapons, training developers would have to formulate training materials and devices so that soldiers could learn how multiple subsystems and missions came together as an integrated whole.

As FY 1989 ended, the Army was formulating a Combined Arms Training Strategy (CATS) to facilitate the transition from near-term to long-term approaches to training. Building on the precepts of FM 25–100, *Training the Force*, the aim of CATS was to devise training that synchronized heavy and light combat elements, aviation, special operations, and support forces of both the AC and the RC for AirLand Battle–Future. By the close of FY 1989 lower budget projections threatened to compromise CATS and the development of training systems. The Commanding General of TRADOC advised General Vuono in September 1989 that training development was "crumbling." He anticipated severe budgetary constraints in FY 1990 that could delay the growth of training centers, the fielding of training simulators, and development of the building blocks of TRADOC's mid- and long-range training plans. The Army's training accomplishments in FY 1989 were less ambivalent than future plans. The Army could look back with satisfaction on a training establishment that had changed significantly during the 1980s in its underlying philosophy, strategy, and tangible resources. Battle-focused training for both individuals and units and earnest efforts to inculcate leadership and professionalism would soon be tested in Panama and Southwest Asia.

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Conclusion

Nearly every facet of the Army's history recounted in this summary had roots in the past. From the narrow perspective of FY 1989 the Army's future was uncertain, buffeted by changes that stemmed from arms control agreements between the United States and the Soviet Union and the more accommodating strategic posture enunciated by Mikhail Gorbachev in FY 1989. The strategic shift, associated with the possibility of an altered strategic balance in Europe brought about by changes in the Soviet Union, induced expectations of changes in the United States' strategic and conventional forces.

Paradoxically, the strategic alternatives that appeared to be emerging in the Eastern Bloc reflected in part the soundness of the Army's strategic role, which centered on its long-standing commitment to the defense of Western Europe. In FY 1989, even before the dimensions of a new East-West strategic balance were clear, the Army faced questions about the relevancy of its past and current policies to new realities. Questions regarding the pace of modernization, the size of the force, and missions were among the broader issues raised.

General Vuono, the Army Chief of Staff, quickly articulated a strategic vision to guide the Army's transition into the 1990s and beyond. This vision professed that the essential characteristic of the Army as a strategic force was its inherent capability to provide sustained land power. To maintain its primacy as a strategic conventional force, the Army must be able to project power, undergo continuous modernization, possess a high degree of lethality and sustainability, and fight as part of joint and combined forces. Reductions in strategic offensive weapons and the elimination of certain tactical nuclear weapons underscored the strategic importance of conventional military power.

The process of change in the Army in FY 1989 resonated with the interplay of past and future. It was apparent in the deliberations associated with Army doctrine, force structure, modernization, the role of the reserve components, training, and personnel policies discussed in this historical summary. The past exerted an abiding influence on many facets of the Army's vision. Doctrine looked forward to war in the twenty-first century as it wrestled with questions of integrating newborn technologies into the Army and the chronic issues of joint and combined warfare and close air support. General Vuono maintained that today's Army was trained and ready when it could take units with neither a warning nor train-up time and deploy them, as in Operation NIMROD DANCER to Panama in May 1989. Nevertheless, past neglect of strategic air and sealift presented vexing questions regarding the Army's ability to carry out its strategic roles.

Other factors affected the Army of the future. Budget reductions compelled the Army to slow the pace of modernization during FY 1989, to cancel some programs, and to consider reductions in manpower and force structure. Congressional oversight pervaded nearly every aspect of the Army. Its influence was most apparent in acquisition reform, in the scrutiny of modernization plans, and in mandates for greater emphasis on joint education and service. The Army's efforts in FY 1989 to harness emerging technologies to warfighting in the future threads its way through this historical summary. Weapons modernization and incorporation of computer-generated systems to enhance management, communications, command and control, intelligence, and training, along with the Army's pioneering work in the space defense programs, illustrated this theme. Research and development faced the vicissitudes of fiscal constraints, external oversight, balancing of intra- and inter-service requirements, the complexity of highly technical systems, and the uncertainties of a changing strategic equation.

Notwithstanding its interest in technology, the Army was a complex human system. For the senior Army leadership the quality of the soldier was the foundation of the force. Reforms in the NCO corps, revamping of the warrant officer personnel system, provisioning of the soldier, the attention to human factors in equipment development through MANPRINT, realistic individual and unit training, the nurturing of leadership and professionalism, and the attention devoted to the quality of life of soldiers and families attested to the pervasiveness of the human theme during FY 1989. The Army also shared common concerns with the larger society—drug abuse, AIDS, equal treatment by gender and ethnic group, and the quality of social services. While it upheld traditional family values in FY 1989, the Army increasingly adapted to the changing lifestyles of its members and to the force's changing demographics. Day care, employment assistance for working spouses and parents, youth services, and other quality of life issues received increasing attention as part of the Army's time-honored tradition of taking care of its own.

General Vuono embodied the primacy of the individual soldier with this statement: "The American soldier—forward deployed or based in the United States—is our first echelon of strategic deterrence." Even though the threat of either a nuclear or major conventional war ebbed, Army forces would remain in Korea and Europe for the foreseeable future. To a greater extent than at any time in the past forty years, conventional forces would likely shoulder the major burden of deterrence. Force projection to deter or combat regional aggression and to protect American interests was exemplified in FY 1989 by the rapid dispatch of Army forces to Panama. These circumstances conferred a high priority on the need for fully structured, trained, and ready forces. Many of the Army's endeavors examined in this summary were directed toward this goal.

Throughout FY 1989 the Army demonstrated a multiplicity of strategic roles—deterrence, international peacekeeping, force projection, and security assistance. In its traditional peacetime role as a versatile national resource, the Army performed a variety of tasks—fighting forest fires, conducting disaster relief and humanitarian assistance at home and abroad, addressing environmental concerns, participating in the war on drugs, and assuming a larger role in countering terrorism. All institutions must successfully adjust to change to survive and remain meaningful. In charting the Army's course for the future, Army leaders in FY 1989 concentrated on developing its capabilities to fight successfully across the complete spectrum of armed conflict. This goal relied upon preserving the positive attributes of the Army's experience that affected readiness and transforming the Army as an institution to be a productive instrument of national power.

Glossary

A^3	Armor/Anti-Armor
AAE	Army Acquisition Executive
A-AF-CLIC	Army–Air Force Center for Low-Intensity Conflict
AAFES	Army–Air Force Exchange Service
AAMP	Army Aviation Modernization Program
AAWS	Advanced Antitank Weapons System
AAWS-H	Advanced Antitank Weapons System–Heavy
AAWS-M	Advanced Antitank Weapons System–Medium
AAWWS	Airborne Adverse Weather Weapons System
ABCA	American, British, Canadian, and Australian
ABE	Advanced Boresight Equipment
AC	Active component
ACCS	Army Command and Control System
ACE	Assistant Chief of Engineers
ACF	Army College Fund
ACFT	Aircraft
ACOE	Army Communities of Excellence
ACPERS	Army Civilian Personnel System
ACR	Armored cavalry regiment
ACRA	Airlift Concepts and Requirements Agency (TRADOC)
ACTEDS	Army Civilian Training, Education, and Development System
ADAPCP	Alcohol and Drug Abuse Prevention and Control Program
ADATS	Air Defense Anti-Tank System
ADDS	Army Data Distribution System
AFA	Architecture for the Future Army
AFAP	Artillery-Fired Atomic Projectile
AFATDS	Advanced Field Artillery Tactical Data System
AFB	Air Force Base
AFFS	Army Field Feeding System
AFHC	Army Family Housing Construction
AFHO	Army Family Housing Operations
AFQT	Armed Forces Qualification Test

AFRC	Armed Forces Recreation Center
AFSC	Armed Forces Staff College
AFV	Armored family of vehicles
AGES	Air-Ground Engagement System
AGR	Active guard/reserve
AGS	Armored Gun System
AHIP	Army Helicopter Improvement Program
AIA	Army Information Architecture
AIDS	Auto-immune deficiency syndrome
AKARNG	Alaska Army National Guard
ALB-F	AirLand Battle–Future
ALB-F(H)	AirLand Battle–Future (Heavy)
ALC	Army Logistics Center
ALFA	Air-Land Forces Application Agency (TRADOC)
ALO	Authorized Level of Organization
AMC	Army Materiel Command
AMMO	Ammunition
AMSAA	Army Materiel Systems Analysis Agency
ANC	Army Nurse Corps
ANCOC	Advanced Noncommissioned Officer Course
ANVIS	Aviator Night-Vision Imaging System
AOC	Army Operations Center
AOE	Army of Excellence
AOS-JTF	Alaska Oil Spill–Joint Task Force
AP	Ammonium perchlorate
APF	Appropriated funds
APFT	Army physical fitness test
APGM	Autonomous precision guided munitions
APPS	Army Personnel Proponent System
AR	Army Regulation
ARCOM	Army Reserve Command
ARI	Army Research Institute
ARNG	Army National Guard
ARPERCEN	Army Personnel Center
ARR	Annual recurring requirements
ARTBASS	Army Training Battle Simulation System
ARTEP	Army Training and Evaluation Program
ASA (CW)	Assistant Secretary of the Army (Civil Works)
ASA (RDA)	Assistant Secretary of the Army (Research, Development, and Acquisition)
ASAS	All-Source Analysis System
ASAT	Anti-Satellite
ASE	Aircraft survivability equipment

ASF	Army Stock Fund
ASIMS	Army Standard Information Management System
ASVAB	Armed service vocational aptitude battery
AT	Annual training
ATACMS	Army Tactical Missile System
ATCCS	Army Tactical Command and Control System
ATM	Anti-Tactical Missile
ATMD	Anti-Tactical Missile Defense
ATOIC	Army Antiterrorism Operations and Intelligence Cell
ATP	Army Training Program
ATTD	Advanced Technology Transition Demonstration
AUDIT	Authorization Discipline Task Force
AVSCOM	Aviation Systems Command, U.S. Army
AWOL	Absent without leave
BAI	Battlefield Air Interdiction
BAQ	Basic allowance for quarters
BASOPS	Base Operations
BBS	Battalion/brigade simulation
BCTP	Battle Command Training Program
BCW	Binary chemical warhead
BDP	Battlefield Development Plan
BEAR	Bonus Extension and Retraining
BFA	Battlefield functional area
BMAR	Backlog of maintenance and repair
BNCOC	Basic Noncommissioned Officer Course
BOS	Battlefield Operating System
BOSS	Better Opportunities for Single Soldiers
C^2	Command and Control
C^3	Command, Control, and Communications
C^3I	Command, Control, Communications, and Intelligence
CA	Civil affairs; commercial activities
CACDA	Combined Arms Combat Development Activity
CAL	Center for Army Leadership
CALL	Center for Army Lessons Learned
CAM	Catchment area management
CAPS	Conventional Armaments Planning System
CAPSTONE	A procedure aligning reserve component units scheduled for Europe with their wartime chain of command

CAR	Chief, Army Reserve
CAS	Close air support
CASMARG	Close Air Support Mission Area Review Group
CAT	Crisis action team
CATS	Combined Arms Training Strategy
CBAS	Company/Battalion Administrative System
CBRS	Concept Based Requirements System
CCL	Combat-configured load
C-CLAW	Close-Combat Laser Weapon
CCTT	Close-Combat Tactical Trainer
CDC	Child Development Center
CECOM	Communications-Electronics Command, U.S. Army
CELP	Civilian Employment Level Plan
CENTCOM	Central Command, U.S.
CEP	Concept Evaluation Program
CFC	Chloroflourocarbons
CFFS	Combat Field Feeding System
CG	Commanding general
CGS	Common ground station
C&GSC	Command and General Staff College
CGSOC	Command and General Staff Officers Course
CHAMPUS	Civilian Health and Medical Program for the Uniformed Services
CINCEUR	Commander in Chief, U.S. European Command
CINCFORSCOM	Commander in Chief, Forces Command
CINCSO	Commander in Chief, Southern Command
CINCSOC	Commander in Chief, Special Operations Command
CINCUSAREUR	Commander in Chief, U.S. Army, Europe
CIPPS	Civilian Personnel Proponent System
CJCS	Chairman of the Joint Chiefs of Staff
CLTP	Civilian Leadership Training Program
CMH	Center of Military History, U.S. Army
CMTC	Combat Maneuver Training Center
COHORT	Cohesion, Operational Readiness, and Training
COLA	Cost of living allowance
COMINT	Communications intelligence
CONUS	Continental United States
CONUSA	Continental United States Armies
COSCOM	Corps Support Command
CPX	Command post exercise
CS	Combat support

CSS	Combat service support
CSSCS	Combat Service Support Control System
CTC	Combat Training Center
DA	Department of the Army
DAB	Defense Acquisition Board
DAC	Department of the Army civilian
DACOWITS	Defense Advisory Committee on Women in the Services
DARPA	Defense Advanced Research Projects Agency
DAS	Director of the Army Staff
DEA	Drug Enforcement Administration
DEP	Delayed Entry Program
DEPMEDS	Deployable Medical System
DEW	Directed energy weapon
DFT	Deployment for training
DISCOM	Division Support Command
DOD	Department of Defense
DOE	Department of Energy
DOMS	Directorate of Military Support (ODSOPS)
DOPMA	Defense Officer Personnel Management Act
DOR	Date of rank
DRB	Defense Resources Board
DS	Direct support
DSB	Defense Science Board
DSS	Devices, Simulators, and Simulation
DTA	Dedicated Training Association (program)
DWS	Distributed Wargaming System
EAC	Echelons above corps
EAD	Echelons above divisions
EADTB	Extended Air Defense Test Bed
EB	Enlistment bonus
ECWCS	Extended Cold Weather Clothing System
EFMP	Exceptional Family Member Program
EIDS	Electronic Information Delivery System
ELINT	Electronic intelligence
EMC	Equipment Maintenance Center
EPUU	Enhanced Position Location Reporting System User Unit
ERINT	Extended range intercept technology
EUCOM	European Command, U.S.

FAADS	Forward Area Air Defense System
FAMSIM	Family of simulators
FAO	Foreign area officer
FAST	Field Assistance in Science and Technology
FBI	Federal Bureau of Investigation
FCP	Family Care Plan
FEMA	Federal Emergency Management Agency
FLOT	Forward Line of Troops
FLRRDAP	Field Long-Range Research, Development, and Acquisition Plan
FM	Field manual
FOG-M	Fiber-Optic Guided Missile
FORSCOM	Forces Command, U.S. Army
FOSC	Federal on-scene coordinator
FOTL	Follow-on to Lance
FSMP	Fire Support Modernization Plan
FTS	Full-time support
FY	Fiscal year
GAO	General Accounting Office
GBCS	Ground-Based Common Sensor
GBFEL	Ground-Based Free Electron Laser
GDLS	General Dynamics Land Systems
GNP	Gross national product
GOCOM	General officer command
GRHP	Government Rental Housing Plan
GRREG	Graves registration
GS	General support
GSA	General Services Administration
GSM	Ground Station Module
HEL	High-Energy Laser
HEMCO	Heavy Equipment Maintenance Company
HEMTT	Heavy Expanded Mobility Tactical Truck
HFM	Heavy Forces Modernization
HIMAD	High-Medium Altitude Air Defense
HIP	Howitzer Improvement Program
HIV	Human immuno-deficiency virus
HMMWV	High Mobility Multipurpose Wheeled Vehicle
HOMES	Housing Operations Management System
HQDA	Headquarters, Department of the Army
HSB	Heavy Support Brigade
HSM	Humanitarian Service Medal

HVM	Hypervelocity Missile
IAS	Integrated Avionics Subsystem
ICBM	Intercontinental Ballistic Missile
ICR	Individually carried record
ID	Infantry Division
IDF	Installation detention facility
IDT	Inactive duty training
IEW	Intelligence and Electronic Warfare
IMA	Individual Mobilization Augmentation
INF	Intermediate-Range Nuclear Force
IP	Installment Purchase
IRR	Individual Ready Reserve
IST	Invite, Show, and Test
JCS	Joint Chiefs of Staff, U.S.
JDAL	Joint duty assignment list
JESS	Joint Exercise Support System
JFDI	Joint Forces Development Initiative
JPME	Joint professional military education
JPO	Joint Project Office
JRDC	Joint Regional Defense Command
JRTC	Joint Readiness Training Center
JSAC	Joint State Area Command
JSO	Joint service officer
JSTARS	Joint Surveillance and Target Acquisition System
JTF	Joint Task Force
JTF-AK	Joint Task Force–Alaska
JTF-B	Joint Task Force–Bravo
JTF-P	Joint Task Force–Panama
JTFP	Joint Tactical Fusion Program
JTMD	Joint Tactical Missile Defense
JTMDPO	Joint Tactical Missile Defense Project Office
JTX	Joint training exercise
KEM	Kinetic Energy Missile
LABCOM	Laboratory Command, U.S. Army
LAMP	Lighter amphibian
LAV	Light Armored Vehicle
LCAC	Landing Craft, Air Cushion
LCU	Landing Craft, Utility
LEA	Law enforcement authority

LHX	Light Helicopter, Experimental
LID	Light Infantry Division
LOGCAP	Logistics Civil Augmentation Program
LOGEX	Logistics training exercise
LOGMARS	Logistics application of automated marking and reading symbols
LOGNET	Logistical Data Network
LOGWP	Logistics working party
LOSAT	Line-of-Sight Anti-Tank (vehicle)
LOS-F-H	Line-of-Sight–Forward, Heavy
LOS-R	Line-of-Sight, Rear
LOTS	Logistics Over the Shore
LPN	Licensed practical nurse
LRRDAP	Long-Range Research, Development, and Acquisition Plan
LSV	Logistics Support Vehicle
LTACFIRE	Light Tactical Fire Direction System
LUPS	Logistics Unit Productivity System
MACOM	Major Army command
MAM	Materiel Acquisition Management
MANPRINT	Manpower and Personnel Integration
MAPS	Modular Azimuth Positioning System
MASINT	Measurement and signature intelligence
MATC	Mobilization Army Training Center
MBT	Main Battle Tank
MC	Medical Corps, U.S. Army
MCA	Military Construction, Army
MCB	Managing the Civilian Workforce to Budget
MDW	Military District of Washington
MEC	Maneuver Exercise Command
METL	Mission essential task list
MFO	Multinational Force and Observers
MHE	Materials Handling Equipment
MIA	Missing in Action
MICOM	Missile Command, U.S. Army
MILES	Multiple Integrated Laser Engagement System
MILVAN	Military van
MIRACL	Mid-Infrared Advanced Chemical Laser
MLRS	Multiple Launch Rocket System
MOADS	Maneuver Oriented Ammunition Distribution System
MOBSTA	Mobilization station

MOS	Military Occupational Specialty
MOUT	Military Operations on Urban Terrain
MPCL	Multi-Purpose Chemical Laser
MPRC	Multi-Purpose Range Complex
MPTS	Manpower, Personnel, Training, and Safety
MQS	Military Qualification Standards
MRE	Meal, Ready to Eat
MSE	Mobile Subscriber Equipment
MT	Military technician
MTOE	Modified table of organization and equipment
MTT	Mobile training team
MTU	Mobile test unit
MUSARC	Major U.S. Army Reserve Command
MW	Master warrant
MWR	Morale, Welfare, and Recreation
NAAD	National Army Medical Department Augmentation Detachment
NAF	Non-Appropriated Funds
NATO	North Atlantic Treaty Organization
NBC	Nuclear, biological, and chemical
NBCRS	Nuclear, Biological, Chemical Reconnaissance System
NCESGR	National Committee for Employer Support for the Guard and the Reserve
NCO	Noncommissioned officer
NCO-ER	Noncommissioned officer evaluation report
NCOES	Noncommissioned Officer Education System
NDU	National Defense University
NGB	National Guard Bureau
NGREA	National Guard and Reserve Equipment Appropriations
N-LOS	Non–Line-of-Sight
NPB	Neutral particle beam
NTC	National Training Center
NTV	Non-Tactical Vehicle
NVG	Night-Vision Goggles
OCAR	Office of the Chief, Army Reserve
OCONUS	Outside the Continental United States
ODCSLOG	Office of the Deputy Chief of Staff for Logistics
ODCSPER	Office of the Deputy Chief of Staff for Personnel
ODCSRDA	Office of the Deputy Chief of Staff for Research,

	Development, and Acquisition
ODP	Officer Distribution Plan
ODT	Overseas deployment training
OJCS	Office of the Joint Chiefs of Staff
O&O	Operational and Organizational (plan)
OP	Observation point
OPFOR	Opposition/opposing force
OPTEMPO	Operating tempo
O&S	Operation and support
OSD	Office of the Secretary of Defense
OSIA	On-Site Inspection Agency
OTE	Office of Testing and Evaluation
OVT	Operational verification test
PACOM	Pacific Command, U.S.
PDF	Panamanian Defense Forces
PEO	Program executive officer
PERSCOM	Personnel Command, U.S. Total Army (see TAPA)
PL	Public law
PLDC	Primary Leadership Development Course
PLL	Prescribed load list
PLS	Palletized Loading System
PM	Product manager
PO	Program officer
POE	Port of entry
POL	Petroleum, oil, and lubricants
POM	Program Objective Memorandum
POMCUS	Pre-positioned Materiel Configured to Unit Sets
POV	Privately owned vehicle
POW	Prisoner of war
PPBES	Planning, Programming, Budgeting, and Execution System
PRIMUS	Primary Care to Uniformed Services
PSYOPS	Psychological Operations
QCI	Quarters cleaning initiative
QMP	Quality Management Program
QOL	Quality of life
RC	Reserve component
RCAS	Reserve Component Automation System
RCRS	Reconnaissance–Counter-Reconnaissance–Surveillance

RCTDAP	Reserve Component Training Development Action Plan
RCTSTF	Reserve Component Training Strategy Task Force
RCW	Ration, Cold Weather
R&D	Research and Development
RDA	Research, Development, and Acquisition
RDT&E	Research, Development, Test, and Evaluation
REFORGER	Return of Forces to Germany
RF	Radio-frequency
RIMS	Reserve Component Instructional Information Management System; Revised Intheater Mobility Study
RISTA	Reconnaissance, Intelligence, Surveillance, and Target Acquisition
RLW	Ration, Light Weight
RMP	Reprogrammable microprocessor
ROBAT	Robotic Obstacle-Breaching Assault Tank
ROBUST	Redistribution of BASOPS/Unit Structure within TDA
ROTC	Reserve Officer Training Corps
RPMA	Real Property Maintenance Activities
RSTA	Reconnaissance, Surveillance, and Target Acquisition
RUPS	Reserve Unit Priority System
SACEUR	Supreme Allied Commander, Europe
SADARM	Search and destroy munitions
SASMA	Sergeants Major Academy
SDI	Strategic Defense Initiative
SDIO	Strategic Defense Initiative Organization
SDS	Strategic Defense System
SEAL	Sea, Air, Land (U.S. Navy SOF)
SEMA	Special Electronic Mission Aircraft
SF	Special Forces
SHAPE	Supreme Headquarters, Allied Powers Europe
SIGINT	Signals intelligence
SIMNET	Simulation network
SINCGARS	Single Channel Ground and Airborne Radio System
SKA	Skills, knowledge, and attitudes
SLAR	Side-Looking Airborne Radar
SLBM	Space Launched Ballistic Missile
SLTC	Senior Leader Training Conference

SOA	Special Operations Aviation
SOCOM	Special Operations Command, U.S. Army
SOF	Special Operations Forces
SQT	Skill Qualification Test
SRB	Selected Reenlistment Bonus
SRTS	Short-Range Thermal Sight
SRV	Socialist Republic of Vietnam
STARC	State Area Command
STEP	Software Test and Evaluation Panel
TAADS	The Army Authorization Documentation System
TABE	Test of Adult Basic Education
TAC	Tactical Air Command, U.S. Air Force
TACCIMS	Theater Automated Command and Control Information Management System
TACCS	Tactical Army Computer System/Tactical Army Combat Service Support Computer System
TacFire	Tactical Fire Direction System
TAMMS	The Army Maintenance Management System
TAPA	Total Army Personnel Agency
TBMP	Technology Base Master Plan
TCIP	Terrorism Counteraction Improvement Plan
TDA	Table of distribution and allowances
TDY	Temporary duty
TF	Task force
TGW	Terminal Guidance Warhead
TIP	Treaty Implementation Plan
TMAP	Tele-operated Mobile All-purpose Platform
TMD	Theater Missile Defense
TMDAPO	Theater Missile Defense Applications Project Office
TOE	Table of organization and equipment
TOV	Tele-Operated Vehicle
TOW	Tube-launched, Optically tracked, Wire-guided missile
TPU	Troop program unit
TQM	Total Quality Management
TRADOC	Training and Doctrine Command, U.S. Army
TRAIN	Training Resource Access Information Network
TRAINS	Training Reserve and Action Instructional Network System
TRI-TAC	Tri-service Tactical Communications
TROSCOM	Troop Support Command, U.S. Army
TSA	Troop Support Agency

TUSA	Third U.S. Army
TWOS	Total Warrant Officer System
TWS	Thermal Weapons Sight
TWVMP	Tactical Wheeled Vehicle Modernization Plan
UAV	Unmanned Aerial Vehicle
UCMJ	Uniform Code of Military Justice
UGV	Unmanned Ground Vehicle
ULLS	Unit Level Logistical System
USACFSC	U.S. Army Community and Family Support Center
USACIDC	U.S. Army Criminal Investigation Command
USAFC	U.S. Army Finance and Accounting Center
USAICS	U.S. Army Intelligence Center and School
USAISC	U.S. Army Information Systems Command
USAPIC	U.S. Army Personnel Information Systems Command
USAR	U.S. Army Reserve
USAREUR	U.S. Army, Europe
USARJ	U.S. Army, Japan
USARSO	U.S. Army, South
USASDC	U.S. Army Strategic Defense Command
USCG	U.S. Coast Guard
USFK	U.S. Forces, Korea
USMA	U.S. Military Academy
USSOCOM	U.S. Special Operations Command
USSOUTHCOM	U.S. Southern Command
USSPACECOM	U.S. Space Command
VE	Value engineering
VHA	Variable housing allowance
VIABLE	Vertical Installation Automation Baseline
VIS	Vehicular Intercommunications System
WAM	Wide Area Mine
WESTCOM	Western Command, U.S. Army
WFX	Warfighter exercise
WHNS	Wartime Host Nation Support
WIC	Women, Infants, and Children
WO	Warrant officer

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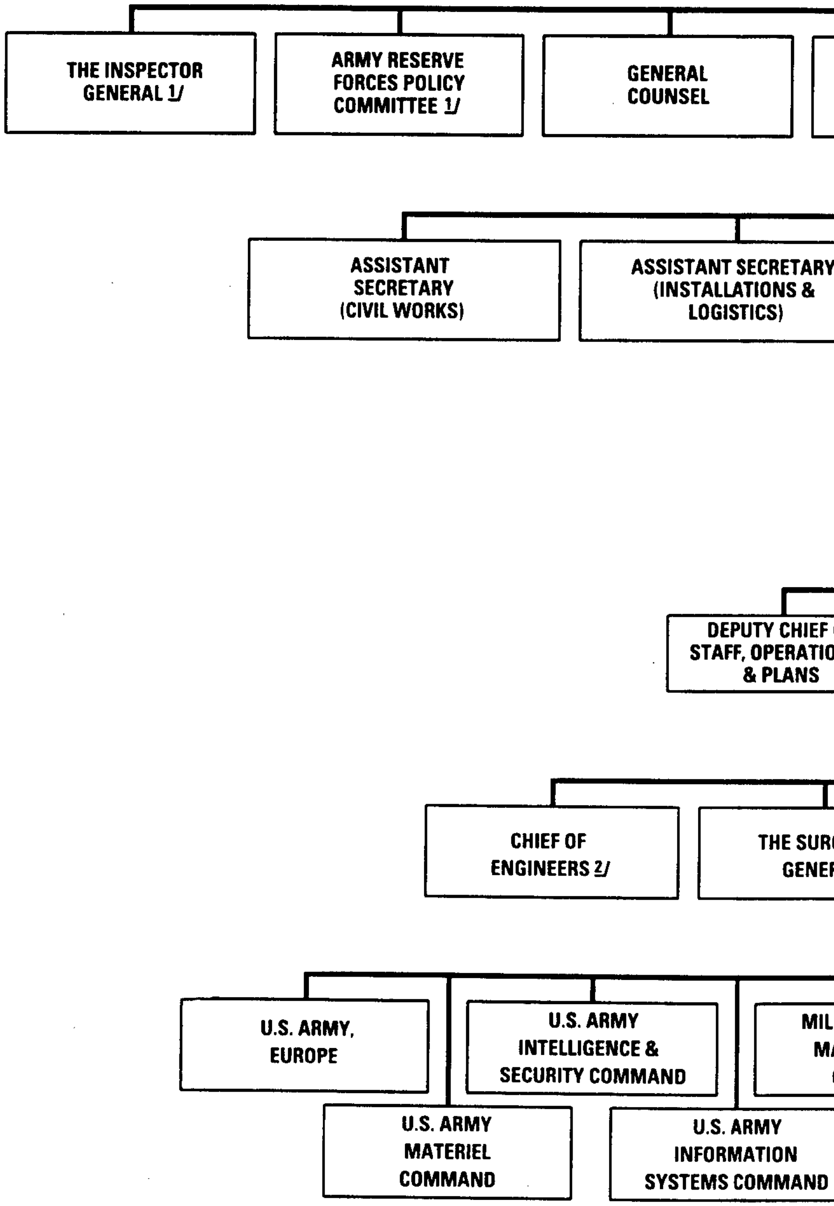

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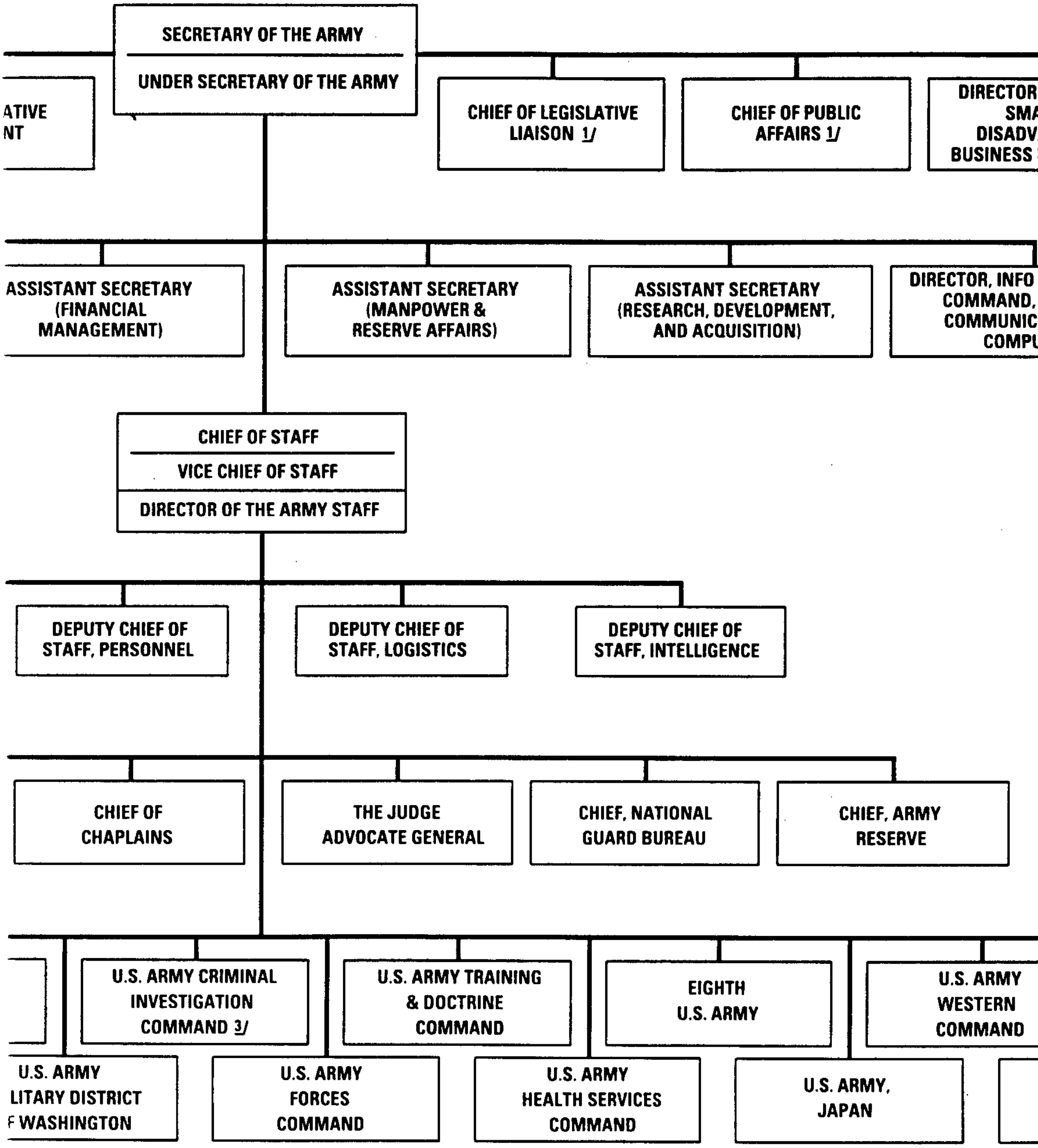

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