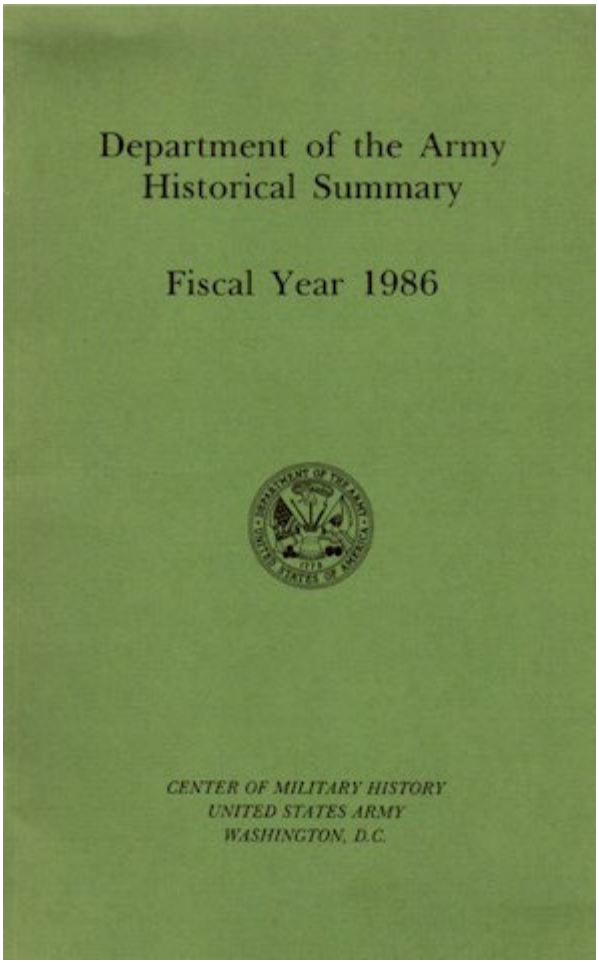

Department of the Army Historical Summary

Fiscal Year 1986

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CENTER OF MILITARY HISTORY
UNITED STATES ARMY
WASHINGTON, D.C., 1995

The Library of Congress has cataloged
this serial publication as follows:

Library of Congress Catalog Card 75-647561

ISSN 0092-7880

Preface

The 1986 *Department of the Army History Summary* (DAHSUM) initiates a modified procedure. Previous reports depended on the submissions of the staff sections and offices of the headquarters, from which the historian fashioned a comprehensive report. In the present edition, Mr. Gough has accomplished the research himself, drawing on open sources to outline the goals of the Army leadership for the fiscal year. He then goes on to recount the achievements of the year with regard to the stated goals. The final product has been reviewed by the staff of Headquarters, Department of the Army, for accuracy.

By its nature, the new approach yields a summary which does not seek to embrace the plethora of activities and actions addressed by staff in one year. Such information is available in the *Annual Historical Review* that each headquarters office prop duces under the provisions of AR 870-5. This classified report contains a wealth of information on the major actions handled in the headquarters.

The DAHSUM provides an excellent overview of the fiscal year and can be used for orientation of new personnel. Action officers needing more detailed information for preparation of background papers and briefings should check their agency's copy of the *Annual Historical Review.* Between these two documents, the Army preserves a record to which our successors inevitably will turn.

This DAHSUM contains one other new feature. Appended to the main report is a detailed treatment of one of the unique activities of the year. When appropriate, such items will appear

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in future years' summaries. The purpose is to share with those not directly involved in the events the details of a

significant aspect of the Army's achievements. In this case, the concern of the Army in the wake of the tragedy at Gander evoked a response that exemplified the caring nature of all those who came forward in support. The rendering of that effort is by Mr. Karl Cocke.

Washington, D.C.

WILLIAM A. STOFFT
Brigadier General, USA
Chief of Military History

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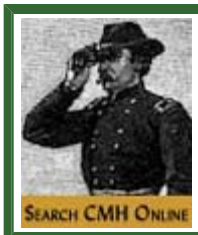

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Introduction

Since 1981, the Secretary and the Chief of Staff of the Army have designated an annual central theme as a means of focusing attention on those things that are important and necessary to the Army. For 1986 the theme was Values-the fundamental values of the military profession. Most basic among these, the Secretary and the Chief of Staff pointed out, are loyalty, duty, selfless service, and integrity. Beneath these overarching values, they observed, our soldierly and ethical standards and qualities-commitment, competence, candor, and courage-are nurtured and given opportunity for growth. Such nurturing and growth must take place in peacetime because war does not allow time for such processes.

This emphasis on basic values came at a time when the quality of the men and women serving in the Army was extraordinarily excellent. As the Army's leaders contemplated their responsibility to ensure the most thorough possible preparation for any future war or other contingency, they could take satisfaction in knowing that the ideals they championed would reach an audience that was potentially highly receptive. How to maintain that excellence and that level of receptivity was a primary concern as the Army began the year.

Increased recruiting resources and expertise, enlistment bonuses, the new G.I. bill, the new Army College Fund, and "quality-of-life" programs provide incentives that help attract and keep the soldiers that the Army must have. Actions to improve recruiting facilities and lease new ones where needed also contribute to recruiting successes. But erosion of benefits or programs, and changes in demographics, could hamper future recruiting efforts. Therefore, the Chief of Staff at the beginning of fiscal year 1986 stressed the desirability of continuing these programs that aid in attracting and keeping highly qualified people.

Expanding on this point, the Vice Chief of Staff emphasized the importance of retaining noncommissioned officers whose

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leadership skills and technical talents make them attractive to employers outside the Army. Should these soldiers leave the Army, increased pressure would be brought to bear on the recruiting market at a time when the national economy is improving and the available pool of 17- to 21-year-olds is decreasing. Therefore, the Vice Chief stated, the Army must pay NCOs competitive wages, reimburse them properly for the moves that the government orders them and their families to make, and provide them with appropriate living and working conditions. These desiderata, he observed, apply equally to young officers.

Within the NCO corps, imbalances in military occupational specialties and pay grades have presented a problem that the Army attacked in earnest in fiscal year 1985. The objective of the corrective program was to reduce to the lowest practicable levels, by the end of 1986, the 29,000 overages and shortages in grades E-5 to E-9 that existed at the beginning of 1985.

In 1986 the Army continued to select outstanding NCOs from all military occupational specialties for formal training at the Defense Equal Opportunity Management Institute. Graduates were detailed for single tour assignments as equal opportunity advisers, generally at brigade level. In these positions they could keep track of promotion, punishment, awards, discharge, reenlistment, and indiscipline rates, and thereby help commanders monitor considerations of race and gender. The Deputy Chief of Staff for Personnel cautioned that although the equal opportunity environment remained positive throughout the Army at the start of the year, leaders at all levels must continue to maintain active programs. He noted:

There are many who might argue that the necessity for equal opportunity efforts in the Army is history. Each year,

however, the Army recruits about 140,000 new soldiers, all with biases and prejudices. The focus of an equal opportunity catalyst must include these new accessions to shape a positive climate today and for our future Army.

The Deputy Chief of Staff for Personnel also discussed, as an integral element of recruitment and retention, the general objective of fostering wholesome families and communities. He projected, for 1986, the introduction of new programs for financial planning assistance and quarters-based child care, and expansion of existing programs, such as child care center construction and child development. He also announced that a program to alleviate financial hardships incurred in permanent change of station moves would be given high priority. This program would provide increases in household goods weight

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allowances, travel allowances for dependents of junior enlisted soldiers in the continental United States (CONUS), mileage allowances for dependents under two years of age, and temporary lodging in CONUS. Finally, he stressed accident prevention as a command responsibility, observing that while all accidents are not preventable, an accident-free record is the only acceptable goal for Army leaders at any level.

Amplification of this emphasis on recruitment and retention programs came from the Deputy Chief of Staff for Logistics, who at year's beginning counted among his most important objectives the provision of high quality services to soldiers and their families. He predicted that operational changes in the commissary system would bring continued improvements in levels of service.

Retention in a peacetime army is not a function solely of material considerations. A sense of pride and belonging in the unit is essential in creating an atmosphere conducive to retaining good soldiers. The Chief of Staff expressed his belief that the Army's unit manning system, consisting of the COHORT (cohesion, operational readiness, and training) unit movement system and the regimental system, when fully implemented, would foster such a sense of pride and belonging and produce cohesive, well-bonded, and stable units.

Over the past few years, declining rates of drug abuse have contributed to unit stability. Encouraged by this trend and desirous of maintaining it, the Deputy Chief of Staff for Personnel at the start of the fiscal year exhorted commanders to constantly enforce Army policy on drug abuse and to pursue an aggressive urinalysis program. He also stated his determination to see alcohol deglamorized and to have leaders shape a climate in which alcohol abuse and resulting misconduct would not be tolerated. Further, he cautioned that enrollment in rehabilitation programs should not carry a stigma for problem drinkers, and he urged that those recovering under such programs be totally integrated into units by being returned to jobs for which they are trained.

The Chief of Staff, mindful that the Army also depends on its civilian work force for essential functions, noted that the Army faces challenges in recruiting, retaining, and motivating an increasingly professional work force, and in ensuring adequate support of civilian personnel. He set as a goal the stabilization of civilian strength at slightly above 400,000 through the substitution of capital for labor and the development of the best possible organizations.

Just as recruiting and retaining people of high quality is important, so too is providing them with the best possible training to prepare them to carry out their missions. At the beginning of the fiscal year, the Commander, U.S. Army Training and Doctrine Command (TRADOC), noted that several years before the Army had

adopted operational art as a separate division of military studies, restoring the study of theater-level operations to doctrine after an absence of almost 30 years. By installing the operational level of war between strategy and tactics, the Army acknowledged that the planning and conduct of campaigns and the linking of military means to political goals merited separate study. So far, this change has stimulated thought and study at Ft. Leavenworth schools and has provoked some discussion in military journals, but the operational level of war has yet to receive critical attention in the forces in the field.

He went on to say that only a deliberate and effective training effort would alter this situation in the field, since neither the Army's senior leaders nor middle-grade officers possessed training or experience in the operational level of war. Over the years, joint training programs, vastly overshadowed by tactical subjects, had slipped almost out of existence. The Army, therefore, would have to recover a lot of ground before it could convert the tenets of the AirLand Battle doctrine of maneuver warfare into a real operational capability. The TRADOC commander declared that efforts under way at the Command and General Staff College and the School for Advanced Military Studies at Fort Leavenworth would do much to correct the deficiency by training and educating officers in the operational level of war. These efforts, he stated, would be reinforced by the publication in the fall of 1985 of a revised edition of Field Manual (FM) 100-5, *Operations,* which would more precisely describe the nature of the operational art, place it in its proper relationship to tactics, and provide considerations for defensive and offensive campaign planning. He also expected the publication at about the same time as the manual for corps operations and the operations of echelons above corps.

More effective training in the execution of AirLand Battle doctrine, the TRADOC commander predicted, would come as the Army made the transition from the current family of manual training simulations to computer-driven simulations. He forecast the increased use of these aids by commanders and battle staffs from battalion through corps. Device-based training, he expected, would continue to grow as an effective alternative to training with major hardware in the field.

Well-trained troops cannot be effective on the modern battlefield without the proper equipment. The Chief of Staff expressed the Army's clear understanding of this truth when he stated at the beginning of the fiscal year that "providing the American soldier with better equipment than his enemy is the Army's goal." His confidence that this goal was being met was implicit in his observation that "superb systems like the M1 Abrams tank, the M2 Bradley fighting vehicle, the multiple-launch rocket system . . . and the Black Hawk helicopter are being fielded with great success despite some growing pains with quality assurance."

At about the same time, the Vice Chief of Staff cautioned that the pace of modernization of close-combat equipment could and should be accelerated. He also emphasized that it is essential to bring in rapidly the deep-attack weapons systems that are an integral part of AirLand Battle doctrine. Even in the face of restrictions imposed by limited funds, he urged that the Army "look ahead to provide the equipment necessary to realize the full promise of AirLand Battle doctrine." A major result of this realization, he observed, would be a raising of the nuclear threshold.

As the Deputy Chief of Staff for Operations and Plans noted, modernization was continuing as rapidly as funding and production schedules permitted. In his sober appraisal,

More than the other services, the Army's weapons and equipment replacement processes were hindered by the economic requirements of the Vietnam war. We are only now embarked on our first real wave of extensive force modernization; but, with the recent reductions in budget authority, we may be forced to stretch out programs, to slow our efforts markedly and, perhaps, even to eliminate important development and acquisition initiatives.

On a more positive note, the Deputy Chief of Staff for Operations and Plans corrected an erroneous view of the equipment readiness of Army units. In the period 1980-85, equipment-on-hand ratings often showed a decline, even though the Army was fielding new materiel. This anomaly, the Deputy Chief of Staff explained, came about because changes in authorization documents had preceded equipment deliveries in units scheduled for modernization. Unit status reports, which indicate what percentage of its authorized equipment a unit has on hand, therefore had implied that units were not ready for combat, even though they actually still possessed their full authorization of older equipment. The Deputy Chief of Staff reported that the Army is working toward the elimination of

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such distortions through improved synchronization of equipment fielding and documentation changes. He also pointed out that the unit status report is not designed to reflect improvements in fighting ability; a battalion equipped with new

M1 tanks will report the same unit status as one equipped with older M60 tanks, despite the greater fighting capability of the modernized battalion. As a corrective, the Army has developed a system called "measuring improved capability of Army forces," which shows that the Army's divisional fighting capability increased by 18 percent in the five years ending with fiscal 1985. The Deputy Chief of Staff projected an increase of 55 percent by fiscal year 1988, assuming congressional support of the fiscal 1986 budget and a two-year funded delivery period.

Fighting capability is of the utmost importance at a time when a rough parity with the Soviet Union at a strategic nuclear level has increasingly shifted the burden of deterrence toward conventional forces. The Deputy Chief of Staff for Operations and Plans stressed the need for forces in being that are capable of rapid response to the signals of aggression. These forces must be able to react during the critical pre-conflict stage or to arrive in threatened regions in sufficient time to gain a tactical edge for following forces. In the succinct expression of the Secretary and the Chief of Staff of the Army, "Readiness is our number one mission."

Readiness obviously includes preparation not only for the early stages of conflict, but also for large-scale conventional war. For that reason the Secretary and the Chief of Staff, in the Army's posture statement for fiscal 1986, emphasized continued support for improvements in full-time reserve component manning and other aspects of reserve component readiness. With a mandated end-strength of 780,800 for the active component, the need for increased reliance on the reserve components is patent.

Writing at the start of the fiscal year, the Chief of Staff showed his concern with another crucial aspect of readiness-strategic sealift. He stated the Army's need to support programs that respond to the decline of the Merchant Marine fleet and to industry containerization trends that move away from more militarily useful breakbulk cargo sealift programs. The Army, he noted, is supporting the Navy's programmed increases to the Ready Reserve Force (part of the National Defense Reserve Fleet) and programs to allow modification of container ships to meet unit equipment movement require-

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ments. To complement increased Navy sealift while holding the line on personnel strength, the Army has programmed increases in its ability to participate in joint logistics-over-the-shore operations-in other words, to better unload equipment from ships in areas with austere or nonexistent port facilities.

Once in the area of operations, troops must be sustained, and the nation's ability to do that has long been an object of concern. The Secretary and the Chief of Staff, describing the Army's posture for fiscal 1986, judged that while significant gains have been made in our ability to sustain our fighting forces, much work remains. In the fall of 1985, the Chief of Staff pointed to the pre-positioning of materiel configured to unit sets (POMCUS) as an important area requiring more increases to improve readiness. Under POMCUS, the Army stores organizational equipment in company- and battalion-sized packages at locations near where conflict may occur. The Chief of Staff also commented on the state of the Army's physical plant, which would be a vital element in the sustainment of forces in combat. Past underfunding for the maintenance of facilities has led to a massive backlog of work needed to maintain aging real property assets. Progress is being made, however, and the Chief of Staff hopes to be able to continue to partially offset growing annual maintenance requirements while reducing the maintenance backlog to a manageable level.

Another aspect of sustainment extends into the force structure because the Army places heavy reliance on the reserve components to perform vital combat service support functions in time of conflict. Maintenance is an especially significant area in this regard. Over 70 percent of the Army's nondivisional maintenance companies are assigned to the reserve components. At the beginning of the fiscal year, the Deputy Chief of Staff for Logistics stated that the Army must ensure that the reserve component maintenance force is equipped with the tools and test equipment necessary to maintain newly fielded equipment for the active and reserve component units that they would be supporting in wartime. He focused on the Regional Maintenance Training Site program as one among several initiatives designed to provide qualified soldiers for combat service support units. This program brings together facilities, instructors, training devices, equipment, test sets, and special tools to support training at twenty-one proposed regional maintenance training sites geographically dispersed within the continental United States. The Deputy Chief of Staff for Logistics projected that in

1986 the Army would establish

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maintenance training sites at Camp Shelby, Mississippi, and Fort Bragg, North Carolina.

Production of equipment is also a matter of great concern to those charged with responsibilities related to sustainment of the forces in time of combat. Plans for mobilization of the manufacturing capacity of U.S. industry involve billions of dollars; but as the Deputy Chief of Staff for Research, Development, and Acquisition noted at the start of the year, these plans have not been well supported in the past. He declared the Army's intention to focus on this issue in the future, but he added that it would have to be done within the constraints of a limited budget.

What forces might need to be sustained, and where, are questions that the Deputy Chief of Staff for Operations and Plans addressed when he stated that "the ability to respond across the spectrum of conflict, on varied terrains and in differing environments, requires a total force posture that is flexible, effective and balanced." For the Chief of Staff, there is an "important challenge" in achieving the optimum balance between heavy and light forces, the active and reserve components, combat and support forces, and forward-deployed and U.S.-based forces. And all this must be done while modernizing the force structure.

To achieve this balance, the Army has embarked on an evolutionary process involving both the active and the reserve components. As related by the Deputy Chief of Staff for Operations and Plans, the midterm goal is a 28-division land force that will provide strategic flexibility, broad utility, and joint fighting capability. In addition to several initiatives already in train involving the 7th Infantry Division (Light), the 10th Mountain Division (Light Infantry), a third Ranger battalion and a Ranger regimental headquarters, and an expanded aviation structure, the Deputy Chief of Staff noted at year's beginning that programs were taking shape to activate the 6th and the 29th (an Army National Guard division) Infantry Divisions (Light) and to convert the 25th Infantry Division to the new design. He expected the light infantry division structuring process to conclude by 1989, as the challenges of building facilities for stationing the new units are overcome.

In addition, the Deputy Chief of Staff for Operations and Plans cited the redesigning of the 82d Airborne, 101st Airborne (Air Assault), and 2d Infantry Divisions, and the 9th Infantry Division (Motorized). Also, he noted that the Army was continuing to streamline the "Division 86" design, with all

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fourteen heavy divisions being so modified. Most of the space savings from these modifications are being applied to improving corps fighting capabilities, in line with the renewed emphasis on the operational level of war.

The Chief of Staff pointed to the Army's success in increasing the number of active Army combat battalions while maintaining a constant, active duty military strength. Manpower to form these battalions has been freed through internal restructuring efforts, along with unit productivity improvements, civilian substitution, and increased reliance on host-nation support and the reserve components. More new battalions will be formed in the future, the Chief of Staff promised.

A challenge articulated by the Deputy Chief of Staff for Operations and Plans is the need, on the one hand, to increase opportunities for leaders at all levels to receive full-time schooling and specialized training commensurate with new doctrine and equipment, while on the other hand continuing to man active component units at an appropriate level of strength. "Within a necessarily constrained end strength," the Deputy Chief of Staff observed, "we face some difficult compromises in balancing professional development requirements with the need to keep adequate numbers of leaders in our units." Speaking in general of force balancing and modernization, he declared that "we will proceed on our current course, perhaps at a slower rate, but with the eventual realization of our major objective-a modern, quality Total Force, designed and equipped to perform its mission."

In line with this aim, the Deputy Chief of Staff for Logistics at the start of the fiscal year declared his intention to continue a review of the structure of logistical units. The aim is to make these units less manpower intensive and more equipment intensive, with a focus on commercial equipment. He also discussed a civilian logistics manpower study, under way, which is to identify potentially significant improvements in productivity as well as areas for potential savings in civilian manpower.

Saving manpower and money was also a result sought in the pooling of resources stemming from an Army-Air Force memorandum of agreement signed in May 1984. That agreement established thirty-one initiatives (several more were added later), of which fifteen had been implemented by the end of fiscal year 1985; the remainder were to be completed in 1986.

An important Army management initiative was inaugurated with the appointment in fiscal year 1985 of a Competition Ad-

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vocate General, whose function is to reduce obstacles to the competitive acquisition of high quality goods and services. As enunciated by the Chief of Staff, the Army sought to achieve the following goals through the Competition Advocate General and a variety of other means of managing the research, development, and acquisition process: better planning, improved management information systems, greater use of multiyear contracting, improved risk analysis, and better quality assurance management.

The Army Materiel Command is overhauling the way the Army develops and buys weapons, improving quality and accelerating the equipment development and fielding cycles. As stated by the Chief of Staff, the goal is to limit development to four years (two years for product improvement) and to test technology in the field with troops in order to identify and hasten the development of promising concepts. The Chief of Staff also declared that the Army must increase its use of state-of-the-art, commercial items produced in existing commercial facilities.

By the summer of 1986, the Army expected to establish at the Ballistic Research Laboratory at Aberdeen Proving Ground, Maryland, its first network of supercomputers. This increase in computer power promised to give the Army Materiel Command's designers their first opportunity to analyze complete weapons systems-an analysis that the Chief of Staff predicted would ultimately reduce development and life cycle system costs, shorten development time, conserve scarce materials, and provide optimum weapons systems performance.

The Chief of Staff enumerated several other series of management challenges that the Army faces in equipment modernization and integration. First, the successful integration of new equipment and the transfer or rehabilitation of displaced equipment will require the application of a variety of management skills. (In a related matter, the Deputy Chief of Staff for Logistics expected property disposal operations to improve further in 1986, when all policies on materiel returns and excess management issues were to be consolidated into a single publication.) Second, to prepare for the 1990s and beyond, the Army must place greater emphasis on "leverage" technologies that offer the potential for innovative, revolutionary change in military systems. Third, the Army is committed to exploring all opportunities to save weight, reduce cost, and improve performance through the use of advanced materials in Army equipment.

In resource management, the Chief of Staff stated, Army commanders must use innovative approaches to meet the challenges associated with fixed active military and civilian strengths and limited funds. He cited as an example a new concept of financing the construction of facilities to support the stationing of the 10th Mountain Division (Light Infantry) at Fort Drum, New York. The Army's objective here is to gain high quality facilities more quickly at the least cost through increased state and local government participation and through private sector involvement in raising and operating a division post.

One of the most crucial fields in Army management is that involving information; thus the Chief of Staff in 1984

created the information mission area, which encompasses all major areas of Army information: strategic, tactical, and sustaining base. The Army's goal, as stated by the Assistant Chief of Staff for Information Management, is to deemphasize these three areas' boundaries by creating a single, comprehensive, fully integrated Army information architecture-to have one completely interoperable information base. This base is to include various computer systems for information processing, the communication links to interconnect information flow at all echelons, and the standardization essential for common language and functional support. In an era of rapidly expanding information technology, the Assistant Chief of Staff observed, the Army seeks to maintain technological currency, avoid obsolescence, and provide a method for incorporating improved technology into existing systems without disrupting information support to the Army in peacetime, during transition to war, or in wartime. The information management program designed to achieve this goal, he noted, is in place; the challenge is to ensure its smooth execution.

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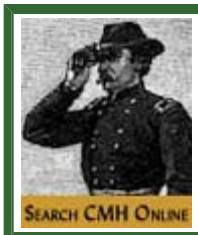

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Staffing

As a result of the Balanced Budget and Emergency Deficit Control Act of 1985 (the Gramm-Rudman-Hollings Act), the Army, along with the rest of the federal government, had to operate in a climate of budget austerity during the fiscal year. The Gramm-Rudman-Hollings measure directed that reductions be taken in all programs, projects, and activities at the lowest level of budget detail. For fiscal year 1986 only, the president exempted most of the military personnel programs, with the result that the Army had to make larger cuts in other programs. Reductions in personnel accounts therefore were comparatively small.

In meeting mandatory reductions in personnel accounts, the Army sought to minimize the effect on career soldiers while maintaining the active end strength of the Army. Initially the Army implemented a voluntary early-out program for soldiers who intended to leave the service in fiscal year 1986. When the money saved by this step did not meet the reduction target, additional measures became necessary. Reductions in promotions, in special and incentive pay (primarily bonuses), and in permanent change of station moves followed. During a program review in March 1986, the Army restored enlisted promotions to the previous level.

Recruitment and Retention

The active military end strength remained at 780,800 for fiscal year 1986-an achievement made possible by an aggressive civilian substitution program, application of productivity-enhancing technology, and transfer of appropriate missions to the reserve components. Army National Guard paid drill strength increased from 418,893 in fiscal year 1985 to 426,765 in fiscal year 1986, while Army Reserve paid drill strength increased from the fiscal year 1985 level of 269,407 to 285,178

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in fiscal year 1986. In the same period, Guard Selected Reserve strength increased from 439,952 to 450,496, and Reserve Selected Reserve strength increased from 292,080 to 310,650.

In addition to surpassing its total recruitment requirement in fiscal year 1986, the active Army, for the third straight year, could report that more than 90 percent of its new recruits were high school graduates. While the percentage of nonprior service enlistees scoring in the top three test categories remained steady at 63.1, the percentage scoring in the lowest category declined to 3.7 and thus continued a five-year-old trend. *(See Table 1* for enlisted accession requirements and accomplishments for fiscal years 1985-87.) These figures met the Army's requirements of recruiting 59-63 percent test category IA through IIIA soldiers each year, recruiting 90 percent high school graduates (nonprior service), and limiting test category IV accessions to less than 10 percent. These requirements comfortably comply with the congressional floor of 65 percent nonprior-service male high school graduates and the ceiling of 20 percent test score category IV. Achievement of such requirements is notable in the face of a declining labor pool, an improving economy, and decreased unemployment, and can be attributed in part to such Army incentives as fair and competitive compensation, educational benefits, and cash enlistment bonuses.

TABLE 1 - ENLISTED ACCESSIONS
(In thousands)

Category	Fiscal Year 1985		Fiscal Year 1986		Fiscal Year 1987	
	Rqmt.	Actual	Rqmt	Actual	Rqmt	Actual

Prior Service	6.3	6.3	8.4	8.4	11.0	-
Nonprior Service	119.0	119.1	126.9	127.1	128.1	-
Male	103.8	103.7	111.6	111.7	112.1	-
(I-IIIA)	64.6	63.8	69.1	69.2	69.8	-
(HSDG)*	92.7	92.6	100.0	100.1	100.3	-
(HSDG I-IIIA)	53.5	53.8	57.5	57.6	58.0	-
Female	15.2	15.4	15.3	15.4	16.0	-
(I-IIIA)	10.1	10.1	10.9	11.0	11.0	-
(HSDG)	15.2	15.4	15.3	15.4	16.0	-
(HSDG I-IIIA)	10.1	10.1	10.9	11.0	11.0	-

*High school diploma graduate.

Once recruited, the soldier of good quality must be retained, and, as in recent years, the Army in fiscal year 1986

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concentrated its retention efforts on that type of soldier. Because of the improved quality of Army accessions over the last five years, the three-year attrition of first term soldiers has declined. The Army continued to rely in 1986 on adequate compensation, reenlistment bonuses, and educational incentives to retain the type of soldier it needs. Results of retention efforts for fiscal years 1985 and 1986 are presented in *Table 2.*

TABLE 2 - ACTIVE ARMY REENLISTMENTS
(In thousands)

Category	Fiscal Year 1985			Fiscal Year 1986		
	Rqmt.	Actual	Percent	Rqmt.	Actual	Percent
Initial Term	27.9	28.7	102.8	32.6	33.5	102.7
Midterm	22.6	23.1	102.2	23.1	24.7	106.9
Career	22.5	21.9	97.3	21.9	21.6	101.2
TOTAL	73.0	73.8	101.1	77.1	79.8	103.6

One of the most important incentives to enlistment is the new G.I. Bill, which became effective on 1 July 1985. This measure pays benefits of up to $10,800 for active duty personnel and authorizes the Army to pay to certain qualified enlistees additional educational incentives over and above the basic active duty benefit. These additional benefits, referred to as the New Army College Fund, are $8,000, $12,000, and $14,000 for two-, three-, and four-year enlistments, respectively. Cash bonuses of up to $8,000 for a four-year active duty enlistment are also available to qualified individuals who enlist in a designated skill. Use of an enlistment bonus and the Army College Fund for the same individual in the past has enabled the Army to attract high quality enlistees in hard to fill skills for longer enlistments. But the fiscal year 1986 Department of Defense Appropriations Act prohibited such dual payments to individuals; as a result, the Army expected to see migration from four-year to three-year and from three-year to two-year terms of service. The prohibition also threatened to affect the Army's ability to distribute high quality accessions into critical skills.

Following a record year for program strengths for each category of the selected reserve, the Army National Guard and the U.S. Army Reserve in fiscal year 1986 continued to make a strong showing in enlistments. This achievement was the result

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of continued congressional support of the Selected Reserves Incentive Program, increased use of full-time personnel, and the accomplishment of overall recruiting objectives. Reserve component enlisted accession statistics for fiscal years 1985 to 1986 appear in *Table 3.*

TABLE 3 - RESERVE COMPONENT ENLISTMENTS
(In thousands)

	Fiscal Year 1985		Fiscal Year 1986	
	Rqmt.	**Actual**	**Rqmt.**	**Actual**
USAR				
Prior Service	33.3	30.2	45.5	47.6
Nonprior Service	44.3	48.6	34.0	33.7
TOTAL	77.6	78.8	79.5	81.3
ARNG				
Prior Service	37.9	43.5	45.0	38.5
Nonprior Service	49.0	39.4	47.5	44.2
TOTAL	86.9	83.0	92.5	82.7

To assist in providing the Army a West Point graduate with the best, most up-to-date education available, the United States Military Academy initiated an extensive facilities modernization program. The purchase and renovation of Ladycliff College, renamed New South Post, will free valuable classroom space in the central post area. Renovation will include modernization of classrooms, laboratories, and cadet room furnishings.

The Reserve Officers' Training Corps (ROTC) initiated several recruiting programs to improve its ability to recruit and produce its officer requirements. The programs include the ROTC Scholarship Program, the Simultaneous Membership Program, the Viability Management Program, the Mission Management System, and the ROTC Advertising Program.

ROTC scholarships increased from 6,500 in school year 1980-81 to the present figure of 12,000. Last year over 10,000 students applied for 1,450 four-year scholarships. The Simultaneous Membership Program is aimed at attracting and retaining ROTC cadets. In fiscal year 1986, 5,747 students were simultaneously enrolled in ROTC and assigned to reserve component troop units. Under the Simultaneous Membership Program, students may supplement their college income by drawing the pay of an E-5 while serving as an officer trainee.

To improve ROTC production, ROTC cadre are being redistributed to markets of high potential under the Viability

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Management Program. This program allows the disestablishment of nonproductive institutions with a concomitant shift in cadre to more productive ones.

Improved retention, better management, and increased enrollments are necessary to increase . the number of officers commissioned from ROTC. Key to the accomplishment of this strategy is the ROTC Mission Management System, which will automate enrollment data and allow ROTC to manage production better without increases in manpower. Increased ROTC advertising is required to minimize the drop in the propensity of college students to enroll in ROTC.

Personnel Management

As part of the fiscal year 1986 Defense Authorization Act, Congress approved changes to Title 10 of the U.S. Code that provide for the "commissioning" of Army warrant officers. These changes allowed the Army to align its procedures with those of the Navy, the Marine Corps, and the Coast Guard, all of which make appointments to the grades of CW2, CW3, and CW4 by "commission"; under previous law, the Army had "appointed" its warrant officers to WO1 through CW4. There are three basic consequences of a warrant officer commissioning program: it allows warrant officers to administer oaths of reenlistment, to serve as commanding officers, and to have their commissioned warrant officer service characterized as "commissioned service." Practically, commissioned warrant officers who are assigned as commanding officers will have significantly more authority to impose nonjudicial punishment under Article 15 of the Uniform Code of Military Justice.

Impetus for another personnel management program, the balancing of the Army's structure of military occupational specialties (MOSs), came from the General Accounting Office. On several occasions the General Accounting Office took the Army to task for not forcing soldiers to move from overstrength to understrength Moss Since fiscal year 1984, the Army had been attempting to balance its MOS structure through voluntary reclassification. In that year the Army asked 12,400 soldiers in overstrength Moss to transfer to skills in which there were shortages; 3,500 responded favorably, asking to be retrained in 100 shortage Moss The next year, 1,200 soldiers, out of nearly 6,100 queried, sought retraining. Still, fiscal year 1986 found 30,000 soldiers, including 15,000 E-5s and E-4s, serving in overstrength Moss As a result, the Army began a

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test program aimed at soldiers coming up for reenlistment and those on a second or succeeding enlistment who are not approaching reenlistment. Those coming up for reenlistment are required to designate a shortage skill in which they would be willing to retrain, before they are permitted to reenlist. Those unwilling to change Moss will be forced to leave the service. Those on other than first enlistments will be required to take actions to move to a shortage MOs within ninety days of notification, or will be forced to reclassify.

Under its Force Alignment Plan I, the Army seeks to reduce critical imbalances in MOs and grade level of detail among noncommissioned officers. The plan's objective is to cut to the lowest levels practical the 29,000 overages and shortages in grades E-5 to E-9 that existed at the beginning of fiscal year 1985. Progress in fiscal year 1986 was significant; by August 1986, critical MOs imbalances had been reduced to 15,000. Among noncommissioned officer MOs/grade cells, those filled at a level of 95 to 105 percent reached 32 percent of the total.

Stability and Cohesion

In 1981, the active Army implemented a Unit Manning System designed to improve combat effectiveness by reducing personnel turbulence and fostering unit cohesion, esprit, and loyalty in Army units. The program consists of two major subsystems: COHORT (cohesion, operational readiness, and training) unit replacement for the active Army and the U.S. Army regimental system. Under COHORT, first-term soldiers and career soldiers in battalion-size and smaller units are stabilized within the organization for three to five years. This long-term relationship fosters greater horizontal (peer) and vertical (chain of command) bonding within the unit. In addition, commanders have time to develop long-range training objectives for obtaining performance standards higher than those currently attainable with an individual replacement system.

Through calendar year 1985, the active Army activated 122 company-size and 13 battalion-size COHORT units. Plans called for an additional 23 company-size units to be activated in fiscal year 1986 to replace units reaching the end of the COHORT life cycle.

Within the regimental system, a regiment is defined as a unit or a group of similar units designated with a unique regimental color and formed for the purpose of providing an affiliated soldier with an opportunity for long-term identification,

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the potential for recurring assignments, and the basis to perpetuate history, customs, and tradition. There were 15 active combat arms regiments in the system as of fiscal year 1985. Among the combat arms in fiscal year 1986, 2 air defense, 4 armor, 1 aviation, 3 cavalry, 6 field artillery, 16 infantry, and 1 training base units came under the system. In addition, 9 combat support and combat service support branches or other elements (including the Corps of Engineers, which is also a combat arm) were placed under the system.

Discipline indicators for the year were generally favorable. The rates per 1,000 for property crimes decreased for the sixth straight year. After declining for five straight years, the violent crime rate increased slightly (1.8 percent) over the fiscal year 1985 rate. Drug offenses are divided into two major categories: marihuana use and possession, and all other drug offenses. The fiscal year 1986 rate per 1,000 for marihuana use and possession was 31.9 percent below the fiscal year 1985 rate. In 1986 the other drug offenses category decreased 7.1 percent from the previous year-the fourth straight year of declining rates in this category. After a record low rate per 1,000 in fiscal year 1985, the absent without leave rate increased 0.8 percent in 1986. The desertion rate per 1,000 for 1986 was the same as in 1985 (6.6), following a record low rate for desertion in fiscal year 1984 of 6.1.

Quality of Life

There were major improvements for family member travel during the fiscal year, especially for junior enlisted families. New allowances included payment of per diem for dependents during permanent change of station travel, payment of temporary lodging costs in the continental United States, major increases in household goods weight allowances for junior enlisted soldiers,. and payment of dependent travel for junior enlisted soldiers for moves within the continental United States.

As part of the Exceptional Family Member Program, the Army on 1 August 1986 began mandatory medical screening of all family members applying for accompanied travel in the continental United States. Family members above the age of six are screened through a review of their medical records. Those with possible handicaps are referred to their primary care provider for evaluation and completion of a functional questionnaire to determine whether enrollment in the program is necessary. Family members six years of age and under are seen by

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a primary care provider for a physical and developmental screening examination. At each Army medical treatment facility there is a point of contact for the exceptional family member program. During the month in which the screening began, the Department of Defense published new instructions increasing the emphasis on the treatment of exceptional family members in the continental United States.

Under new legislation, military families looked forward to increases of about 50 percent in the government's payments for permanent change of station moves. Payments to service members, however, would still lag far behind federal civilians in comparable salary ranges. Moreover, the new permanent change of station reimbursement rates did not affect unmarried service members without dependents.

In a related matter, the Army began a test of a modified payment method for all military temporary duty travel. Conducted under legal authority granted by Congress in the fiscal year 1986 authorization act, the test is the first step in the Army's efforts to acquire permanent legal authority to implement a temporary duty travel system that is easier to understand and administer, and that more equitably reimburses soldiers for their travel expenses.

A major family program, the upgrading and construction of child development centers, received impetus as Congress funded nineteen such projects, compared to six in 1985. The Army considers this program a readiness issue; Army active duty members have a total of 511,600 children under the age of twelve, for whom provision of proper care is a must if these service members are to be fully effective in their duties.

There were also new programs in support of the Army Community Service, the primary resource for family support on Army installations. A financial assistance and consumer education program offered debt liquidation counseling to

soldiers and their families. Army Community Service Centers also began to provide counseling and supportive services to handicapped family members. Unfortunately, money available in 1986 was not sufficient to fully fund all community service programs.

The new Army Medical Enhancement Program is designed to improve the availability and the quality of Army medical care. Each active duty Army family is to be assigned to a primary care physician-a step that will create informal health maintenance organizations at each post so that families will know exactly who to turn to for their medical care. The mix

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and number of physicians is to be determined by the number and mix of the patient population.

The first day of the fiscal year saw the opening in Fairfax County, Virginia, of the Army's initial clinic under the Primary Medical Care for the Uniformed Services (PRIMUS) program. Operated by private contractors, the clinic offers basic medical care and laboratory and pharmacy services. Anyone eligible for military health benefits can use the facility on a drop-in basis. The Army plans as many as twenty-five additional PRIMUS clinics.

On 1 October 1985 the Army also began a program to test all recruits' blood for evidence of the virus believed to cause the acquired immunodeficiency syndrome, or AIDS. Later in that month, the Secretary of Defense directed that programs be established to test all military personnel for the presence of the virus. Testing of active duty and reserve personnel being deployed within the continental United States began in February 1986. In the summer of 1986, the testing program was extended to all active duty personnel, with testing of the reserve components scheduled to begin in the spring of 1987.

Family members and civilian employees and their family members who are authorized government medical care may be tested, upon request, as resources permit. Testing will not be repeated routinely if a test has been administered within the previous twelve months. Department of the Army policy provides that persons who test positively are not eligible for entry into the Army. A disease surveillance program will be conducted for soldiers with confirmed positive tests. Those who demonstrate no evidence of progressive clinical illness or of immunologic deficiency will not be separated from the service solely on the basis of having tested positively. Infected soldiers who demonstrate progressive clinical illness or immunologic deficiency will be considered physically unfit for further military service and will be processed for physical disability. Through this program, the Army intends to ensure continued readiness of the force, to protect the fitness of Army personnel and their families, and to protect potential accessions who must be immunized.

Aware that dental records are a vital link in the identification of human remains, the Army leadership expressed concern that many reservists either lack dental records or have incomplete records. As a result, the Army instituted a comprehensive program designed to correct this problem. The highest priority is given to obtaining and protecting identification pan-

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ographic x-rays and to ensuring that records of reserve component soldiers who train outside of the United States are complete and accurate.

In a major reorientation on a health issue, the Army mounted a strong crackdown on smoking. Instead of permitting smoking except where specifically prohibited, the new policy makes nonsmoking the norm for buildings and work areas occupied by the Department of the Army. The policy change, a response to a newly implemented Army Health Promotion Program ordered by the Secretary of Defense, applies to all of the Army's soldiers and civilian employees. Except for designated smoking areas that are necessary to avoid undue inconvenience to persons who desire to smoke, smoking is prohibited in Army-occupied space. Individual supervisors have discretion to designate smoking areas in their offices, but only where they have determined that the secondhand smoke from tobacco products can be sufficiently isolated to protect nonsmokers from its effects. In general, smoking is prohibited in conference rooms, restrooms, auditoriums, gymnasiums, and elevators. Adequate ventilation, and space for nonsmoking patrons, must be available in

eating facilities, or smoking is not allowed. The ban includes smoking in all military vehicles and aircraft. Soldiers and civilian workers who refuse to comply with no-smoking orders are subject to adverse administrative action. The Secretary of the Army and the Chief of Staff, who ordered the new policy, stated that it is necessary because the smoking of tobacco harms readiness by impairing physical fitness and by increasing illness, absenteeism, premature death, and health care costs.

In another readiness-related area, the Army shifted the emphasis in its safety program. Historically, the Army Safety Program has been conducted by means of external inspections that produced predictable negative reactions among commanders, soldiers, and civilian personnel. The new SafeArmy 1990 plan, which sets five-year goals, stresses the teaching of safety skills rather than after-the-fact inspections. In 1986, the plan's first year, the Army National Guard worked with the U.S. Army Safety Center in implementing a tactical risk management techniques course for Guard safety officers. These officers will be responsible for teaching their acquired skills to selected division-, brigade-, battalion-, and company-level representatives.

To increase the dining facility participation rate, the Army during the fiscal year placed increased emphasis on the attitude of food service personnel, preparation and display of

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food, mealtime environment, and nutrition education. In addition, the Army halted cash subsistence allowances for thousands of single enlisted soldiers below grade E-7 who live in barracks or, in some cases, off post. These soldiers had been drawing a cash basic allowance for subsistence instead of being provided meals in Army dining facilities. The size of the allowance permitted the soldiers to eat three meals a day in mess halls and have money left over-a condition reported by the Army Audit Agency and out of line with the requirements of the Gramm-Rudman-Hollings Act. The Army projected a saving of $6 million from the reduction in the cash subsistence allowances.

The Army commissary construction program continued to provide for replacement or modernization of commissaries from surcharge funds paid by commissary patrons. In 1986 and 1987 the Army planned to spend $124.8 million in surcharge funds on replacements and major renovations of nineteen commissaries worldwide. Commissaries provide an essential noncash benefit that is considered an entitlement for soldiers recruited under the present voluntary recruitment program. This benefit plays a key role in maintaining morale and ensuring a high quality of life for the Army family.

In fiscal year 1985 the Army initiated a program for a stable annual investment to rehabilitate, renew, or replace those deteriorated or obsolete dwelling units currently in the Army inventory. The fiscal year 1986 budget continued the Army's attack on large maintenance backlogs in order to improve the living conditions of soldiers and their families. A new concept at Fort Ord, California, involved the leasing of Army land there to accommodate a 200-unit mobile home park for enlisted personnel. The objective was to alleviate quickly a very serious housing shortage and to provide a pleasant living experience for enlisted personnel.

Programs to ensure compliance with environmental regulations that stress proper management of hazardous toxic wastes remained a high priority. The Army spent more than $92 million during the fiscal year to clean up contamination at Army installations.

Civilian Work Force

Also continued into fiscal year 1986, by Congress, was a test that eliminates civilian end strength ceilings. This legislation significantly increases the Army's flexibility to manage ci-

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vilian employment levels without the requirement to meet an arbitrary ceiling on the last day of the fiscal year.

Another continuing program was civilian substitution, which is designed to ensure the best use of soldiers. This program

converts military positions to civilian, thus releasing soldiers for duty in essential combat, combat support, and combat service support units. The result is increased readiness. During the fiscal year, the Army made 832 conversions, as planned.

The Army continued to make progress in civilian personnel mobilization planning. Installations identified retired Department of Defense civilians who could be mobilized; identified their employees who have military obligations as reservists and as military retirees; and screened from military recall those key employees with military obligations. Special emphasis remained to be placed on establishing civilian requirements on approved mobilization tables of distributions and allowances; ensuring that these requirements are reflected accurately in the Department of Defense Wartime Manpower Planning Systems; and ensuring that civilian employees identified as essential in emergency are prepared to perform their duties under wartime conditions.

In April 1986, at the direction of the Chief of Staff, the Deputy Chief of Staff for Personnel established the Civilian Personnel Modernization Project. This action followed a special inspection by the Army's Inspector General that found significant problems in the existing civilian personnel management system. The purpose of the new joint civilian-military project is to improve the system by revising policies and procedures. Challenges include reducing the complexity of the system and improving leadership. By the end of the fiscal year, the project had resulted in the development of a draft of a proposed modernized system. Throughout the Army, managers and civilian personnel specialists reviewed and revised this draft. As the project continues to April 1987, participants will expand and refine the draft and develop an implementation plan for it.

Recognizing a void in training and professional development at the mid-management level, the Deputy Chief of Staff for Personnel directed a task force, as part of the Civilian Personnel Modernization Project, to develop an Army Management Staff College. The college will train Army civilians in grades GS-12 to GS-14 and GM-13 to GM-14, and Army majors and lieutenant colonels, in functional relationships, philosophies, and systems used in the Army's sustaining base.

Courses offered will cover such key areas as military forces and doctrine, strategic studies, leadership, and management systems and methods. The first pilot course is planned for June 1987, and a second for February 1988.

To improve the management of Army civilian and contract security guards, the U.S. Army Military Police Operations Agency developed Army Regulation 190-56, *The Army Civilian Police and Security Guard Program.* Published on 10 September 1986, this regulation assigns responsibilities and prescribes policy, standards, and procedures for effective implementation of the program. Besides covering selection, employment, training, and professional development, the regulation initiates the Individual Reliability Program for civilian employees and contract guards.

The new Relocation Services Program, managed by the Corps of Engineers, permits permanent change of station benefits above those previously allowed. The main feature of the program is a guaranteed home sales provision that allows a prospective employee residing in a weak real estate market area to sell his home to a real estate company and have the government pay the costs of the sale. This provision will better enable the Army to fill key civilian employee positions.

Implementing a Department of Defense directive aimed at detecting drug use, the Army developed a program of urinalysis tests for civilian employees. Testing is limited to critical jobs in four work categories: aviation, law enforcement, safekeeping of chemical and nuclear materials, and clinical and control staff in the Army drug and alcohol prevention program. Ten thousand Department of the Army civilian employees in these categories are affected by the program. No one is allowed to obtain a job in a critical category without taking a urinalysis test, and a positive test precludes subject person from consideration for such a job. For current employees, a positive test leads to an offer of counseling or treatment. The employee is also subject to adverse action, which could result in removal from federal service, including removal for failing to meet this condition of employment. Legal challenges to block administration of the tests failed; however, appeals and other legal actions were pending at the end of the fiscal year. On 15 September 1986 President Ronald Reagan issued Executive Order 12564, which called for a drug-free federal workplace. In light of

this order, the Army began a review of its civilian drug testing program.

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During the year the Army instituted a new policy that requires civilian employees to check in at the servicing military medical facility or occupational health clinic whenever they incur a job-related injury or ailment. This policy was established as part of an effort to meet the President's goal of a reduction in occupational injuries and associated medical claims. Employees must complete the check-in before seeking treatment in the private sector. The check-in procedure enables Army medical personnel to offer the employee the opportunity to be treated at the Army clinic. Also, the check-in provides the health and safety professionals with better data on accidents and exposure to possibly dangerous environments. These data serve as the basis for preventative actions.

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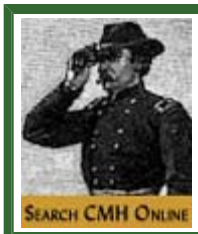

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Training

The imperative for training of high quality was never more challenging than in fiscal year 1986. Within the framework of a revitalized combined arms concept, new tactics placed higher emphasis on initiative, flexibility, and synchronization. To transform textbook theory into wartime practice requires well-trained units. New weapons systems, more mobile and lethal, make possible a continuing doctrinal revolution. To transform design potential into battlefield capability requires well-trained individuals and crews. To transform these highly motivated volunteers into combat-ready soldiers, crews, and units requires well-trained leaders. The Army during the year reemphasized leadership-a low-cost investment with high-yield benefits-in both the school and the unit.

Individual Training

Completed in final draft form in October 1985, the revised Field Manual (FM) 100-5, *Operations,* received the Chief of Staff's approval in February 1986. With its publication in May 1986, the new field manual provided an important link between AirLand Battle doctrine and Army professional education and training. Incorporated in the manual are lessons learned since the introduction of AirLand Battle doctrine in 1982. These lessons stem from combat operations, teachings, exercises, war games, and comments from the Army in the field. The lively professional discussion that greeted the appearance of FM 100-5 indicated that the manual would play a large role in improving the Army's training in the operational level of war.

An intense 9-week course with an additional 144-hour correspondence phase, the Combined Arms and Service Staff School at Fort Leavenworth is designed to provide captains with the professional skills necessary to serve successfully as

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staff officers at battalion, brigade, and division levels. The Army began the course in 1981 after the Review of the Education and Training of Officers' Study Group said that all captains should be trained in the basic staff operations of the Army in the field. Mentors, usually former battalion commanders, instruct the captains in small problem-solving groups. The Army's goal is to train in the school all basic branch captains from year groups 1979 and later between their sixth and ninth years of service. Command involvement in and support of the program greatly increased during fiscal year 1986. Senior commanders encouraged captains to complete the correspondence phase of the course in order to be eligible for the attendance phase. The school conducted nine classes during the fiscal year, training 2,229 students-nearly double the 1,200 trained in fiscal year 1985. Policies and procedures refined in the program during 1986 will be employed for full implementation in fiscal year 1987, when the school will train 4,500 captains per year.

As a result of a recommendation of the Professional Development of Officers Study, completed in December 1984, the Command and General Staff College began a new program of doctrinal training for Army officers slated to attend foreign schools. Known as the Combined Arms Refresher Course, the program includes sixty-two instructional hours of tactics and operations, supplemented by instruction in topics such as terrorism, low intensity conflict, and joint and combined operations. Eventually, the course will be expanded to include officers scheduled to attend command and staff colleges of sister services. In March 1986 the Army War College conducted a one-week pilot course aimed at developing a similar program for officers who will attend the senior service colleges of sister services.

Recent initiatives have increased the required Ranger positions in the Army from fewer than 1,000 to a projected total of almost 5,500 by fiscal year 1987. These needs translate to an annual training requirement of over 3,000 soldiers. By fiscal year 1987, the Army intended to increase the available training opportunities for Rangers to over 3,000 slots annually, from 2,300 in fiscal year 1986.

Restructuring of the Noncommissioned Officer Education System, carried out during the year, will provide sergeants in combat support and combat service support branches with the same type of professional training, oriented toward leader development, that is afforded their counterparts in combat

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branches. With the realignment of the system, all noncommissioned officer training follows a common track. Training for NCOs focuses initially on leadership in the Primary Leadership Development Course. The next step is the Basic Noncommissioned Officer Course, which contains standard leader training required throughout the Army and skill training that addresses directly the requirements of soldiers serving in each branch of the Army. Production of highly trained and motivated NCO section or squad leaders is the aim of the basic course. Through increased emphasis on soldiers' skills and encouragement of common understanding of tasks, these two courses serve to bond the NCOs of all branches. NCOs continue professional training in the Advanced Noncommissioned Officer Course. Capping the system is the highly selective and challenging Sergeants Major Course taught at the U.S. Army Sergeants Major Academy.

Since the Korean War, the professional development of NCOs has been the subject of only three major studies. The third of these, the NCO Professional Development Study, submitted forty-five recommendations to the Chief of Staff in December 1985 after more than five months of deliberations. The Chief of Staff approved thirty-five of these recommendations, in addition to a proposal that a top-level Department of the Army board be appointed to review NCO professional development at least every two years. The goal of these reviews will be to determine what the Army requires of its NCO Corps and to ensure that the NCO Professional Development System is supporting those requirements.

With the advent of the Bradley Infantry Fighting Vehicle, the Infantry Center and School at Fort Benning, Georgia, doubled enrollment in the twelve-week master gunner's course. Equipped with the TOW missile, a 25-mm. cannon, and a machine gun, the Bradley is the infantry's first turret vehicle. Additional master gunners are required to bring Bradley units up to the level of gunnery that is standard in armor units. By upgrading one gunner position in each Bradley platoon, the goal will be accomplished without any increase in Bradley platoon strength.

The fiscal year 1985 Defense Authorization Act authorized the Secretary of Defense to institute a program of counterintelligence polygraph screening examinations for Department of Defense personnel whose duties involve access to classified information. In response to this congressional mandate, the Deputy Secretary of Defense on 28 October 1985 designated

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the Secretary of the Army as the executive agent for polygraph training within the Department of Defense and directed him to expand the existing polygraph examiner training course at the Military Police School at Fort McClellan, Alabama. On 15 April 1986 the polygraph course at Fort McClellan was redesignated the Department of Defense Polygraph Institute. Supported on a "fair share" basis by the military services and the National Security Agency, the institute expanded its training capability from 48 to 108 students per year. Additionally, the institute has responsibilities to train polygraph examiners from other federal agencies, including the Federal Bureau of Investigation and the Secret Service, and to conduct polygraph research.

Training Support

In its third year of training reserve component units alongside active units, the National Training Center at Fort Irwin, California, was the training site for two more Army National Guard roundout battalions. As the Army's key facility for training mechanized and armor task forces, the National Training Center has significantly improved unit performance. One light infantry battalion was included among the units trained in 1986. This training experience prepared this unit for high intensity combat and demonstrated how heavy and light forces can work together on the modern battlefield.

Fiscal year 1986 saw an increase in the Army's investment in range construction to $112 million, up from $76 million the previous year. Begun in 1982, the Army Range Modernization Program has matured into an effective management system to field range systems in support of modernized weapons and training requirements. The Multipurpose Range Complex is the keystone facility that provides a challenging gunnery experience for tank and mechanized infantry units up to platoon level. Eleven of the fourteen planned ranges will be under construction or completed by fiscal year 1987. The Military Operations on Urbanized Terrain (MOUT) facilities provide individual and collective training for this difficult mode of combat. Twelve MOUT complexes are planned; two additional facilities will be completed or under construction by fiscal year 1987.

In June 1986 the U.S. Army Training and Doctrine Command's (TRADOC's) Language Research Center, Training Technology Field Activity, was officially activated at the Defense Language Institute, Presidio of Monterey, California. Jointly managed by the institute and the Deputy Chief of Staff,

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Training, TRADOC, the new center's mission is to identify, test, and evaluate, under controlled conditions, new methods of language instruction, and to apply in the institute's language courses the results of these activities. As its first major action, the center began a six-month analysis of the status of military language instruction, its use, and sustainment problems. Results of this analysis will be applied to a "test-bed" course at the institute, and should provide a basis from which to work in solving language training problems.

The Army has developed and fielded training devices, simulators, and simulations that are revolutionizing the way soldiers and units train. These tools permit unit commanders to sustain higher levels of unit proficiency at less cost, and they provide training feedback not previously available. With special emphasis on providing simulations to the reserve components, the devices are increasingly integrated into initial entry and unit sustainment programs. Although many of the recent investments in training technology do not provide an absolute saving, they improve the effectiveness of training and the proficiency of soldiers and units, as well as compensate for increased operating costs of modernized systems. For instance, the Multiple Integrated Laser Engagement System and the instrumentation at the National Training Center allow objective evaluation and permit critiques of individual and collective tasks in areas of increasing importance and technical complexity.

While battle simulations provide an efficient method of training soldiers, unit commanders, and staffs, the simulations currently available to commanders are either manually-driven or very labor-intensive automated systems. There are no standard, computer-driven simulations at corps or division level. Brigade through crew simulations are inefficient and often do not operate in real time. Improvements in battle simulation were under way during the year, however. For example, the Army Training Battle Simulation System, fielding of which began in 1985, is a computer-driven simulation that provides a highly realistic environment to train battalion commanders and their staffs in the control and coordination of combined arms operations.

The fiscal year 1986 ammunition budget reflected savings achieved through the use of devices and simulators and through reductions in forecasted ammunition needs-reductions resulting from the activities of the Standards in Training

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Commission. The commission establishes uniform standards for weapons training and supporting resources for the Army.

Development continued on an automated training management system responsive to the planning and resource needs of units from battalion through Department of the Army. With assessment, conceptual definition, and functional description of the Integrated Training Management System completed, the Army was prepared to initiate a competitive contract action for a prototype validation of the continental U.S. division module of the system in the 9th Infantry Division (Motorized).

Reserve Component Training

During the year, the Army had under way initiatives to improve training of the reserve component units so as to prepare them better to execute their wartime mission. The Key Personnel Upgrade Program develops key personnel within Army National Guard units through direct association during additional training periods with counterpart active component officers or NCOs. This program provides Army National Guard officers and NCOs practical experience in a tactical environment. In the U.S. Army Reserve, a readiness training program places members of the Individual Ready Reserve on periods of voluntary active duty with an active component unit in positions appropriate for their grades and mobilization specialties.

The Overseas Deployment Training Program enables high priority reserve component units to train in their geographical contingency areas with their wartime gaining command. Begun in 1976 with 26 units and cells participating, the program has grown to nearly 2,000 participating units and cells in fiscal year 1986. Included this year was the 32d Infantry Brigade, Wisconsin Army National Guard, which took part in the REFORGER exercise in Europe. Selected units trained up to twenty-six days in joint Chiefs of Staff exercises, working alongside their active component counterparts.

On 1 March 1986 the North Carolina Army National Guard organized the first Army National Guard advanced attack helicopter battalion, which will be equipped with the AH-64 Apache. During the remainder of the year, the newly formed 30th Aviation Battalion began qualification of aviators and maintenance personnel in the Army's newest attack helicopter at various schools within the U.S. Army Training and Doctrine Command. First deliveries of the AH-64 to the North Carolina Guard are scheduled for fiscal year 1987.

During the year, development continued on several important training facility programs for the reserve components: a Regional Training Center, Regional Maintenance Training Site (RMTS), and Regional Training Site-Medical (RTS-Medical). The Regional Training Center, planned for Fort Dix, New Jersey, will be a test-bed facility for developing combat arms, combat support, and combat service support soldier and leader skills through a device-based training strategy. The RMTSs will be located throughout the continental United States in areas with a high density of reserve component maintenance units. The projected establishment during the fiscal year of pilot RMTSs was delayed because of problems in documenting modified tables of organization and equipment, bringing units on line, and obtaining equipment packages. These difficulties were on the verge of solution at year's end, however, and the Army expected to have four pilot sites-two more than earlier projected-operational in the early months of fiscal year 1987. Twenty-one RMTSs are scheduled to become operational by 1991. The RMTSs will be the keystone in transition and sustainment training for the reserve component maintenance personnel on the repair of current and force modernization equipment. For many units, the RMTSs will provide the only opportunity they will have to train on modern equipment before deployment to the theater of operations. The third program, the RTS-Medical, will provide reserve component medical units with complete sets of deployable hospital equipment for training.

U.S. Army Reserve Forces Schools play a vital role in the training of reserve component soldiers. The schools offer the Command and General Staff College Course, warrant officer entry courses, NCO leadership courses, and other courses supporting the NCO educational system. To increase enrollment in these courses by Army Reserve soldiers, the Army conducted a test during the fiscal year to determine if it is feasible to pay these soldiers while they attend the courses.

Exercises

The overall Army exercise program includes both unilateral and joint and combined exercises. Unilateral exercises are generally sponsored and conducted at corps level and below. Major joint and combined exercises are coordinated and sponsored by the joint Chiefs of Staff (JCS) or one of the unified commands under the auspices of the joint Chiefs of Staff Exer-

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cises Program. The levels of Army commitment of troops and support to the exercise schedule are governed by availability of forces to meet troop list requests, the sufficiency of support funds, and the relative value of the activity as a training vehicle or instrument of national policy.

Deployment exercises provide invaluable training to units based in the continental United States. Joint training and interoperability objectives are established for each exercise to ensure that forces have sufficient time to develop supporting objectives and conduct preparatory training. Reserve component participation for specific exercises is identified at least two years in advance.

Of fifteen JCS-directed and thirty-seven JCS-coordinated exercises in which the Army participated in fiscal year 1986, a major one was REFORGER 86, in which the Army deployed approximately 17,000 U.S.-based forces to Europe to conduct a field training exercise with theater forces. Held from 1 January to 21 February, this eighteenth exercise in the series again demonstrated U.S. fighting capabilities and the rapid reinforcement of the North Atlantic Treaty Organization (NATO), improved NATO interoperability, and exercised general defense and contingency plans. U.S.-based troop units involved included the 1st Infantry Division; the Wisconsin Army National Guard's 32d Infantry Brigade (Mechanized); and the Army Reserve's 310th Theater Army Area Command, 354th Civil Affairs Command, and 412th Engineer Command. With this first use of a major Army National Guard unit, reserve component units accounted for over 40 percent of the participating U.S.-based forces.

In recent years, actual maneuver in the field-training phases of REFORGER has been scaled back due to environmental considerations. Adverse weather often makes the potential costs of maneuver damage claims unacceptable. To prepare for REFORGER 86, a combined U.S.-Federal Republic of Germany team traveled to the United States and provided damage prevention training. Field commanders made decisions during the exercise to scale down the scope of activities and reduce movements of heavy vehicles. This sensitivity to the host nation's needs has paid dividends in the reduction of claims costs, but also has reduced training opportunities.

The largest of the exercises in which the Army participated was TEAM SPIRIT, a joint/combined exercise conducted by the Republic of Korea-United States Combined Forces Command from 10 February to 25 April. The purpose of the TEAM SPIRIT

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series is to improve the defensive posture of the Republic of Korea and the United States through training in joint/combined operations, including the reception, staging, employment, and redeployment of out-of-country U.S. augmentation forces. Over 200,000 personnel, including approximately 60,000 from U.S. services, took part in 1986. U.S. Army units participating included the Eighth Army, elements of the 2d and 25th Infantry Divisions, I Corps Headquarters, a brigade task force from the 9th Infantry Division, and elements of the National Guard and the Army Reserve.

TEAM SPIRIT 86 proved to be the most challenging and tactically realistic exercise in the eleven-year history of the series. Republic of Korea and U.S. interoperability at all levels was outstanding, and the exercise included two firsts: a large-scale joint/combined tactical airdrop and subsequent linkup, and the employment of two field army headquarters.

GALLANT EAGLE, a large-scale field training exercise sponsored by the U.S. Central Command, was conducted at several locations in the western United States from 25 July to 3 August. Air support for the exercise was staged from several airfields spread throughout the southwestern United States. Ground operations were conducted by exercise forces at Fort Irwin, California, and the Marine Corps Air Ground Combat Center at Twenty-nine Palms, California. Approximately 35,000 military personnel were involved in the exercise, with the Army Reserve and the National Guard providing extensive combat service support during all phases. Participating Army units were Third Army Headquarters; XVIII Airborne Corps Headquarters; elements of the 82d and 101st Airborne Divisions, and of the 24th Infantry Division; the 197th Infantry Brigade; 75th Infantry Regiment Headquarters; 5th Special Forces Group, 1st Special Forces; and elements of the 75th Ranger Regiment. GALLANT EAGLE 86 provided a simulated combat environment for training, planning, and execution of joint military operations. The exercise permitted an evaluation of Central

Command Headquarters and portions of its multi-service forces in tactical operations in a desert setting.

The U.S. Southern Command sponsored AHUAS TARA 86 and CABANAS 86, a command post exercise and a field training exercise, respectively, in Honduras. AHUAS TARA was staged from 13 March to 20 April, and CABANAS from 28 February to 30 June. These joint/combined exercises with Honduran forces were part of a series designed to continue U.S. presence in Central America, to establish command, control, and commu-

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nication procedures, and to promote interoperability, rationalization, and standardization between forces.

To provide a military presence in the Caribbean was one aim of OCEAN VENTURE 86, a joint/combined, JCS-directed exercise sponsored by the U.S. Atlantic Command and held from 28 April to 12 May. This exercise also sought to strengthen perceptions of U.S. ability and willingness to project military power, when necessary, to protect national interests of friendly nations. The primary aim was to train Atlantic Command Headquarters and service task forces in rapid crisis deployments and tactical operations. A total of 8,200 U.S. personnel, including 2,400 Army, participated.

Each year the Army participates in worldwide joint Chiefs of Staff command post exercises. These exercises provide the opportunity to train the Army staff and major commands and evaluate plans, policies, procedures, and systems under simulated crisis conditions.

In fiscal year 1986 two such joint exercises were conducted. PORT CALL 86 tested the crisis management procedures of the Office of the Joint Chiefs of Staff, the services, unified and specified commands, and other participating organizations in mobilization and deployment in support of conventional war plans in a multitheater environment. PORT CALL 86 also tested the decision-making process leading to increased military capabilities and expansion of the industrial base in the execution of mobilization and conventional war plans. PRESENT ARMS 86 was an evaluation of selected Worldwide Military Command and Control System procedures and components.

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Modernizing and Equipping the Army

The Army is in the midst of the largest peacetime modernization program in our nation's history. During the fiscal year, the M1/M1A1 Abrams tank, the Bradley Infantry Fighting Vehicle, the Black Hawk and AH-64 Apache helicopters, the multiple launch rocket system (MLRS), the Stinger and Patriot missile systems, and other new items were fielded in sizeable numbers. This equipment gives our soldiers a remarkable qualitative advance in weapon system capability. The Army also continued dynamic product improvement programs to achieve as much growth potential as possible in older systems. Systems such as the Chaparral, Hawk, and TOW missiles, the AH-1S Cobra, the Army Helicopter Improvement Program and CH-47D helicopters, the Fire Support Team Vehicle, M109 howitzers, I-81 mortars, and many others are synergistic partners on the battlefield because of product improvements.

These weapon systems and the soldiers who operate them work inextricably together on the battlefield; that is the essence of the combined arms concept and the belief that a numerically small but high-quality Army, working in a fully synchronized manner, will be able to hold its own against one with superior numbers. For this reason, the Army's research, development, and acquisition planning is linked early and continuously with doctrine, training, and force structure requirements to permit a coordinated advance across mission areas. The sections that follow highlight some of the more important events during the year in modernization and equipment in these mission areas.

Close Combat

The close combat mission area relates to the application of direct combat power. As the term indicates, close combat involves two adversaries pitted directly against each other, man

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against man, weapon against weapon. Included in this area are items such as tanks, fighting vehicle systems, direct line-of-sight weapons, and short-range mortars that are used by the infantryman.

A significant challenge to the Army is to develop and field, for the 1990s, an armored force that is capable of meeting the projected military threat but that imposes minimal costs for operations and support. On 10 January 1986 the Vice Chief of Staff established the Armored Family of Vehicles Task Force to define the Army's strategy for the development of such a family of vehicles. The task force is emphasizing commonality of vehicle components, modularity of construction, and multiple system capabilities. Included in the task force's scope are all types of armored vehicles, both heavy and light, as well as combat and combat support vehicles. With a permanent staff of about fifteen officers, the task force is headed by a major general who consults with all Training and Doctrine Command schools, reserve components, other services, and the U.S. NATO allies. A final report from the body is due in August 1987.

Fiscal year 1986 was the seventh year of production for the M1 Abrams tank, and the second year of procurement of the M1A1 version of the Abrams, which is equipped with a 120mm. gun (instead of the M1's 105-mm. gun) and a nuclear, biological, and chemical overpressure protective system. Production of both models totaled 529 for the year, and 7 battalions were fielded. The Army continued to pursue a product improvement program to assure that the Abrams, the primary ground combat weapon system for closing with and destroying enemy armored forces, maintains its competitive position through the 1980s and beyond.

Also continuing was conversion of M60A1 tanks to the improved M60A3 model equipped with gun stabilization, laser rangefinder, solid-state computer and thermal shroud, and a thermal imaging sight that extends capabilities during periods of reduced visibility. Conversions numbered 480 and involved 9 tank battalions.

The M2 Bradley Infantry Fighting Vehicle became the subject of, controversy over its ability to survive on the battlefield. As the result of live-fire tests begun at Aberdeen Proving Ground in 1984, critics in Congress and within the Department of Defense charged that the fighting vehicle's armor was inadequate to protect troops inside the vehicle. Although the Army Chief of Staff suspended testing from April to Septem-

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ber 1986, fielding of the vehicles continued. At the end of the fiscal year, the number of Bradleys in service stood at 2,562. The Bradley provides the mechanized infantry with a full-track, lightly armored fighting vehicle, and scout and armored cavalry units with a vehicle for their screening, reconnaissance, and security missions. Both the infantry and cavalry versions have a two-man turret that mounts a 25-mm. automatic cannon; this primary armament is supported by the TOW antitank guided missile system and a 7.62-mm. coaxial machine gun. In addition, six 5.56-mm. firing port weapons are positioned along the side and the rear of the infantry version of the vehicle. A more lethal TOW 2 missile system for the Bradley was in production in 1986 and is scheduled for fielding in 1987.

Production of the new AH-64 Apache attack helicopter increased significantly during the year. The Army received 117 units, bringing the total number of Apaches in the fleet to 165. A quick-reacting, airborne antitank weapon, the Apache is equipped with a target acquisition designation sight and a pilot night vision sensor that permit its two-man crew to navigate and attack in darkness and in adverse weather conditions. Although the principal mission of the helicopter is the destruction of enemy armor with the Hellfire missile, it is also equipped with a 30-mm. chain gun and Hydra 70 rockets that are lethal against a wide variety of targets. Deployment of the weapon began in 1986; when fielding is completed, the Apache will be the Army's primary attack helicopter.

Twice during the year, the Army found it necessary to ground its Apache fleet. The first grounding occurred on 27 January after cracks were found in the rotor blades of fourteen of the aircraft. A subsequent investigation by the manufacturer determined that the cracks were caused by a tool used to adjust the trailing edge of the 22-foot-long blade. Redesign of the tool eliminated the problem, and the Army lifted the grounding order on 20 February 1986. Deliveries, but not production, were halted during the grounding period. On 12 March, a civilian test pilot at Fort Rucker, Alabama, experienced control problems with an Apache before takeoff. As a precaution, the Army again grounded the Apache fleet and suspended deliveries. The culprit in this second incident proved to be a defective four-inch bolt in the aircraft's upper flight control support assembly. Working together, the Army and the manufacturer designed a new hardened-steel bolt. On 16 April, after ordering units to install the new bolts, the Army

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rescinded the grounding order and opened the way for the resumption of Apache deliveries and training.

In line with steadily increasing production rates for the Apache, the Army in 1985 instituted a competition between two manufacturers for annual production lots of the helicopter's primary weapon, the Hellfire antitank missile. Each year, the low bidder in the continuing contract competition will receive a large share of the contract, while the other firm gets the remainder. This novel arrangement represents a departure from the Army's usual sole-source contract during the first few years of a weapon system's life, when low initial quantities and unproven production techniques and specifications often discourage bidding. With its relatively trouble-free development history and prospect of high-quantity production, the Hellfire seemed well suited to the dual-source acquisition strategy. Early in 1986, however, the Army announced that it would buy no Hellfires in 1987 because of a backlog in production caused by problems with the missile's guidance circuits. The missile homes in on a laser spot that can be projected against a target by ground observers, other aircraft, or the launching aircraft's own designators.

The Army began the Apache program to meet challenges that could not easily be met by the Cobra series of helicopters. A single engine, two-place attack helicopter, the AH-1 Cobra saw extensive combat in Vietnam. In its original configuration, the Cobra was an excellent weapon against enemy personnel and lightly armored vehicles, but had no capability against tanks. In 1977 the Army mated the TOW missile with the AH-1 to produce the TOW/Cobra, or AH-1S. While an effective weapon system, the Cobra is limited in performance and largely confined to operation in fair

weather. In addition, the TOW missile is wire-guided, and the launching aircraft must keep the target in its sights until missile impact, thus tending to expose the helicopter to enemy missile and gun fire. Since the Cobra will remain in service in a complementary role long after the fielding of the Apache, the Army in June 1986 announced plans to equip about half of the Cobra fleet with a new targeting system that will permit the aircraft to perform anti-armor, armed escort, and reconnaissance missions at night and during bad weather. The new system, employing infrared sensors rather than radar for night operations, can be used to fire the TOW and the helicopter's 20-mm. automatic cannon and 2.75-inch rockets.

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In another upgrade effort, the Army Helicopter Improvement Program (AHIP), the service received the first production OH-58D observation helicopters. A refurbished OH-58A, the OH-58D (commonly referred to as the AHIP) is fitted with a mast-mounted sight that enables the aircraft to operate at night and in other conditions of limited visibility. The sight incorporates a special television, a thermal imaging system, and a laser designator-range finder. Using the sight, the crew can scout and direct artillery fire while hovering behind trees and hilltops, safe from direct enemy fire. Although the AHIP is designed to be used in attack, cavalry, and artillery roles, the Army confined its use to field artillery observation, approving an initial low rate of production and directing that a follow-on test be conducted. The Army, on 1 April 1986, formed a task force at the Aviation Center, Fort Rucker, Alabama, to remedy deficiencies in the AHIP.

At an earlier stage is the Advanced Anti-Tank Weapon System-Medium (AAWS-M), a medium antitank missile that will replace the Dragon wire-guided missile. In August 1986 the Army Missile Command awarded contracts to three contractors for a demonstration of possible technologies for the AAWS-M. The goal is a weapon that can be carried by the individual soldier, is easy to operate and economical to maintain, and is effective against heavy armor.

The M-249 Squad Automatic Weapon, the Army's new light machine gun, encountered problems in field tests during the year. Although found to be reliable and accurate, the weapon presented unacceptable hazards in the form of an exposed hot barrel when in use, sharp edges, and a front sight that required special adjustment tools. Consequently, the Army halted production of the weapon, and Congress deleted funds for it from the fiscal 1986 defense budget. In addition, Congress retroactively set aside for other purposes, including retirement and pay raises, money for the program in the 1985 budget. Over 1,100 M-249s already issued were to remain in use but be retrofitted. The remaining Squad Automatic Weapons-over 7,000-were to stay in depots until corrective changes could be made.

Fire Support

In December 1985 the Army completed deployment in the Federal Republic of Germany of the Pershing II missile system. The U.S. 56th Field Artillery Command is now equipped with

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36 single-warhead Pershing IIs at each of three sites, making a total of 108 missiles. Deliveries of the Pershing II were temporarily suspended in January 1985 after three U.S. soldiers died in a fire that ignited while they were unloading missile components from a shipping container. A subsequent Army investigation concluded that static electricity had caused combustion in the solid propellant rocket motor, and the Army modified the missiles, their transporters, and procedures before resuming deployment. Deployment of the Pershing II system was completed on schedule, and the Army conducted a number of successful flight tests using the 56th Field Artillery Command's troops and missile systems.

During the year, the MLRS continued to be fielded. The primary missions of the MLRS are counterfire and suppression of enemy air defenses. The MLRS supplements cannon artillery by delivering heavy volumes of improved conventional submunitions in a short time against critical targets. Germany, one of five international partners in an MLRS deployment program, continued its work on a scatterable mine warhead for the system. Also in train was the co-development by the United States, the United Kingdom, the Federal Republic of Germany, and France of a terminal

guidance warhead to defeat armor.

Fielded in the early 1960s, the M109 self-propelled howitzer is designed to provide the primary indirect fire support to the maneuver brigades of the armor and mechanized infantry divisions. An improved model, the M109A2, is in full-scale production, with final delivery scheduled for 1987. A depot-modified version, the M109A3, has the same performance capabilities as the M109A2. The M109A2/A3 is transportable in a C-5 cargo plane and can fire both conventional and nonconventional munitions. In October 1985 the Army began the development of a major modification of this fielded system, including automotive improvements, nuclear, chemical, and biological protection for the crew, a driver's night vision device, enhanced communications, a ballistic computer and navigation system, and built-in test equipment.

The Army's new light divisions presented a challenge as to how to provide these maneuver organizations with necessary fire support without unduly weighing them down. A workable solution came in the form of the British Royal Ordnance L119, a 105-mm. light howitzer. Now type-classified as the M119, this weapon will replace the M102 and M101A1 howitzers in light divisions. Early in the fiscal year, the Field Artillery Board at Fort Sill, Oklahoma, completed its test of the M119, which

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passed with some qualifications. The weapon had a tendency to bounce at higher elevations and charges, but this flaw did not affect accuracy of fire. Testers successfully displaced the 4,100-pound howitzer using high mobility multipurpose wheeled vehicles (HMMWVs) and the UH-60 Black Hawk helicopter. With the M119, light division commanders will have the improved range and performance needed to maintain maneuverability and the ability to strike quickly. The howitzer fires all of the conventional 105-mm. ammunition in the Army's inventory, and will be fielded with rocket-assisted projectiles and dual-purpose improved conventional munitions.

Units in Korea began to receive the M981 Fire Support Team Vehicle during the year. A modified M113A2 armored personnel carrier, this vehicle gives the Field Artillery's fire support teams the ability to rapidly direct motor, artillery, and air-delivered fire support through use of any of its four radios and to designate targets for laser-guided munitions. In order to perform these functions, the vehicle is equipped with a ground/vehicular laser locator designator, a north-seeking gyrocompass, and a position locating and reporting system. These electronic components permit rapid generation of very accurate target location data that is transmitted to the artillery battalion's fire direction center by an on-board, four channel, digital message device.

Air Defense

The 20-mm. Vulcan air defense gun, which has been in service for almost twenty years, has limited target acquisition and fire control capabilities. In addition, the gun's range is restricted to 1.6 kilometers. Although the Army's Product Improved Vulcan Air Defense System program is designed to improve the weapon, the service had expected the Sgt. York Division Air Defense (DIVAD) Gun System to replace the Vulcan. That expectation ended with the cancellation by the Secretary of Defense of the Sgt. York in August 1985 because of problems of technology and cost and change in the projected threat. Consequently, the Army developed the Forward Area Air Defense System plan to coordinate its air defense needs. The plan consists of five elements: a missile to engage targets out of the gunner's line of sight; a gun-missile hybrid in the stead of the DIVAD; a light Army vehicle outfitted with Stinger missiles to create a line-of-sight rear weapon for division rear areas; improved Army communications and surveillance sys-

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tems; and the creation of some air defense capabilities for the M 1 Abrams tank and the M2 Bradley Infantry Fighting Vehicle through upgrading of their guns and ammunition. Development work on the plan is scheduled to begin in 1987.

For theater air defense, the Army will depend primarily on the Patriot its new all-altitude missile system. Designed to acquire, track, and engage several enemy aircraft simultaneously, even in the face of intensive electronic

countermeasures, the Patriot eventually will replace the older Nike Hercules and Hawk systems. The Patriot design eases logistical burdens, since its overall performance is achieved with less equipment, less operational manpower, and fewer repair parts than the current systems. During an air battle, the only manned element of a Patriot battery, or fire unit, would be the engagement control station, which provides for human control of automated operations. A fire unit will consist of eight unmanned launchers, each loaded with four ready-to-fire missiles that are sealed in canisters and require no field maintenance. In August 1986 the 2d Battalion, 3d Air Defense Artillery, the fourth Patriot battalion to be trained, was deployed to the Federal Republic of Germany. Earlier in the year, the Chiefs of Staff of the Army and the Air Force agreed that the Army will retain primary responsibility for the Patriot system. This decision, made after a year's study, reflected problems of cost, personnel, and fielding that would have been involved in a transfer of the system to the Air Force.

Product improvement continued during the year in several of the other important missile systems in the Army's inventory. These systems include the Hawk, a medium-range system designed to provide air defense coverage against low to medium altitude air attack; the Chaparral, a short-range air defense surface-to-air system; and the Stinger, a shoulder-fired, infrared homing missile whose mission is to provide air defense coverage to even the smallest of combat units.

Strategic Defense

The President's Strategic Defense Initiative (SDI) continued to be among the top priorities of the Department of Defense. The SDI stemmed from a 23 March 1983 speech in which the President called for a "comprehensive and intensive effort to define a long-term research and development program to begin to achieve our ultimate goal of eliminating the threat posed by strategic nuclear missiles." During the year, the Army

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played a major role in SDI through the work of the U.S. Army Strategic Defense Command (USASDC), which was authorized 977 personnel and received approximately one-third of the Department of Defense's Strategic Defense Initiative Organization's research, development, testing, and evaluation budget of $2.7 billion. The USASDC headquarters in Arlington, Virginia, gave direction to its ballistic missile defense program, located in Huntsville, Alabama. In addition, the command continued to operate the Kwajalein Missile Range as a Department of Defense National Range. One of two U.S. ranges designated for ballistic missile defense testing, the Kwajalein range was also a principal target in the testing of strategic offensive missiles.

From the late 1950s to the beginning of SDI in 1983, research and development in ballistic missile defense was the purview principally of USASDC's predecessors. The USASDC, created on 1 July 1985, carries forward the Army's involvement in this area within five SDI program elements: surveillance, acquisition, tracking, and kill assessment; kinetic energy weapons; directed energy weapons; systems analysis and battle management; and survivability, lethality, and key technologies.

The Army made progress on a variety of major SDI projects during the fiscal year. Airborne Optical Adjunct involves airborne optical sensors that acquire, track, and discriminate among data, then give the data to ground-based radar. This technology would be essential for future applications of airborne optics to defense concepts. Terminal Imaging Radar would be a ground-based radar able to discriminate multiple targets in real time at high altitudes within the atmosphere. The radar would receive data from an airborne optical sensor and provide reentry vehicle state vectors to defense interceptors. The technology for a low-cost, ground-based, nonnuclear defense interceptor that could be employed against reentry vehicles in midcourse, outside the atmosphere, is the object of the Exoatmospheric Reentry-vehicle Interceptor Subsystem. This technology would require a multistage, lightweight interceptor with a precommit optical sensor for homing in on its target. The High Endoatmospheric Defense Interceptor project involves technology for a ground-launched nonnuclear interceptor that would operate in the upper reaches of the atmosphere in conjunction with the ground-based radar. A ground-based laser would be a unique laser utilizing electron beam energy. Work on this project anticipates a boost-kill phase system whose beam would be directed against targets by bouncing it off large relay mirrors based in space.

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A major USASDC achievement during the year was the sixth flight of the Flexible Lightweight Agile Guided Experiment. On 27 June 1986 this ground-launched vehicle scored a direct hit against a rocket-boosted target at White Sands Missile Range, New Mexico. This success confirmed the vehicle's ability to achieve accuracies required for nonnuclear kills within the atmosphere.

The direction of the Department of Defense that SDI organizations involve U.S. allies in SDI had a significant impact on USASDC in 1986, beginning with the creation within the command of a Multinational Programs Office to facilitate contact with other countries. The Strategic Defense Initiative Organization designated the Army as the lead service for theater defense architectures and gave USASDC the lead in developing the needed technologies and systems. To demonstrate how system elements function collectively, USASDC initiated plans to provide a European theater defense test bed and combined Allied defense experiments. Architectural studies involving concepts and requirements, as well as interim system development, became the concern of the command.

Combat Support

On 7 June 1986 an abrasion strip came off the tail rotor of an OH-6 light observation helicopter in flight near Fort Campbell, Kentucky. The pilot experienced control problems but landed the aircraft, which rolled over on its side, breaking off the main rotor blades. The Army grounded its entire fleet of OH-6s until the entire leading edge of each rotor strip could be examined closely for defects. On 16 July 1986 the Army lifted the grounding and announced that the fleet of 364 OH-6s would be returned to flight status over the next two months as the tail rotor assemblies were repaired.

Engineering development proceeded on the Aquila remotely piloted vehicle, a small, propeller-driven, automatically and remotely controlled aircraft. Intended primarily for target acquisition and field artillery support, the Aquila is designed to survive over hostile territory. In addition to adjusting artillery fire and laser-designating targets for destruction by laser-guided munitions, the aircraft can perform aerial reconnaissance functions. Rail-launched from a flatbed truck, the Aquila can be recovered after a mission and reused. Second-stage development and operational tests of the Aquila should be completed in 1987.

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Tough enough to live and fight with the infantry, and fast enough to move with tanks, the M9 armored combat earthmover is a tracked, amphibious, armored earthmoving vehicle that is designed to provide critical combat engineer support to fighting forces. The M9 creates man-made and enhances natural obstacles in order to slow and channelize enemy maneuver, thereby making enemy forces more vulnerable, and digs in friendly weapon systems to increase their ability to survive. A competitive single-year procurement of the M9 was awarded in July 1986 and production continued with the expected execution of the first of five priced options in November 1986. In March 1986 the 7th Infantry Division (Light) became the first unit to be equipped with the vehicle from Low Rate Initial Production.

Army ground combat forces require a system that can be rapidly deployed by engineer units to clear lanes in minefields. Operations must be conducted under enemy fire and in daylight or darkness. To meet this need, the Army began acquisition in fiscal year 1986 of the Marine Corps' trailer-mounted M58 line charge system, which consists of the M58 high explosive linear demolition charge; the Mark 22 five-inch rocket, for projecting the explosive charge across the minefield, a rocket launcher with firing kit; and the standard Army M353 trailer. The charge is contained in a box that is cradled on the rocket launcher, which in turn is mounted on the trailer. A light forces engineer vehicle tows the assembled system to about fifty meters from the edge of a minefield and the rocket is fired, pulling the line charge across the minefield with it. With the line charge resting across the minefield, the operator detonates the charge.

To meet the urgent requirement for a scattermine system in the light infantry divisions, the Army during the year began procurement of the VOLCANO rapid mine dispensing system. VOLCANO is composed of mounted launcher racks with mounting hardware, an electrical dispenser control unit, and a mine canister loaded with GATOR antitank or antipersonnel mines, both of which are in procurement by the Air Force and the Navy. VOLCANO can be fitted to

either the Black Hawk helicopter or Army ground vehicles. With VOLCANO, a Black Hawk can deliver about 960 mines.

The Army continued efforts to improve the nuclear-biological-chemical defensive aspects of chemical warfare deterrence. Fielding of a new lightweight decontamination system and production of a new chemical agent monitor continued, while de-

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velopment of a new protective mask and other individual and collective protection, detection, and warning equipment proceeded. The service awarded an initial procurement contract for a large area smoke screening generator to permit smoke-screening on the move by HMMWVs and M113A2 armored personnel carriers.

During the year the Army's chemical demilitarization program changed significantly. PL 99-145, passed in November 1985, requires the destruction of the entire unitary chemical stockpile by September 1994 in conjunction with the acquisition of binary chemical weapons. In March 1986 the Army submitted to Congress a demilitarization concept plan that outlined alternative procedures and program costs. The chemical stockpile is located at eight sites in the continental United States, and on Johnston Atoll and in Europe. In addition to initiating a programmatic environmental impact statement, the Army began construction on the Johnston Atoll Chemical Agent Disposal System.

Congress gave the Army's chemical stockpile modernization program full funding authority, with some restrictions. By the end of the fiscal year, all congressional requirements were met to allow the President to certify that initial production of the 155-mm. binary projectile could commence. Advanced development of the MLRS binary chemical warhead continued with a series of highly successful flight tests.

Development continued in a number of other combat support areas. These included the joint Surveillance and Target Attack Radar System, a battle management and targeting system that detects, locates, tracks, classifies, and assists in attacking both moving and stationary targets beyond the forward line of troops; (Quick Fix, a tactical, heliborne, electronic jamming system; and improved nuclear projectiles for the standard 8-inch and 155-mm. howitzers.

Combat Service Support

Deliveries of the UH-60A Black Hawk helicopter continued to U.S. Army Forces Command; U.S. Army Training and Doctrine Command; U.S. Army, Europe; U.S. Army, Japan; and U.S. Army Reserve and National Guard units. The Black Hawk, which is being fielded to air assault, air cavalry, and aeromedical evacuation organizations, can carry more than twice the UH-1 payload and is capable of transporting an entire eleven-man, fully equipped squad faster and in all weather conditions.

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On 12 March 1986, the day after a Black Hawk crash in Elba, Alabama, killed three soldiers, the Army grounded its entire fleet of 698 UH-60A's-the second time in eleven months that the fleet had been grounded because of safety concerns. After the previous grounding order, issued in the spring of 1985, Army investigators found problems in the main rotor hub. The Army subsequently directed the manufacturer to make $6.5 million in repairs and lifted the flight ban in the summer of 1985. On 30 April 1986 the Army lifted the second grounding order, even though total destruction of the aircraft had prevented investigators from determining the cause of the 12 March crash. The investigation did reveal, however, several areas for improvement in the Black Hawk, including repositioning of some of the control switches to afford easier access for pilots during flight. Also, Black Hawk pilots were required to perform more extensive preflight checks and more frequent maintenance checks.

The Army procured six more C-12 airplanes during the year, bringing the total of these low wing, twin engine, pressurized cabin, passenger and cargo carrying utility aircraft in the inventory to 104. Capable of operating under instrument flight conditions day or night, in high-density air traffic control zones, and in known icing weather

conditions, the C-12 contributes to the combat readiness and effectiveness of both active and reserve component units (about 20 percent of the airplanes are with National Guard units).

After brake pedal failures on three HMMWVs-two at Fort Dix, New Jersey, in November 1985, and the third at Fort Jackson, South Carolina, in January 1986-the Army banned use of the vehicles and temporarily stopped accepting them from the manufacturer. In each failure, none of which caused an accident or injury, the brake pedal assembly broke off the shaft connecting it to the brake cylinder, about two feet below the pedal itself. To correct the problem, the manufacturer replaced the brake ,pedal assembly on each HMMWV in the Army's inventory with another containing two extra welds. By mid-March the replacements were completed and the fleet of HMMWVs had been returned to service. No sooner had the manufacturer resumed deliveries of the vehicles, however, than delays in the receipt of insulation components caused a two-month suspension of production.

The HMMWVs are used in airborne, airmobile, and light infantry divisions as weapons carriers for the TOW missile, in addition to filling roles as reconnaissance, fire support, com-

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munication, personnel transport, and command and control vehicles, and ambulances, in various other Army units. The four-wheel-drive HMMWV is diesel powered and uses a common chassis with various body configurations to meet these requirements. Eventually, the HMMWV will replace all M274s (1/2-ton Mules), all 1 1/4-ton M561 Gama Goats, and selected M151 Jeeps (1/4-ton) .

Soldier Support

Among developments in items that directly support the individual soldier was the issue of the first Micro Climate Cooling Vests. Designed to reduce heat casualties caused by long periods spent in an armored vehicle or a nuclear-biological-chemical suit, the vests provide personal air conditioning for the soldier. In a tank, hot air from the vehicle's turbine engine passes through a cooling system to a tube connected to the vest, which is worn under the battle dress uniform shirt. The vest carries 70° F. air over the soldier's torso, thus cooling vital organs in that area of his body. By means of a switch on a Y-valve on the vest tube, the soldier can control the amount of air entering the vest. The M1A1 Abrams tanks produced during the fiscal year were equipped with the Micro Climate Cooling Vests.

The Army approved for use a complete suit of Kevlar body armor for explosive ordnance disposal (EOD) specialists. These technicians currently use the standard protective gear for infantry soldiers, the Kevlar helmet and vest. Some EOD units have supplemented the standard infantry gear with locally purchased items of body armor-an indication of the need for the new suit. Made of laminated layers of Kevlar, with a face shield of polycarbon and acrylic, the suit will protect a soldier from the blast of a two-pound pipe bomb at close range: This item will be available for issue in fiscal year 1989.

Fielding of the new camouflaged chemical protective battle dress overgarment continued. The U.S. Army Training and Doctrine Command announced new doctrine that extends the overgarment's wear life in terms of increased days of wear and increased chemical protection.

Command, Control, and Communications

The Army awarded a contract during the year for production of Mobile Subscriber Equipment, an area communications system that will be fielded at the corps and division levels. Mobile Subscriber Equipment provides, to principal commanders and their staffs, the highest degree of mobility and area communications service for voice, data, and facsimile. Commanders and their staffs thus can exercise command and control over their forces on a rapidly changing battlefield. (An approximate commercial equivalent is a telephone system with mobile radiotelephone service and data capability.) The system is interoperable with the joint Tactical Communications Program, combat net radios,

commercial telephone, and NATO systems. It allows users to keep the same telephone number as they move on the battlefield, and will automatically route calls around damaged or jammed nodes. Since market surveys had determined that systems like Mobile Subscriber Equipment were already available, the Army decided to accept the best available system rather than develop the "ultimate" system; the result is a significant saving of time, money, and personnel.

Testing began on the modules of the All Source Analysis System, which will be the control system for the Intelligence/ Electronic Warfare subsystem of the Army Command and Control System. Many sophisticated sensor systems already have been fielded, but the ability to process the resultant information and distribute timely intelligence to battle commanders is limited by manual and partially automated methods now employed. The All Source Analysis System will provide modern minicomputer systems to speed the process and improve its accuracy and effectiveness. Under the joint Tactical Fusion Program, the system is being developed together with the Air Force counterpart system, the Enemy Situation Correlation.

The Army awarded a multiyear production contract for the Tactical Army Combat Service Support Computer System (TACCS). TACCS is a transportable, commercially available computer system that has been made more rugged for use on the battlefield. The system is intended for use at various levels of command down to battalion, in missions that include personnel, supply, maintenance, medical, ammunition, and transportation. Primary functions of the system are data entry, in-

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quiry and retrieval, editing, printing, and data transmission to higher level systems.

Fiscal year 1986 saw the initial fielding of the Maneuver Control System, a militarized, automated command and control system that provides computer-aided support for decision making by tactical commanders and their battle staffs at corps through brigade levels. The Army also awarded, during the year, a contract for procurement of commercially available hardware for the tactical computer processor, a part of the Maneuver Control System.

The Single Channel Ground and Airborne Radio System (SINCGARS) went into low rate initial production in December 1983. Lightweight and capable of providing secured voice and data transmission, the SINCGARS family of radios also possesses electronic anti-jamming features. The Army delayed full-scale production after it found that the initial production radios fell far short of the frequency of repair standard for the equipment. A contract for 16,000 radios could not be awarded in fiscal year 1986 as planned because the contractor had problems in meeting the contractual reliability requirements. SINCGARS therefore had to remain in low-rate initial production. When fielded, SINCGARS will be a major means of communication for armor, artillery, and infantry forces from brigade to platoon level.

The increasing congestion in the radio spectrum, and new radio and radar technology to reduce the effects of jamming, have accentuated the need for automation in battlefield frequency management and in the dissemination of communications-electronics operating instructions. During the year, the Army formed study groups and spectrum management and frequency committees to address the congestion aspect of jamming.

On the last day of the fiscal year, the Army implemented the joint Interoperability of Command and Control Systems (JINTACCS). Designed to enhance interoperability among the services, JINTACCS consists of a series of standardized messages and is particularly useful where regular reporting is required.

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Mobilizing, Deploying, and Sustaining the Army

To meet crises, the Army must be able to expand efficiently and to deploy the required personnel, supplies, and equipment. Fiscal year 1986 improvements in the area of readiness for mobilization included the widening of unit participation in the Army National Guard's mobilization exercise program and a muster of part of the Individual Ready Reserve. Strategic mobility increased through better airlift and sealift, but with very large problems remaining. The Joint Deployment System, fielded shortly before the beginning of the fiscal year, showed promise of improving the Army's ability to deploy effectively. There was also progress, in 1986, in the development of various transportation automation systems that contribute to deployment.

In planning for the sustainment of forces deployed overseas, sea-based materiel pre-positioning programs showed significant progress, while the REFORGER 86 exercise again demonstrated the effectiveness of the Army's major materiel prepositioning program in Europe. Initiatives began or continued in other areas of sustainment, including combat service support units, war reserve equipment, medical readiness, petroleum distribution equipment, and tactical water support. Particularly in regard to war reserves and medical readiness, stubborn shortfalls remained a serious concern.

Mobilization

To bring the active and reserve components to required wartime strength during mobilization, the personnel of the Individual Ready Reserve (IRR) are essential. The largest of the reserve categories of pretrained individual manpower, the IRR grew from a strength of 301,825 in fiscal year 1985 to 347,500 in 1986. At the direction of Congress, the Army mustered a

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portion of the IRR in January 1986 to determine its availability and fitness for duty. During this voluntary assembly, the IRR personnel went to a military facility near their home, updated their personnel information, underwent physical screening, and received a briefing about reserve responsibilities and opportunities. Subsequently, the Army began to develop plans for an involuntary screening of the entire IRR during fiscal year 1987.

To offset the shortfall in pretrained individuals that would occur upon mobilization, the Army developed the retiree recall program. This program preassigns Regular Army and reserve retirees to suitable mobilization positions, including reserve training divisions and brigades. An important aspect of the program is that use of the retirees would release active component individuals for reassignment or deployment. In 1986, 130,000 retirees were preassigned to installations in the continental United States, 3,300 to U.S. Army, Europe, and 185 to Eighth Army in the Republic of Korea. Exercise CERTAIN SAGE, conducted at eight installations in October and November 1985, involved the recall of 384 volunteer retirees to active duty to test mobilization procedures at the installation level.

Another mobilization effort is the Individual Mobilization Augmentee Program, which grew out of the old Mobilization Designee Program. In October 1981 the participants were reassigned from the IRR to the Selected Reserve, where they are subject to the president's authority to call up 100,000 reservists in an emergency. Augmentees are preassigned to active component units, to the Selective Service System, and to the Federal Emergency Management Agency in peacetime in order to train for their wartime duties. Since the program's inception, approximately 27,000 augmentee positions have been identified as necessary to support the active Army. Actual augmentee strength stood at 13,315 this year-an increase of 1,393 over fiscal year 1985-but even at this level the program can provide significant mobilization assistance in the face of the continuing cap on active Army end strength.

Since 1978, the Army National Guard has had a formal, multifaceted mobilization exercise program. This program is geared to full participation in the JCS five-year exercise plan as well as participation in the actual mobilization process through unit level exercises. During this fiscal year, the program was extended to all Army National Guard units.

To be carried out successfully, mobilization requires sufficient facilities. Efforts by the Corps of Engineers to identify

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mobilization facilities requirements began to come to fruition in fiscal year 1986 as mobilization master plans were prepared for most major installations in the continental United States.

Deployment

Despite formal interservice commitments to define requirements for sealift and airlift resources, and to identify the programs that will most efficiently meet those requirements, progress in resolving shortfalls in strategic lift capabilities has been slow. Solutions are expensive, and there is a continuing decline in the ability of the civil sector, primarily the U.S. Merchant Marine, to meet wartime needs.

Adequate strategic airlift is particularly critical in the early days of a war or other crisis. There is a recognized long-term requirement of sixty-six million ton miles per day for inter-theater airlift. The fiscal year 1991 program will result in approximately forty-eight million ton miles per day of capability. Fielding of the C-17 Airlifter, scheduled to begin in fiscal year 1992, will reduce the deficit significantly; in addition, this versatile aircraft will provide essential outsize airlift capability, reduce the intratheater airlift shortfall, provide a needed replacement for the C-141, and augment the C-130 fleet. In the near term, airlift capability is being improved by "rewinging" the C-5A fleet, acquiring forty-eight C-5B and forty-four additional KC-10 tanker planes, improving wartime aircraft utilization rates, extending the service life of existing aircraft, and improving the capabilities of the Civil Reserve Air Fleet.

Strategic sealift is critical to the deployment of Army forces and to their resupply. The continuing decline of the Merchant Marine fleet, and the shipping industry's trend toward containerization and away from more militarily useful breakbulk shipping, require innovative approaches to the problem. With the Army's support, the Navy is attempting to meet the challenge through a combination of programmed increases to its U.S. Ready Reserve Force and programs for modification of container ships to enable them to meet unit equipment movement requirements. But even these efforts will not enable the nation to meet the total surge shipping requirement projected over the next five years. Moreover, unless the decline of the U.S. Merchant Marine fleet is halted or reversed, or other solutions are found, our sealift capability will diminish further.

Specific Army programs also aim to have a positive effect on overall mobility. Most important in this category is the light

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division, which is designed to be deployable by air in far fewer C-141B-equivalent sorties than the standard infantry division. The light division's rapid deployability and high combat-to-support ratio may well preclude a later necessity to deploy a larger, more costly force. The Army also continues to be aware of the need to address transportability as a critical factor in the design of new equipment. Modernized equipment, no matter how good, is ineffective unless it can be transported to the theater efficiently.

Progress continued during the year in programs that aim to balance Navy strategic sealift and Army-Navy offload and discharge systems. Navy fielding of Fast Logistics Ships, flatracks and seasheds, the Auxiliary Crane Ships, and the Heavy Lift Pre-positioning Ship, and the expansion of the Ready Reserve Force have all contributed to reducing strategic sealift shortfalls. The Army has programmed discharge capability to match the Navy's delivery profile and satisfy the minimum logistics-over-the-shore requirement. Programs include modernization and upgrade of the Army's watercraft and tugboat fleet and the joint acquisition with the Navy of causeway systems designed to make watercraft

more useful in those areas of the world where shallow beach gradients limit logistics-over-the-shore operations.

The Army's land- and sea-based pre-positioning programs serve to reduce the total lift requirement by reducing the overall quantity of materiel requiring shipment, as well as the distance to be traveled from the pre-positioning site to the area of operations. For example, the Army improved its readiness through the pre-positioning early in the fiscal year of combat service support equipment aboard a Heavy Lift Pre-positioning Ship in Southwest Asia. The 8,000 tons of equipment aboard the ship would be required to unload equipment and supplies arriving from Diego Garcia and fast sealift transports deploying from the continental United States in support of U.S. Central Command operations. This combat service support equipment would provide the logistics-over-the-shore capability necessary to unload materiel in areas where port facilities are limited or nonexistent. Most of the equipment on the Heavy Lift Pre-positioning Ship is difficult to deploy and could not be deployed by surface in time to meet an emergency properly.

A very important land-based Army pre-positioning program is the 25-year-old pre-positioning of materiel configured to unit sets (POMCUS). Under POMCUS, the Army stores organizational equipment in Europe in company- and battalion-size

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packages, in a ready-for-use condition. The program's purpose is to position the majority of a unit's equipment forward, so that in time of crisis only unit personnel, with minimum equipment, would require airlift to meet the exigencies of a NATO emergency. During the REFORGER 86 exercise, POMCUS again proved its worth as participating troops drew 894 wheeled and 2,512 tracked vehicles, and 1,632 trailers from its stocks. Over 99 percent of the vehicles were operational when drawn-an essential indicator of the program's potential effectiveness.

Despite this success, a number of major mobilization and deployment exercises since 1978 have revealed critical deficiencies, particularly in centralized deployment management. In response, the Army and its sister services have developed the Joint Deployment System, a crisis execution system specifically designed to support coordinated, prompt deployment planning and execution. After a four-year development effort, the joint Deployment System became operational in September 1985. Fielding of the system provides the joint community with a powerful new capability to control and monitor the deployment of military forces; however, it also places additional manpower demands on commands and agencies involved in deployment planning and execution. Future demands for additional resources are expected as experience with the system increases.

Automation of information management systems for transportation is an area in which the Army has made much progress recently. These systems promise to be valuable aids to deployment. Systems successfully tested include the Transportation Coordinator Automated Command and Control Information System prototype, the Software Acceptance Test for the Department of the Army Standard Port System-Enhanced, and the initial capability for the Installation Transportation Office/Military Transportation Management Command interface module of that command's Crisis Action Management System. Development of the Container Management System has begun.

Sustainment

As a result of its Training Base Capacity Study 85, the Army was able to assess more accurately the ability of the expanded mobilization training base to meet sustainment requirements described in the Mobilization Army Program for Individual Training. Consequently, the service created, at the

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Department of the Army level, a program development increment package designed to solve equipment shortages in the U.S. Army Reserve training divisions. The long-term goal of this project is to equip the training divisions with a proper mix of new and old equipment to ensure sufficient flexibility in the mobilization training base to support sustainment needs.

Congress during the year approved the purchase of the Reichel Logistics Facility in the Northern Army Group (NORTHAG) area of NATO's defense perimeter. In the late 1970s, analysis of the evolving threat to Europe's Central Region indicated that NORTHAG would have to defend against the most probable main attack by the Warsaw Pact. As a result, the United States agreed to reinforce this area outside the traditional U.S. area of operations. Concurrently, the United States made a commitment to develop the capability to reinforce NATO with ten divisions within ten days. The Reichel facility is ideally located and suited to provide an essential logistical support coordination center needed to meet the reinforcement objectives in the NORTHAG region.

The decision to provide NATO with a minimum D-day force of ten divisions, with requisite air and logistics support, was made on the condition that the United States allies would provide appropriate host nation support. In 1982 the United States and the Federal Republic of Germany (FRG) signed a wartime host nation support agreement by which the FRG would supply U.S. forces with approximately 93,000 trained reservists in crisis or war (50,000 of these would support the Army). For the fourth year, unit activations of some of these FRG reservists took place in 1986; they will continue through 1988. The costs of the agreement are to be shared equitably by the two countries. A U.S.-FRG Joint Committee is developing detailed technical implementation procedures to provide, receive, and sustain agreed support. A military technical agreement that details the military support to be provided is complete and is expected to be signed in 1986. A civilian technical agreement, detailing support to be provided from the civil sector, is in draft.

Although some problems of sustainment are common to all geographical areas, the U.S. Central Command, with its responsibility for Southwest Asia, has a special concern with one difficulty-tactical water support. As the Department of Defense Executive Agent for Land Based Water Resources Management, the Army develops, in close coordination with the other services and appropriate defense agencies, concepts and

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doctrine for water support. This fiscal year saw the publication of such doctrine in JCS Publication No. 3. Also during the year, in the GALLANT EAGLE exercise, Central Command employed a water detection response team. As a result of the team's work, a successful well was dug during the exercises at the National Training Center at Fort Irwin, California. In other tactical water support activities, a 150,000 gallon-a-day water purification system on a LASH barge underwent successful operational testing. Purification systems with twice that capacity were successfully mounted on three BC 231A barges, which at year's end were awaiting pre-positioning.

One of the most critical elements of sustainment is distribution of bulk petroleum. The Army is responsible for this distribution to all services in either a developed or an undeveloped theater. It is the Army's mission to maintain a flow of bulk fuels from a combination of offshore and pier-side tanker discharge systems through a network of onshore storage and distribution systems. Petroleum distribution equipment contained in the Army Facilities Component System is thirty to forty years old, labor intensive, and no longer commercially available. The Army is in the process of updating the system and has programmed funds to improve off-load and inland distribution of petroleum products through use of commercially available technology. Equipment employing this technology can be installed quickly and easily, increases unit productivity, and alleviates the consequences of manpower shortages. Procurement of lightweight aluminum pipeline, quick lock couplings, and improved storage capabilities has begun. A full system demonstration, including a timed test, of ship-to-shore undersea pipeline and commercially available single anchor leg mooring systems was successfully completed in October 1985.

Medical readiness remained an area of concern for the Army in 1986. The service's ability to provide wartime medical support has been severely limited by a shortage of the medical equipment and professional medical personnel needed to meet wartime requirements. During the fiscal year, thirty hospital sets designed to meet the new Deployable Medical Systems requirements were funded for procurement, with fielding to begin in fiscal year 1987. Funding to equip the entire medical force structure by fiscal year 1991 is programmed. Some progress was made in alleviating the critical shortage of professional personnel in certain specialties-this accomplishment the result of improved recruiting and new incentives. At present, deployable medical personnel would be adequate to

provide care on a worldwide basis, but there would be shortages of surgeons, surgical nurses, and related specialists in the continental United States. Moreover, the Army medical support base in the United States would experience shortfalls in the facilities and materiel necessary to sustain the fighting forces.

In general, there is a shortage of personnel in combat service support functions. The Army in 1986 had several initiatives under way to reduce the shortfall. Forty-one combat service support units are scheduled for activation in the reserve components between the current year and fiscal year 1990. As logistics unit productivity systems are fielded, the spaces made available by increased efficiency are being applied to raise the authorization of combat service support units.

The situation in war reserve stocks remained in flux during the year. These stocks are established in strategic locations throughout the world; during the initial days of combat, they would provide an immediate supply of munitions, fuel, and secondary items until the supply pipeline could be filled from the continental United States. Modernization and changes to the force structure cause constant adjustments to stockage levels. While modernization provides new, more effective equipment and resultant overall gains in sustainment capacity, that equipment requires different support items. The necessity of sustaining a mixed fleet of older and modern equipment results in additional resource requirements. Although there has been steady improvement in war reserves over the past several years, funding constraints, coupled with increasing and changing requirements, have prevented the Army from meeting its goals. One additional day of war reserve stocks costs about $2 billion. Putting the consideration of modernization aside, a multi-billion dollar investment over current funding would be required to achieve the Army's total war reserve stockage objectives.

A comprehensive depot maintenance program is vital to the sustainment of combat forces. The materiel maintenance element of the program provides an efficient and effective source of supply by returning serviceable major and secondary items to the central supply system. Materiel maintenance also supports foreign military sales programs and helps maintain production capability for mobilization. The maintenance support activities element provides for fielding support for new systems, maintenance engineering, new equipment training, and revision of technical publications. Although the fiscal year

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1986 budget eliminated the depot maintenance backlog for overhaul and repair, the funding reduction caused by the Gramm-Rudman-Hollings Act created a backlog of $104 million.

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Structuring the Force

In response to a broadening spectrum of threats, the Army has been restructured to capitalize on technology and to employ the AirLand Battle doctrine in diverse and distant geographic settings. This effort has resulted in the creation of a balanced force of heavy, light, and special operations units streamlined to execute that doctrine. The restructuring has been accomplished within a deliberately fixed active component end strength necessitated by considerations of national demography. With a need to commit a reasonable portion of limited resources to force modernization, readiness, and sustainment, the Army has integrated reserve component units with the active force to a degree unprecedented in recent history.

Divisions

The Army continued the process of creating lighter forces that are more deployable and more suited to meeting probable crises. Having completed its conversion to the light infantry design in the previous fiscal year, the 7th Infantry Division (Light) underwent a year-long certification in 1986. Lessons learned from this experience will be applied to the other light divisions' conversions. In Hawaii the 25th Infantry Division changed over to the new design during the year.

Activated as a new division in fiscal year 1985, the 10th Mountain Division (Light Infantry) continued its growth in 1986. Availability of facilities, particularly family housing, at Fort Drum, New York, determined the pace of this growth. One of the division's infantry brigades moved to Fort Benning, Georgia, where it will be stationed until adequate facilities are available at Fort Drum in fiscal year 1989. The 10th Division continued building its combat structure during the year by activating two infantry brigade headquarters, four infantry battal-

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ions, and one field artillery battalion. Additions to the division's combat service support structure, begun in 1985, also continued. The division will have the 27th Brigade of the New York Army National Guard as a roundout brigade.

During the fiscal year, the Army activated the 6th Infantry Division (Light) at Forts Wainwright and Richardson in Alaska. This new division was formed around the existing 172d Infantry Brigade, which was already stationed in Alaska. The 205th Separate Infantry Brigade, U.S. Army Reserve, headquartered in Minnesota, will round out the division. Security of strategically critical sites throughout Alaska and the Aleutian Islands is the 6th Division's primary mission.

Completed in 1986 was the reactivation of the 29th Infantry Division (Light), Army National Guard-the Army's tenth National Guard Division. Headquartered at Fort Belvoir, Virginia, the division is based on the assets of the 116th Separate Infantry Brigade (Virginia) and the 58th Separate Infantry Brigade (Maryland). Like the 7th, 10th, and 25th divisions, the 29th Division will have a smoke/decontamination chemical company at corps level.

In 1984 the Army approved new force designs for the air assault and airborne divisions. Based on the light infantry division force design, the airborne and air assault division structures incorporate modifications for unique mission requirements and the need for specialized training. The 101st Airborne Division (Air Assault) began conversion to the new design during the year, and the 82d Airborne Division is scheduled to convert in fiscal year 1987. When the changeovers are completed, both divisions will be more readily deployable and will possess greater tactical mobility; improved reconnaissance capabilities; a broader range of communications assets; organic nuclear, biological, and chemical decontamination capabilities; and smoke support.

Reorganization of the Army's heavy divisions along Division 86 lines also progressed during the year. Army design

models provide for an armored division of about 16,800 members (6 tank battalions and 4 mechanized infantry battalions) and a mechanized infantry division of approximately 17,100 (5 tank battalions and 5 mechanized infantry battalions). The design includes an increase from 3 to 4 in the number of tank and infantry companies assigned to maneuver battalions. These companies are being equipped with the Abrams tank and the Bradley Infantry Fighting Vehicle. The division support command provides a forward support battalion to each brigade

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and a main support battalion within the division rear area. A long-range surveillance detachment has been placed in the divisional cavalry squadron. Infantry squads and 155-mm. howitzer sections have been reduced to nine men each. The eight-inch howitzer batteries have been moved to corps, and a multiple launch rocket system battery has been retained as a divisional general support weapon. During fiscal year 1986 heavy forces in both Europe and the continental United States continued conversion to the refined unit designs as required new equipment was fielded and facilities became available. Reserve component affiliation with selected active units continued, with roundout units converting to new unit designs at about the same time as their associated active component units.

The 2d Infantry Division in Korea completed its conversion to a special design during fiscal year 1986. This division formerly contained 2 tank battalions, 3 infantry battalions, and 1 mechanized infantry battalion; in its new configuration, it has 2 tank battalions, 2 mechanized infantry battalions, and 2 air mobile battalions. The new design answers the unique requirements of this forward deployed division and provides increased firepower through the use of modern equipment while staying within required space authorizations.

Also completed during the year was the conversion of the 9th Infantry Division. Formerly this division was comprised of 1 tank battalion, 3 infantry battalions, 1 light motorized battalion, 1 light attack battalion, and 2 light combined arms battalions. With its new design, the division contains 5 heavy combined arms battalions, 2 light combined arms battalions, and 2 light attack battalions. Tactics and equipment emphasize high tactical mobility combined with extensive firepower-for example, the use of High Mobility Multipurpose Wheeled vehicles equipped with TOW missiles. At the same time, the division retains strategic mobility more comparable to the light divisions.

Corps

Integral to the employment of the newly structured divisions under AirLand Battle doctrine is greatly increased responsibility for the corps commander in fighting the deep battle. The Army's largest tactical organization, the corps will be the primary instrument for achieving operational objectives. The corps commander must integrate the major operations-close, deep, and rear-of the battle.

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To provide the corps commander the assets necessary to fight, control, and sustain simultaneously these three operations, the Army is redesigning the corps structure. Revisions thus far accomplished or proposed include increasing the strength of the command operations battalions and area signal battalions in the corps signal brigade; transferring division Chaparral missile system, and adding Hawk missile system battalions to the corps air defense artillery brigade; strengthening the corps military police brigade; providing intelligence personnel within the corps; transferring eight-inch field artillery cannons to the corps and converting cannon artillery battalions to three 8-gun batteries; adding a multiple launch rocket system battalion and a target acquisition battalion with remotely piloted vehicles to corps artillery; and adding attack helicopter battalions to the corps aviation brigade.

Special Operations Forces

Special Operations Forces complement conventional capabilities across the spectrum of conflict, but are uniquely suited for limited objective operations at the lower end of the spectrum. Revitalization of these forces is a high Army priority. During fiscal year 1986 the Army increased the manning level of the Special Warfare Center at Fort Bragg, North Carolina, by 122 spaces (886 this year, compared to 764 in 1985), and improved the 1st Special Operations Command

by activating a support battalion and a signal battalion, and increasing manning levels in military intelligence units.

The reserve components provide a substantial contribution to Army Special Operations Forces. Fifty percent of the special forces and 90 percent of the psychological operations and civil affairs units are in the reserve components. In 1986 planning progressed on equipment modernization that will improve the fighting ability of the reserve component Special Operations Forces. Mobilization requirements for some reserve component Special Operations Forces will be increased, with additions planned for special call-up authority.

In May 1984, the Army and Air Force Chiefs of Staff agreed to a transfer of all Special Operations Forces rotary wing support aircraft to the Army. The Deputy Secretary of Defense vetoed the agreement, however, in December 1984. Subsequently, the two services agreed to a transfer of missions in this area. Both services have worked to develop appropriate implementation plans that allow for necessary growth in avia-

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tion capabilities. The Army continued to plan for activation of a Special Operations Aviation Brigade composed of both active and reserve component aviation units. Despite the 1984 veto of the aircraft transfer, this issue remained unresolved at the end of fiscal year 1986.

Force Management

Because manpower staffing standards are developed at the work center level of detail, they are an important tool for management decisions throughout the planning, programming, budgeting, and execution system cycle. The new Manpower Staffing Standards System establishes the basis for determining manpower contingencies, measuring effectiveness, and improving personnel utilization. The system also provides credibility for Army manpower requirements when the Department of Defense, Congress, and the General Accounting Office examine them. Manpower requirements for 415,000 spaces-approximately two-thirds of the table of distribution and allowances spaces in the Army-will be determined using the system. In fiscal year 1986 standards were approved for 14,000 spaces, studies were begun on 24,000 spaces, and 65,000 spaces were formally scheduled for study. These accomplishments brought the totals to 91,700 spaces covered by approved standards, 98,000 spaces under study, and 94,600 spaces scheduled. By the end of the fiscal year, 22 percent of the goal of 415,000 spaces under approved standards had been achieved.

Also during the fiscal year, Army Functional Dictionary codes were used for the first time to support the table of distribution and allowances portion of Total Army Analysis in developing the Army's programmed force structure. Use of the codes allowed the Army staff to compare manpower requirements throughout the Army with those in the major commands, and thus provided a better information base for making force structure decisions.

The Army Authorization Documents System was employed in the creation of modified table of organization and equipment documents for designated medical units in four major commands. This system supplies data on organization, personnel, and equipment to support units in performance of their assigned missions.

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Organization, Management, and Budget

The limits on the active Army's end strength, the need for high quality in men and equipment, and the most extensive peacetime military modernization in the nation's history-these elements combined to focus attention on the Army's stewardship of its resources. Several changes in organization during the year, and a variety of management programs, continued the Army's efforts to make the most of what it received to carry out its mission.

Organization

A realignment of the functions of The Adjutant General Center and the U.S. Army Military Personnel Center (MILPERCEN) neared completion as the fiscal year ended. Under the new arrangement, soldier sustainment and separation will become the principal focus of The Adjutant General, who will serve as a director within MILPERCEN. Soldier services for which The Adjutant General will be responsible include military awards, retirement and separation, civil education incentives,. and the administration of the physical disability program. Although most of these services previously came under the purview of MILPERCEN, the Office of the Deputy Chief of Staff for Personnel and other elements of the personnel community also performed some of them. The Adjutant General was expected to retain staff supervisory responsibility for the U.S. Army Physical Disability Agency, the Military Postal Service Agency, the Institute of Heraldry, the Armed Forces Courier Service, and the Environmental Support Group.

In late 1985 and early 1986, the Army continued to build upon the directions set forth in the Army Space Policy that was published in June 1985. Elements of the Army staff were reorganized and the Directorate for Space and Special Weapons

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was established within the Office of the Deputy Chief of Staff for Operations and Plans as a responsible staff focal point for space.

June 1986 marked the establishment at Fort Leavenworth, Kansas, of the U.S. Army Space Institute. Representing the Army user community, the institute develops and integrates space-related concepts and doctrine across various mission areas. Part of the U.S. Army Training and Doctrine Command (TRADOC), the institute assists TRADOC centers and schools in defining requirements for space-related doctrine, training, organization, and materiel. In addition, in conjunction with these centers and schools, the institute develops and disseminates space concepts, doctrine, techniques, and procedures that deal with the application of space systems and technology to land warfare. As the personnel proponent in its subject area, the new entity manages Army personnel who have special space-related training. An important aim of the institute is to help bring about acceptance of a program in which the Army would play the major role in the design and launch of space satellites geared to the needs of ground commanders. Uses of such satellites would include intelligence and weather reconnaissance.

In August 1986 the United States Army Space Agency (USASA) was activated provisionally at Colorado Springs, Colorado. The USASA, which is under the operational command of the United States Commander in Chief, Space, and is a field operating agency of the Office of the Deputy Chief of Staff for Operations and Plans, provides an Army organization analogous to the Air Force and Naval Space Commands, which are components of the United States Space Command (USSPACECOM). The USASA will give USSPACECOM an Army perspective on planning for Department of Defense space system support to land forces; coordinate Army space-related operational requirements; ensure integration of Army requirements into USSPACECOM planning and operations; maintain the Army Space Master Plan; and represent Army interests in the development of strategic defense planning.

A new element of TRADOC established during the year at Fort Monroe, Virginia, sets its sights on a more terrestrial goal. The Army Writing Office seeks to improve the writing style of Army personnel by eliminating "bureaucratese" and replacing it with lucid, crisp prose. Revision or replacement of verbose, unclear Army manuals and regulations is one means of achieving the aim. Another is liaison with instructors,

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throughout the Army school system, who are in a position to influence the writing habits of Army personnel.

In October 1985 the Second U.S. Army activated the first Army Reserve military intelligence command at Fort Gillem, Georgia. All but one of the twenty-one Army Reserve intelligence units in the Second Army came under the new command. Within months of its activation, the command was proving its worth to reserve military intelligence unit commanders through its understanding of their problems and its ability to provide expanded training opportunities.

The Army's security assistance function, previously shared by the Deputy Chief of Staff for Operations and Plans and the Deputy Chief of Staff for Logistics, was consolidated at Headquarters, Department of the Army, under the Deputy Chief of Staff for Logistics. This change was designed to provide a focal point for the control, management, and development of policy central to the United States military-to-military relations with its allies and with friendly countries.

On 10 December 1985 the Secretary of Defense designated the Army as the executive agent for all Department of Defense activities celebrating the bicentennial of the U.S. Constitution. The Secretary of the Army directed the formation of an executive committee and an operational committee, or working group, to coordinate the Department of Defense's involvement in the bicentennial celebrations. The work of these two committees produced the Bicentennial Defense Logo and many events, such as a military demonstration at Fort Meade, Maryland, in celebration of the Annapolis Convention, the dedication of the Soldier-Signers of the Constitution Corridor in the Pentagon, and the publication of the U.S. Army Bicentennial Series.

Management

In fiscal year 1986 the U.S. Army Audit Agency issued 340 audit and advisory reports that identified $2.6 billion in potential monetary benefits. By year's end, management had agreed with recommendations that could result in benefits of $1.6 billion. The audit reports included eighty-two formal multilocation summary and participating site reports that addressed acquisition, research and development, data processing, financial management, logistical resources and support, supply and maintenance, reserve components, and personnel training and support. Also included were thirty-one advisory reports, issued

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to Army staff and field commanders, that pointed out common problems in programs and operations reviewed in recent audits. The advisory reports suggested actions to correct similar problems that may exist at other installations and activities. In providing further assistance to the Army, the agency accepted forty-eight requests for audit from the Army secretariat and staff, various Army commands, and other federal offices.

There were major changes taking place in the way the U.S. Army Audit Agency does business as a result of the automation of many audit and administrative functions. The agency was in the process of acquiring a shared-logic office automation system in order to improve automation support to all Army personnel. The system will consist of minicomputers, personal computer workstations, terminals, portable computers, printers, and associated software. When implemented, the system will allow agency employees to automate many of their day-to-day tasks and should result in increased productivity.

During the year the Army institutionalized a standard installation structure with standard core functions. This culmination of a concerted effort to improve installation management should have many benefits: facilitating the

transition from peace to war by ensuring adequate support to the reserve component units that will replace deploying active units during mobilization; linking organizational and functional requirements to the planning, programming, budgeting, and execution process, so that the Army can develop acceptable performance factors and results for each core function and can measure resources applied against results achieved; providing consistent and predictable support to Army personnel and their families; developing standard management and information systems for use at all Army installations; increasing the efficiency and effectiveness of installation base operations; and assisting in the development of a cadre of professional managers to operate Army installations.

The Model Installation Program continued to produce very positive results, eliminating obsolete procedures and encouraging money-saving ideas. Operating at a total of ten installations, the program has generated approximately 3,000 suggested ways of improving the Army's business methods. Suggestions emanating from the program have caused changes to Army regulations and procedures that will result in better use of limited resources. On 1 October 1985 the Army National Guard began a three-year participation in the Model Installa-

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tion Program under the name Model State Program. Five states, one in each Army area, were selected as test states.

In the face of the limits placed on its active end strength and its civilian force, the Army is increasingly examining methods of improving the productivity of its personnel through the use of technology. With the need to be able to deploy light forces rapidly, the service is making special efforts to improve the ratio of combat to support soldiers (commonly known as the tooth-to-tail ratio). These two initiatives are linked in several of the Army's productivity enhancement programs.

The Army has significantly reduced the personnel and administration support structure of its corps and divisions. To accommodate these cuts, a functional redesign of the personnel and administration system was necessary. After examining every procedure in this system, a task force recommended over 500 work-reducing ideas. During 1986 the Army proceeded with the implementation of many of these suggestions.

Continued benefits accrued from the Army's participation in the Transportation Operational Personal Property Standard System, a joint service management information system designed to automate administrative functions at military personal property shipping offices. The system standardizes, through automated processes, the Department of Defense Personal Property Moving and Storage Program. In addition to increasing productivity in the handling of moves, the system improves the quality control of commercial movers, reduces claims for loss and damage, reduces the number of moves that cause financial hardship to soldiers, and significantly reduces incidents of late arriving documentation.

During 1986 the Army tested prototypes of two complementary logistics item identification systems. Logistics Applications of Marking and Reading Symbols represents the introduction of bar code 'technology into the Department of Defense logistics system. Microcircuit Technology in Logistics Applications embraces a wide range of automatic identification devices and methods of storing and transporting bulk data that does not lend itself to bar codes. Through these programs the Army expects to achieve greater accuracy, improved production flow, increased asset visibility, and reduction of documentation requirements, order and ship time, and stockage investment levels.

During the fiscal year the Army received over 1,625 ideas as a result of the activities of the Supply and Maintenance Assessment Review Team. The team's mission is to improve the

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Army's logistics support by eliminating administrative burdens, streamlining current systems, taking advantage of technology, and implementing good ideas or suggestions in an expeditious manner.

At the start of the fiscal year, the Army combined the efficiency programs that review contractible and noncontractible organizations into the Organizational Efficiency Review Program. A focus on the integration of review methodology

with the Manpower Staffing Standards Systems resulted in the first Army-wide study of Installation Resource Management Directorates. This study will develop staffing standards based on organizations that have first undergone an efficiency review.

To improve their use of resources, Army commanders continued to pursue aggressively productivity capital investment programs. These programs provide funds for tools, equipment, and facilities that save manpower, reduce costs, increase productivity, and improve readiness. In 1986 the programs had a return on investment of $17 for every $1 invested.

Another successful continuing effort, with an expected return on investment in 1986 of 20 percent, was the Value Engineering Program. Army contracts contain a value engineering incentive clause that encourages contractors to submit change proposals that will conserve resources. Contractors share as much as 50 percent of the net reductions in contract costs that result from accepted proposals. During 1986 the Department of the Army instituted policy that expanded the Value Engineering Program by requiring that all project and program managers of major systems participate in the program.

Avoidance of unnecessary costs is a prime indicator of the success of the Army's selective multiyear procurement program. For fiscal year 1986 contract awards, the Army estimated a saving of approximately $773.2 million through the use of multiyear contracts. In considering candidates for these contracts, the Army uses the basic criteria established in the fiscal year authorization act: benefit to the government; stability of the requirement; stability of funding; stability of configuration; degree of confidence in cost; and confidence in contractor capability. It has proved a challenge for the Army to maintain stability of funding for multiyear contractor candidates while at the same time maintaining the management flexibility required to deal effectively with reductions in total obligation authority. In 1986 the Army approved six additional multiyear procurement programs.

Multiyear procurement is one of seven defense acquisition improvement programs. The others are program stability, economic production rates, realistic budgeting, improved readiness and support, encouragement of competition, and strengthening of the industrial base.

Program stability seeks to maintain production quantity floors for selected programs. In 1986 program stability improved considerably thanks to a new program management control system that provides intensive management for major programs. High-level agreement on program baselines, a more disciplined process of change, more clearly indicated program trends, and greater control over costs are all elements of that intensified management.

The Army continually uses economic production rate information to achieve purchases of production at the lowest possible cost. In 1986 seventeen major systems in procurement were evaluated under these criteria.

A broader implementation of realistic budgeting procedures allowed the Army to increase efficiency in its use of fiscal year 1986 funds. Individual projects included data base development, cost estimating relationships, and cost factors.

General officers and senior civilian executives reviewed working group initiatives at quarterly intervals. These reviews resulted in improved readiness of equipment.

By regulation, the Army must establish competition, where possible. All future acquisition plans must address this issue.

To improve industrial base preparedness planning, the Army has developed a milestone schedule and plan of action. Ongoing efforts include the creation of an automated data base for analysis of industrial base issues.

A key area in the handling of resources in today's Army is information management. The Information System Planning Study for Headquarters, Department of the Army (HQDA), completed in December 1982, created an information model which represented the processes, or Army resources, and information classes, or needed information, required to run the Army. Published in March 1986, AR 25-1, *The Army Information Management Program,* formalized a management structure and annual review system to ensure standardization, integration, timeliness, and accuracy of information to

support the mission and goals of the Army. AR 25-1 required all DA echelons to prepare information models and to update them each year using the information model of the next higher echelon as a guide. Strategic, theater/tactical, and sustaining base comprise

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the three major groups of Army information. The ODCSOPS, the CG, TRADOC, and each MACOM in collaboration with the DAS, will submit Information Management Plans annually for the three respective groups for approval and integration by the OACSIM into the Army's Information Management Master Plan.

The Army's goal is to design, build, and field command and control and support systems that will enable the service to operate the same in war as in peace. At the center of this effort is the need to integrate the six major functions of telecommunications, automation, visual information, records management, library activities, and printing and publishing. To this end, the Army on 1 October 1985 established the Personnel Information Systems Command, a subordinate command of the 7th Signal Command, which is located at Fort Richie, Maryland. The new command developed the concept of service centers to develop, process, store, and transmit data. Each service center is under the operational control of the serviced agency.

A large user of electronic media and information systems for computer-based instruction, the Army this year began acquiring an interactive, computer-controlled videodisc system for use in Army schools. This system will be distributed selectively to units in the field in the next fiscal year.

The Army Corporate Data Base is a physically distributed data system that will service the Army's needs for both classified and unclassified data to answer questions that cross functional lines and levels of command. In support of this system, the Army has revamped and accelerated its effort to standardize data elements and identify one proponent for each. During the year, the Army continued to develop a data encyclopedia of the standardized data elements that identifies proponents, users, and storage locations of data elements, as well as their definitions. The Army Corporate Data Base will permit decision-makers and action officers to do their work from an organizationally integrated perspective.

There is a major shortfall in the Army's advanced computing capability for support of weapons system design, modeling, and simulation. With the advanced technology of supercomputers, significant improvements can be made in developing weapons to defeat new Soviet armor, improve armaments, air defense, conventional munitions, and battlefield nuclear weapons, and provide a realistic chemical defense. The Army's proposed solution to the shortfall is to acquire supercomputers competitively. To satisfy immediate requirements, the Army in

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September 1986 acquired a machine that, while possessing only an interim capability, was easily available. The contract for this procurement contained an option for a second configuration; additional configurations are programmed at the rate of one each year until Army requirements are satisfied. Through fiscal year 1991 the estimated cost of the program is approximately $200 million.

A decade ago, the Army established the Continental Army Management Information System (CAMIS) to meet the requirements for mobilization and information management for the reserve components. A restructuring of the system in August 1986 divided the system into three modules to support, respectively, Mobilization Command and Control Two, the Standard Army Multi-Command Management Information System (STAMMIS), and Unit Automation. On 4 September 1986 the Army redesignated CAMIS as Mobilization Command and Control Two, an application of software that is intended to integrate existing and planned software primarily between tiers two and three, or organizational information resources and the individual information user, of the total Army's automation architecture. This range includes STAMMIS; the Army National Guard Management Information Systems, Mobilization; and the United States Army Reserve Management Information Systems. Mobilization Command and Control Two will operate within STARNET, the sustaining base telecommunications network that will provide worldwide telecommunications for the

Army.

Once created, information of a sensitive nature must be secured. As a result of a rash of espionage incidents involving members of the Department of Defense in fiscal year 1985, the Army placed increased emphasis on counterintelligence and security countermeasures. The Army's program to counter subversion and espionage directed against the Army continued to produce exceptional results, with nearly five hundred incidents reported during fiscal year 1986. A 33 percent increase in confirmed hostile intelligence contacts reflected the continuing aggressiveness of the Soviet Union and other hostile governments. The Army expended considerable effort in implementing the security improvements recommended by the Commission to Review DOD Security Policies and Practices (Stilwell Commission).

Foremost in this Army effort was the Department of the Army Command Inspection. In November 1985 the Secretary of Defense directed the military departments and defense

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agencies to conduct a one-time, top-to-bottom security inspection. The purpose was to determine if relevant security policies and procedures were well understood, observed in practice, and enforced. The Department of the Army conducted the inspections between January and July 1986. HQDA formed two inspection teams; one inspected each major command headquarters, the other each major HQDA staff agency. Those headquarters and staff agencies, in turn, inspected their subordinate commands and field operating agencies, and provided overall assessment reports to the Office of the Assistant Chief of Staff for Intelligence (OACSI), HQDA. The OACSI submitted a consolidated report to the Secretary of the Army on 1 October 1986. The inspection report disclosed no major security problems that required action by the Secretary of Defense. In general, the Army security program was found to be in fair condition, with classified information being properly protected. Sensitive compartmented information activities and the general information security program received good ratings. Automated security, communications security, and personnel security were found to be in need of much improvement. As a result of the command inspection, the Army staff and the major commands initiated actions to correct the noted vulnerabilities and weaknesses.

Budget

In the absence of a formal appropriations bill, the Army at the beginning of the fiscal year relied for its operations and maintenance appropriations on a continuing resolution. The resolution funded operations and maintenance through 19 December 1985, at which time Congress enacted the Department of Defense appropriations bill. The 1986 operations and maintenance appropriation of $18.975 billion was slightly higher than fiscal year 1985 obligations, which totaled $18.66 billion. Actual obligations for fiscal year 1986 were $19.004 billion.

The Gramm-Rudman-Hollings Act reduced the operations and maintenance appropriation by $961 million or approximately 5 percent of the appropriated amount. This loss of almost $1 billion caused reductions in unit training, flying hours, depot maintenance overhauls, and repair of real property. Additionally, levels of effort in communications, recruiting, administration, and base operations support were reduced. Finally, the Army adjusted its program priorities on the basis of guidance provided by a joint Army staff-major command con-

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ference, co-chaired by the Comptroller of the Army and the Deputy Chief of Staff for Operations and Plans, that was held early in January 1986.

Like Gramm-Rudman-Hollings, foreign currency fluctuations caused a substantial adjustment to the appropriation's total obligation authority. The strong U.S. dollar of fiscal year 1985 was replaced by a much weaker one in 1986. In Germany alone the dollar fell from a budgeted rate of 3.73 DM to one dollar to almost 2 DM to one dollar by the end of fiscal year 1986. Although the foreign currency fluctuation account provided relief, a transfer into operations and maintenance of approximately $891 million was still required.

The fiscal year 1986 budget, which granted the Army $75.4 billion-compared to $73.5 billion in the previous year-enabled the Army to continue its progress in correcting decade-old deficiencies and improving force readiness. A comparison of fiscal year 1986 funding and the Army projection in the president's fiscal year 1987 budget is shown in *Table 4.*

TABLE 4 - ARMY BUDGET
($ in millions)

	FY 86	**FY 87**
Military Personnel	27,691	28,193
Retired Pay Accrual	(6,682)	(6,871)
Military Personnel, Army	22,358	22,982
Retired Pay Accrual	(5,468)	(5,918)
National Guard Personnel, Army	3,163	3,077
Retired Pay Accrual	(716)	(575)
Reserve Personnel, Army	2,171	2,134
Retired Pay Accrual	(498)	(378)
Operation and Maintenance	22,436	24,034
Operation & Maintenance, Army	19,009	20,301
Operation & Maintenance, Army National Guard	1,573	1,743
Operation & Maintenance, Army Reserve	742	774
Army Family Housing	1,111	1,212
National Board for the Promotion of Rifle Practice	1	4
Investment	ACTUAL	ESTIMATE
Procurement	17,774	15,998
Aircraft Procurement, Army	3,351	2,780
Missiles Procurement, Army	2,762	2,207
Weapons & Tracked Combat Vehicles Procurement, Army	4,267	3,804
Ammunition Procurement, Army	2,375	2,087
Other Procurement, Army	5,019	5,119
Research, Development, Test, and Evaluation	4,563	4,557
Military Construction	1,928	1,871
Military Construction, Army	1,524	1,263
Military Construction, Army National Guard	97	141
Military Construction, Army Reserve	58	87
Army Family Housing Construction	249	380
Stock Fund	378	110
Stock Fund War Reserve	378	110
Peacetime Stock Fund Inventories	0	0
TOTAL PROGRAM	74,769	74,762

Note: Columns may not add due to rounding.
1 Procurement figures for FY 87 are estimated.

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Special Functions

Civil works is the collective title for a variety of functions assigned to the Chief of Engineers. These functions include the planning, design, construction, operation, and maintenance of facilities, and the management of real estate, all of which are necessary for the development of the nation's water resources and the improvement of rivers, harbors, and waterways for navigation, flood control, hydroelectric power, recreation, fish and wildlife, and related purposes, including shore protection.

Although these functions are distinguishable from military activities, they provide a significant and continuing technical and professional engineer capacity that would be indispensable in the event of a military mobilization. In this connection, the Corps of Engineers in fiscal year 1986 participated in two exercises directed by the joint Chiefs of Staff, PORT CALL 86 and PRESENT ARMS 86. These exercises tested the ability of the Corps' division and district personnel to shift from peacetime to wartime roles. PRESENT ARMS demonstrated the importance of the Corps' resources in supporting the Army and the nation in the event of a catastrophic national emergency.

Legislation

During the year, the Department of the Army worked closely with congressional leaders and staff, and within the Executive Branch, to coordinate comprehensive water resources development legislation that would authorize new civil works projects and specify cost-sharing responsibilities. On 13 November 1985 the House of Representatives passed its $21 billion version of H.R. 6; the Senate approved its $13 billion bill on 26 March 1986. The Administration supported the smaller Senate bill, which provided for 191 projects, because the measure embodied an agreement on cost sharing and user fees

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worked out by Administration and Senate leaders in 1985. In September 1986 the bills were in conference.

Over the past several years, the idea of sharing feasibility study costs with nonfederal project sponsors evolved in response to tight budgets, the Administration's desire to move governmental responsibility from the federal level to the state and local levels and the private sector, and the desire to ensure the success of the studies. The Supplemental Appropriations Act for fiscal year 1985, enacted in August 1985, specified that, in cases where a local sponsor-a state, county, or city government, port authority, regional flood control district or levee board, etc.-could be identified, the sponsor would have to sign an agreement to share costs of the project with the federal government under terms acceptable to the Secretary of the Army. The Army adopted the formulas contained in the Senate version of the pending authorization bill.

The act imposed a deadline of 30 June 1986, after which funds appropriated in the legislation would only be available if an agreement had been signed. Corps of Engineers district offices began negotiating agreements with project sponsors in the fall of 1985, following guidance from the Office of the Chief of Engineers and the Assistant Secretary of the Army for Civil Works. On the final day of June 1986, the Assistant Secretary of the Army for Civil Works signed the last of a series of such agreements, thus ensuring initial construction funding for thirty-three new Corps navigation, flood control, and other water resource projects. Seventeen of the projects for which agreements were signed-mostly those for flood control could proceed to construction as soon as design was complete. Construction was not allowed to begin on the others, however, pending enactment of the authorization bill containing increased user fees and other key provisions.

Total appropriations provided by the fiscal year 1986 Energy and Water Resources Development Appropriations Act were slightly higher than the total provided by the fiscal year 1985 act *(Table 5).* A reduction of 4.3 percent, resulting

from the Gramm-Rudman-Hollings Act, more than offset this increase. The Corps of Engineers applied the Gramm-Rudman-Hollings cuts across the board to studies, projects, and other activities, but the impact on progress in studies and construction was negligible.

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TABLE 5 - ENERGY AND WATER RESOURCES DEVELOPMENT APPROPRIATIONS
($ in millions)

	FY 1985	FY 1986	% Change
General Investigation	183	129	-7
Construction	890	919	+3
Operations and Maintenance	1305	1319	+ 1
Mississippi River and Tributaries	321	315	-2
General Expense	112	107	-4
Flood Control Coastal Emergency	25	25	-
Revolving Fund	-	7	-
Permanent Appropriations	8	8	-
TOTAL	[1] 2799	[2] 2829	+1

1 This total was increased by supplemental appropriations amounting to $95 million.
2 This total was decreased by 4.3% or $121 million in accordance with provisions of the Gramm-Rudman-Hollings Act. An additional $25 million was provided by the Urgent Supplemental Appropriations Act.

Construction

Construction started on several of the new projects contained in the fiscal year 1985 Supplement Appropriations Act after local cooperation agreements were signed. These were primarily flood control projects rather than commercial harbor or navigation lock projects, which required further legislation to increase their ability to generate revenue.

In ongoing construction, work on Lock and Dam 26 of the Mississippi River in Illinois and Missouri progressed at an accelerated rate. By the end of the fiscal year, the project was approximately half finished.

The Corps of Engineers completed twelve major construction projects during the year-more than the number of new construction starts. This situation maintained a recent trend, as the construction portion of the civil works mission continued to decline from its peak in the 1970s.

To support its assigned troop strength of 450,000, the Army National Guard over the past five years has expanded its facilities inventory to 2,956 armories, 918 surface equipment maintenance shops, 100 aviation support facilities, and 271 training sites. In fiscal year 1986 programs to acquire needed facilities continued. These programs include acquisition of storage facilities to safeguard and maintain the increased levels

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of supplies and equipment required by the combat and combat support missions assigned to Army National Guard units; new weapons training ranges to upgrade combat readiness; and maintenance facilities to support new combat equipment and weapons systems entering the Guard inventory. A survey during the year revealed that 1,400 armories are still regarded as inadequate and require replacement or major rehabilitation and expansion.

Operations

For the third consecutive year, Congress appropriated more for the Corps of Engineers to operate and maintain existing civil works projects than to build new ones. As more projects were put into operation, and existing ones aged and required more extensive maintenance, the operations and maintenance portion of the civil works program continued to increase.

During the year the Corps operated and maintained 215 harbors, more than 25,000 miles of channels that formed the inland waterway system, 280 flood control projects, and 72 multipurpose projects that included a major portion of the nation's hydropower facilities. More than 250 million cubic yards of material were dredged, and almost 88 billion kilowatt hours of electricity were generated-the latter representing one-third of the nation's hydroelectric power production. There were over 500 million recreation days of use at the 460 projects with recreation areas, making the Corps second in this category only to the U.S. Forest Service.

Disaster Relief

The Army helps other federal government agencies, as well as local and state authorities and foreign governments, meet human needs in the event of natural disasters and other emergencies. As the focal point for this effort, the Corps of Engineers in fiscal year 1986 expended approximately $25.5 million for disaster preparedness activities and emergency response and recovery operations under its PL 84-99 emergency authority. The Corps responded to flood emergencies; provided emergency support to other agencies and authorities, particularly the Federal Emergency Management Agency; established and maintained emergency operations centers required for command and control of responses to disasters; and managed

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the inspection program for nonfederal flood control projects repaired or eligible for repair under PL 84-99. Preparedness activities in support of these efforts included the development, review, and updating of required response plans; the training of response personnel; the development of and participation in exercises to test plans, personnel, and training; the procurement of supplies and equipment necessary to support response efforts; and the overall management of the disaster response program.

Fiscal year 1986 was a record year for flood damages prevented by both completed Corps projects and emergency operations activities, $26.2 billion and $1.1 billion, respectively. As the year progressed, the Corps responded to flood problems on the island of Puerto Rico in October 1985 and May 1986, across the Midwest from the lower Great Lakes, across the Ohio River Valley and into the Mid-Atlantic states in November 1985 and May to June 1986, and in the Coastal and Central Valley of California to western Oregon in February 1986. The Corps provided technical assistance and flood-fighting equipment and materials to federal, state, and local entities.

Three assistance efforts, the October 1985 flooding in Puerto Rico, record flooding over northern California and western Oregon in February 1986, and temporary flood protection and flood-fighting assistance in the Great Lakes, deserve special mention. In October 1985 a tropical wave that later became Tropical Storm Isabel caused major flooding and extensive landslides in Puerto Rico. Officials estimated deaths at 180, over 5,000 people were forced from their homes, and damage estimates reached $125 million. Responding to this disaster, the Corps sent geotechnical people to assist in the search for survivors in landslide areas, in addition to providing damage assessment teams.

During the period 12-21 February 1986, a series of storms produced record amounts of precipitation over much of northern California and western Oregon. Record high flood stages occurred along many of the rivers. About fifteen lives were lost, and nearly one-half billion dollars in damages occurred. These adverse impacts were much smaller than they could have been, however, due to the operation of Corps-built projects and emergency operations that are estimated to have prevented over $15 million in damages.

Record high water levels in the Great Lakes continued to cause floods. In calendar year 1986, excess precipitation averaged six percent above normal during the first seven months.

The Corps provided $7 million in temporary flood protective works and flood-fighting assistance in those areas that were beyond state and local capabilities. Corps technical assistance and investigations also continued.

In the South and East, the Corps responded to several hurricanes and tropical storms from October 1985 to August 1986. Four hurricanes struck the United States in fiscal year 1986, killing at least 21 people and doing more than $1.03 billion in damage. Hurricane Juan hit Lake Charles, Louisiana, on 29 October 1985, with 85 mile per hour winds, killing 7 and causing over $1 billion in damage. The Hurricane Juan system brought flooding throughout the South and East. Hurricane Kate hit Mexico Beach, Florida, on 21 November 1985, and was downgraded to a tropical storm ten hours later, but not before it had left 4 dead, done over $1 million in damage, and caused the evacuation of 100,000 people in thirteen counties. On 26 June 1986 Hurricane Bonnie hit land between Galveston and Port Arthur, Texas, with 85 mile per hour winds. Four people died and damage was well in excess of $1 million. Hurricane Charlie traveled up the East Coast, crossing the outer banks on 17 August 1986, leaving 6 dead and over $1 million in damage.

Regulatory Activities

As a result of the Corps of Engineers' regulatory authority over construction activities by others in the nation's navigable waterways, there were two significant regulatory cases during the year. In one, the Corps decided to issue a permit to Pyramid Companies of Utica, New York, to place fill in a wetland in conjunction with development of a regional shopping mall in Attleborough, Massachusetts. The Environmental Protection Agency (EPA) exercised its veto authority under section 404(c) of the Clean Water Act and filed suit against Pyramid Companies, with the Corps named as codefendant. That litigation was pending at the end of the fiscal year. As a result of the Attleborough case, the Corps and the EPA found that they disagreed over two major issues: first, what constitutes "practicable alternatives" under the 404(c) guidelines; and second, whether mitigation can be considered when determining whether there are practicable alternatives with "less adverse impact."

Another case resulted in the largest civil penalty ever imposed in a federal wetland case. The U.S. District Court in

Boston imposed a $540,000 penalty on Cumberland Farms, a large dairy store franchise in New England, for unauthorized discharges of fill and excavated material into a large wetland in southeastern Massachusetts. Cumberland Farms' activities included ditching, regrading, and channelizing streams in conjunction with converting wetland to farmland. The decision helped to clarify that the Clean Water Act agricultural exemptions apply only to ongoing agricultural activities, not to converting wetland to farmland. Moreover, the decision put the regulated public on notice that unauthorized discharges may be expensive, and it encouraged the public to seek advance permission.

Reimbursable Support to Other Agencies and Foreign Governments

In fiscal year 1986, the Corps of Engineers provided reimbursable support to several state and local governments, to foreign nations, and-representing 90 percent of the total aid-to twenty-five federal agencies. Over 900 man-years of labor were involved in these endeavors.

Three agencies received three-quarters of this support. The Corps aided the Environmental Protection Agency in its sewage treatment plan construction grants program and its "Superfund" toxic waste management program. The Federal Emergency Management Agency got help with its flood insurance studies, emergency activities, and key worker blast shelter program. A number of civilian and defense-related programs of the Department of Energy received support. Another recipient of significant support was the Voice of America, for its $2 billion worldwide radio transmitter modernization program in the United States, Morocco, Puerto Rico, and Thailand.

During the year, the Corps signed new agreements to conduct grant reviews for the Department of Energy's Institutional

Energy Conservation Program; provide construction management assistance at the National Aeronautics and Space Administration's Langley Research Center; provide design and construction management to the Department of Energy's Savannah River Operations Office; provide technical assistance to Puerto Rico on $400 million of wastewater treatment plant construction; conduct a water conservation study at the Corps' Prado Dam for the Orange County Water District, California; provide design and construction for the National Park Service along the Potomac and Anacostia rivers in Washington, D.C.; provide design and construction management services to the

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Federal Aviation Administration on their $11.7 billion National Airspace System Plan; and design and build an intelligence center for the Drug Enforcement Administration.

By designating the illegal importation of drugs as a threat to national security, the president highlighted their serious menace to U.S. society. The Army continued to increase the extent and vigor of its support to the agencies charged with direct interdiction of narcotics.

Army support to Operation HAT TRICK II, a joint United States and host nation operation to interdict illegal narcotics trafficking through the Caribbean, included air traffic control operators, long-range secure communication support, and deployed helicopters. A command and control network, established to provide secure communications for the U.S. Coast Guard, included terminals at Miami, Florida; San Juan, Puerto Rico; and Guantanamo Bay, Cuba; and aboard two Coast Guard cutters at sea. The Army provided two Black Hawk helicopters with crew and maintenance support to augment existing U.S. Air Force support operating from Nassau and Great Exuma Island in the Bahamas. The Black Hawks transported Drug Enforcement Administration and Bahamian Strike Force Police to arrest traffickers. Army elements flew 115 missions that resulted in the seizure of 3,434 pounds of cocaine, 10,230 pounds of marijuana, 6 aircraft, and 7 vessels, and the apprehension of 17 suspects.

On 16 June and 10 July 1986, respectively, the Attorney General and the Deputy Secretary of Defense signed a joint declaration of the existence of an emergency situation as authorized by Public Law 97-86 (10 United States Code 374), and initiated Operation BLAST FURNACE in Bolivia. In response to a request for assistance from the government of Bolivia to the Department of State, elements of the Department of the Army provided mobility and logistics support to joint Drug Enforcement Administration and Bolivian National Police efforts to counter cocaine processing and drug storage sites in Bolivia. Support elements from the 193d Brigade (Infantry) in Panama deployed six Black Hawk helicopters with crews, maintenance and logistics support, a headquarters element for command and control, a security element, and miscellaneous ground equipment and vehicles to support sustained operations. The U.S. Air Force provided air transportation to Bolivia and re-supply. This operation, designed to disrupt the production and transshipment of cocaine from Bolivia, was very successful and

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also proved the ability of Southern Command units to deploy and sustain extended operations in remote locations.

The Army continued its support of the Multinational Force and Observers (MFO) by providing an infantry battalion task force, a logistical support unit, and staff personnel for peacekeeping duties in the Sinai desert. The MFO was a result of the 1979 Egyptian-Israeli treaty of peace. When it became clear that the United Nations could not provide the peacekeeping force called for in the treaty, the two treaty governments on 3 August 1981 signed a protocol, witnessed by the U.S. Government, establishing the MFO. Charged with observing compliance with certain security provisions of the treaty, the MFO began operating on 25 April 1982. The security provisions provide specific limitations on the number and type of military personnel, armaments, and equipment permitted in each of the four zones established by the treaty in Egypt and Israel.

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Conclusion

Despite reductions in personnel budget accounts required by the Gramm-Rudman-Hollings Act, the Army in 1986 was able to surpass its goals for both recruitment and retention of enlisted personnel. Moreover, the quality of recruits, as indicated by standardized tests, remained high. These achievements were attributable partly to fair and competitive compensation, educational benefits, and cash enlistment bonuses. Whether such good results could be achieved in the face of possible future budget constraints is problematical. The 1986 Department of Defense Appropriations Act prohibition against payment of an enlistment bonus and Army College Fund benefits to the same individual threatened to affect both future enlistments and retention of sufficient skill levels.

As Army leaders stressed at the beginning of the fiscal year, quality of life programs form another important element in attracting and keeping the best personnel. As projected, the Army moved ahead during the year on programs for financial planning assistance and child care. Through a new Army Community Service initiative, soldiers and their families were able to receive debt liquidation counseling. Some other Army Community Service programs, however, suffered from insufficient funding. The outlook was brighter for child care, as Congress funded the improvement or new construction of nineteen child development centers-thirteen more than in the previous year.

The Army met its commitment to alleviate financial hardships incurred in permanent change of station moves, although room for improvement remained in this area. New allowances, helpful especially to junior enlisted families, included increases in household goods weight allowances, and allowances for travel as well as temporary lodging for dependents of enlisted soldiers in the continental United States. These changes will increase payments to individual service members for permanent change of station moves by about fifty percent. Even with this improvement, however, overall reimbursement for service

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members, particularly in the junior enlisted ranks, will be less than that for civilian Army employees in comparable pay grades. Also, there was no increase in payments to unmarried service members who have no dependents.

Commissary construction retained a high priority among quality of life programs, but there was a slight scaling back of planned expenditures in this area. Whereas the Army before the start of fiscal year 1986 intended to spend $124.8 million to replace or renovate nineteen commissaries worldwide, these figures later were reduced to $118.4 million and eighteen respectively.

In a significant shift of emphasis in its safety program, the service moved away from external inspections and toward the teaching of safety skills. This new thrust is part of a five-year plan to reduce accidents to an absolute minimum. While the Army's announced goal of an accident-free record probably is not achievable, the target serves as a spur for commanders to do their utmost to make soldiers conscious of the need for constant attention to safety. The redirection of the safety program indicates the desire of Army leaders to increase efforts in areas that affect both quality of life and readiness.

Among the most important of such areas is health. In line with the Army leadership's emphasis on programs that aid both in attracting and keeping highly qualified people and maintaining readiness, the Army in fiscal year 1986 implemented several new initiatives. With the assignment of each Army family to a primary care physician under the Army Medical Enhancement Program, the service anticipates the elimination of uncertainty among its members as to sources of medical care. The initial clinic under the Primary Medical Care for the Uniformed Services program opened-the first of a projected two dozen or more such facilities. The service also started testing recruits and active duty personnel for evidence of the virus that is believed to cause the acquired immunodeficiency syndrome (AIDS). As

resources permitted, the testing was available also to family members and civilian employees and their family members who are authorized government medical care. These tests, and measures taken to deal with positive test results, reflected the Army's and the Department of Defense's concern for the protection of the health of the nation's military forces. Similarly, the Army's markedly strengthened campaign against smoking demonstrated the leadership's willingness to take strong measures to guard the health of Army personnel.

These various efforts to ensure quality came at a time when the Army faced a continuing ceiling on active military end strength. To remain under this ceiling, the service again relied on substitution of civilians for soldiers, increases in productivity through greater use of technology, and transfer of missions to the reserve components. Rising Army Reserve and Army National Guard enlistments helped to ensure that the reserve components could absorb these additional missions.

Besides complying with legal restrictions on its end strength, the Army faced considerable difficulties in distributing soldiers among important military occupational specialties (MOSs). Resolved to reduce the MOS imbalances as much as possible, the service instituted a test program designed to force reenlistees to designate an alternative skill or, in the case of initial reenlistments, face dismissal from the Army.

This necessarily coercive action potentially conflicted with the aims of the Unit Manning System, which is designed to induce stability and cohesion in Army units. The Army's leadership has predicted that the two elements of the system, COHORT and the U.S. Army Regimental System, when fully implemented, will produce a sense of pride and belonging in the unit. While implementation continued during the year, it was not possible at year's end to evaluate fully the effects of the Unit Manning System, either on its own terms or in conjunction with potentially countervailing factors such as the redistribution of personnel in military occupational specialties.

Results of the Army's ongoing fight against drug abuse were more clearly positive. An aggressive approach to this problem bore fruit, as drug offenses continued to decline significantly. Other discipline indicators were more mixed, suggesting the possibility that more intensive campaigns aimed at other areas of misconduct might be worthwhile.

Combat effectiveness, which unit stability and cohesion enhance, is a product primarily of training. In recent years the leadership has greatly increased its emphasis in the Army on training for the operational level of war. The Army's leaders held high expectations at the beginning of the fiscal year for the impetus that the publication of the revised Field Manual 100-5, *Operations,* would give to this training. The new FM did stimulate considerable professional discussion and promised thereby to advance the Army's training and capabilities in the operational art.

Articulated in FM 100-5, the Army's AirLand Battle doctrine requires especially effective translation into troop training

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and education of higher leaders and commanders if the doctrine is to meet its potential. At the start of the year, the Army looked toward computer-driven simulations to improve training in this vital area. Expectations that these simulations would continue to grow as an effective alternative to the older manual training simulations were met as fielding of the Army Training Battle Simulation System progressed.

Confident that the service's research, development, and acquisition programs were providing the excellent equipment that modern battle demands, the Army's leaders nonetheless acknowledged that problems existed in quality assurance and the pace of modernization. Among major weapons systems, the M1 Abrams tank and the upgraded M1A1 were notable for the success of the product improvement program that assures their quality as they are fielded. The M2 Bradley Infantry Fighting Vehicle, on the other hand, became the subject of a highly publicized controversy over the ability of its armor to protect troops inside the vehicle. An interruption of the testing, but not the fielding, of the Bradley resulted. Two small but potentially very dangerous faults in the design and maintenance of the AH-64 Apache attack helicopter forced the Army twice to ground its Apache fleet and halt deliveries of the aircraft. These incidents marred an

otherwise successful first year of fielding of the Apache, production rates for which showed steady increases. Procurement of the helicopter's primary weapon, the Hellfire antitank missile, ceased during the year because of a production backlog attributable to problems with the missile's guidance circuits. In general, budget cuts threatened to retard the Army's equipment modernization program at a time when adverse publicity about defects and cost overruns in major weapons systems tended to overshadow successes in the procurement of other, less publicized, systems.

Readiness of equipment is one of the essentials for mobilization; personnel readiness is another. The Army's senior leaders emphasized the manpower elements of reserve component readiness in their posture statement for the fiscal year. Events in 1986 reflected this emphasis. Individual Ready Reserve (IRR) strength increased significantly and the Army carried out a congressionally-mandated partial muster of the IRR in order to test personnel mobilization procedures. In the retiree recall program, the service tested mobilization procedures at the installation level through a limited recall of volunteer retirees to active duty. Individual augmentee strength grew by more than ten percent.

There also were improvements in two areas that involve readiness of equipment and installations, in addition to that of personnel. The Army National Guard mobilization exercise program was extended to all guard units, and the Corps of Engineers prepared mobilization master plans for most major installations in the continental United States.

Army officials were concerned, too, about the nation's ability to deploy its military forces effectively. Army support for Navy programs designed to improve strategic sealift was high on the Army's list of efforts to enhance joint deployment capabilities. Despite the Army's continued support of such programs, the decline of the U.S. Merchant Marine fleet, industry containerization trends, and large projected surge shipping requirements still threatened to erode further the nation's ability to meet emergency sealift needs.

Pre-positioning of materiel configured to unit sets (POMCUS) is an important means of reducing the airlift and sealift necessary to ensure the timely presence on the battlefield of fully equipped U.S. Army forces. The Army again demonstrated the value of the POMCUS program during the REFORGER 86 exercise in Europe, as the participating troops drew from POMCUS stocks large numbers of vehicles, only one percent of which were not immediately operational. But as Army leaders pointed out at the beginning of the fiscal year, adequate readiness requires increases in the POMCUS program.

Sustainment was no less a concern than deployment. With a high percentage of the Army's nondivisional maintenance companies assigned to the reserve components, service leaders focused on the Regional Maintenance Training Site (RMTS) program as an important means of ensuring that combat service support units have the qualified soldiers they need. Although a variety of difficulties prevented the expected establishment of two pilot RMTSs in fiscal year 1986, these problems were near solution by year's end. In addition, the Army had added two more pilot sites, for a total of four projected to be operational early in fiscal year 1987.

Army officials also dilated on another important aspect of sustainment, industrial preparedness planning. The Army's efforts in this area, which include the creation of an automated data base for analysis of industrial base issues, continued within the constraints of a limited budget.

Major evolutionary force structure changes, one of the Army's highest priorities, progressed during the year. Converted to the new light infantry configuration in 1985, the 7th In-

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fantry Division (Light) underwent a year-long certification in 1986. The 25th Infantry Division completed its conversion to the new light design during the year, while the 10th Mountain Division (Light Infantry), coping with problems in the availability of facilities, continued to build its combat force structure. The Army activated the 6th Infantry Division (Light) and reactivated the 29th Infantry Division (Light), Army National Guard. Adopting a structure based on the light infantry division force design, the 101st Airborne Division (Air Assault) began its conversion. Among the heavy

divisions, which are being reorganized along Division 86 lines, the 2d and 9th Infantry Divisions completed their conversions to new designs. In sum, these changes represented significant progress toward the achievement of the flexible, effective, and balanced total force structure that the Army requires to ensure its ability to respond successfully to any type of conflict.

Achieving this structure, and equipping as well as providing for the men and women in the force, is a tremendously complex undertaking that places unrelenting demands on the Army's management skills. The Army's methods of dealing with this complexity are many and varied; any appraisal of them in a limited space can only touch on a few of the more prominent ones. In procurement, multiyear contracting received considerable impetus from both within and without the Army. The service's estimated saving for the fiscal year of approximately $773.2 million through the use of multiyear contracts demonstrated the worth of the program. At the same time, reductions in total obligation authority challenged the service's ability to maintain management flexibility in administering the program.

Some resource management approaches seemed to respond particularly well to the Army leadership's call for innovation in meeting the challenges associated with limited funds. The successful Model Installation Program continued to produce money-saving suggestions, and expansion of the program through Army National Guard participation promised even greater economies in the future. Productivity capital investment programs had an excellent return on investment of $17 for every $1 invested. At Fort Ord, California, the leasing of Army land for a mobile home park to alleviate a severe housing shortage for enlisted personnel stood out as an example of management ingenuity that addressed simultaneously the fiscal and human dimensions of Army programs.

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In the critical area of information management, the Army moved closer to its goal of a single, fully interoperable information base. One important facet of progress was the acceleration of the effort to standardize data elements and develop a data encyclopedia that defines them and identifies their proponents, users, and storage locations. Another was the establishment of the Personnel Information Systems Command, which evolved the concept of service centers to develop, process, store, and transmit personnel and personnel-related data.

The U.S. Army in 1986 was a force in transition. Because of the costs of the Vietnam War, the Army a decade later was only about midway through its first truly significant force modernization program since that conflict. Fiscal constraints during the year complicated modernization efforts and strained Army commanders' and managers' abilities to fulfill the expectations of the Army's senior leadership. Determination to weather a situation of comparative austerity for an indeterminate time perhaps best characterized the service by the end of the year.

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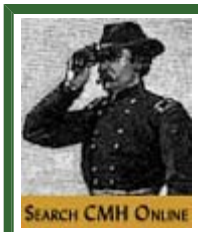

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Appendix A

Tragedy at Gander

On the morning of 12 December 1985, at 0645 local time (0515 EST), Arrow Airlines flight 1285, a DC-8-63 charter carrying 248 passengers and a crew of eight, crashed just after takeoff from Gander International Airport, Gander, Newfoundland. All on board perished. The postcrash fire, fed by the contents of the stricken aircraft's full fuel tanks, took local firefighters nearly four hours to bring under control and approximately thirty hours to completely extinguish. The firefighters were hampered in their efforts because of the rugged terrain, which initially prevented more than one fire truck at a time from being used.

The passengers on the ill-fated charter were U.S. soldiers. All but twelve were members of 101st Airborne Division (Air Assault), most of whom were from the 3d Battalion, 502d Infantry; eleven were from other Forces Command units; and one was a CID agent from the Criminal Investigations Command. They were returning to Fort Campbell, Kentucky, home station of the 101st Airborne Division, after completing a six-month tour of duty in the Sinai with the Multinational Force and Observers (MFO). This international peacekeeping organization, made up of contingents from ten nations, had been established under terms of a protocol between Egypt and Israel signed on 3 August 1981. The MFO has had the mission of implementing security provisions contained in the 1979 Israeli-Egyptian peace treaty.

Perhaps no other event in its peacetime history has so wrenched the soul and torn at the heart of the U.S. Army as the Gander tragedy, which ranked as the worst military air disaster in the nation's history. But in spite of its grief, the Army moved quickly in responding to the tragedy.

Organizing to Meet Disaster

Approximately two hours after the crash, at 0730 EST, Maj. Gen. William G. Moore, Director of Operations Readiness and Mobilization, Office of the Deputy Chief of Staff for Oper-

ations and Plans, activated a Crisis Response Cell within the Army Operations Center at the Pentagon. Operating around the clock during the nine-day period following the crash, the Crisis Response Cell functioned as the Army's nerve center for all activities associated with the tragedy, which included dispatching an Army team to Gander to assist the Canadians in recovery operations; sending a coordination team to the Air Force Port Mortuary at Dover Air Force Base, Delaware, where the remains would be transferred for identification and preparation for burial; coordinating Military Airlift Command flights to transport the remains from Gander to Dover; reconstituting medical and dental records to assist in the identification process; notifying the next of kin; and planning for the memorial services honoring the dead held at Gander, Dover, and Fort Campbell. Numerous other services were held at Army posts at home and abroad.

The HQDA Crisis Response Cell included representatives from the Office of the Deputy Chief of Staff for Operations and Plans (ODCSOPS), Office of the Deputy Chief of Staff for Personnel (ODCSPER), Office of the Deputy Chief of Staff for Logistics (ODCSLOG), Office of the Surgeon General, Office of the Chief of Public Affairs (OCPA), and other Army staff agencies as needed. Because the personnel issues associated with the crash were of such critical importance, ODCSPER formed a Personnel Contingency Cell in the Army Operations Center to support the Crisis Response Cell. Initially the Personnel Contingency Cell focused its attention on providing assistance to the Casualty and Memorial Affairs Operations Center in notifying the victims' next of kin and supporting the identification effort, a major element of which was reconstituting the victims' medical and dental records which were not salvaged from the wreckage of the downed flight. Subsequently, the cell turned its efforts towards appointing and training casualty assistance officers, reviewing procedures for preparation of replacements for overseas movement, and assisting the families of crash victims.

Shortly after he received notice of the tragedy, Gen. Maxwell R. Thurman, Army Vice Chief of Staff, directed Maj. Gen.

John S. Crosby, Assistant Deputy Chief of Staff for Personnel, to lead an Army team to the crash site. The mission of the Gander Response Team was to assist the Royal Canadian Mounted Police (RCMP) in search and recovery operations and to arrange for shipment of the remains of the Army's dead to the United States.

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Major General Crosby and his ten-member team, which included Dr. Robert R. McMeekin (Col., USA), Director of the Armed Forces Institute of Pathology (AFIP), two of his pathologists and a forensic photographer, as well as representatives from ODCSPER, OCPA, Office of the Chief of Legislative Liaison, Office of the Chief of Chaplains (OCCH), and the U.S. Army Military Personnel Center (MILPERCEN), arrived at Gander at about 1500 (local time) or approximately eight hours after the crash. Late on the evening of 12 December, seventeen graves registration specialists from Fort Lee, Virginia (twelve soldiers from the 16th Field Service Company's graves registration platoon and five senior NCOs assigned to the Quartermaster School), joined the team. A second forensic photographer from the Armed Forces Institute of Pathology arrived the following day. The Gander Response Team could also count on logistical and communications support from some forty-five sailors assigned to the United States Naval Station at Argentia, which was about 200 miles from Gander, and a smaller contingent of U.S. Navy personnel with the 770 Communications Research Division stationed at the Canadian Forces Base in Gander. U.S. Navy personnel at Gander, the first Americans at the crash site, assisted airport officials in maintaining security at the site until relieved by the RCMP.

The presence of a general officer at Gander; the professionalism and dedication of the AFIP's Colonel McMeekin, which had a most salutary effect on Canadian medical officials; and the effective support of Mr. George Seidlein, who represented the National Transportation Safety Board at the crash site, were key ingredients in the quick establishment of rapport with Canadian authorities, and the early decision to release the remains of the crash victims and to transfer them to the Air Force Port Mortuary at Dover Air Force Base. A Memorandum of Understanding was signed on 14 December by representatives of the Canadian Aviation Safety Board, the Department of Justice for the Province of Newfoundland, the Royal Canadian Mounted Police, the United States National Transportation Safety Board, and the United States Department of Defense as the executive agent for the MFO. The memorandum authorized the transfer of all remains to Dover, where the Armed Forces Institute of Pathology would perform pathological examinations and take toxicological specimens "under the control and supervision of the Canadian Aviation Safety Board."

The transfer of remains began on 16 December and was completed two days later. Redeployment of the Gander Re-

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sponse Team got underway on 18 December and was finished on 21 December.

The advance party of a second Gander Response Team arrived at the crash site on 16 January 1986 (the main party arrived two days later), following a decision by U.S. and Canadian authorities to renew search operations because Canadian representatives and doctors and U.S. pathologists at Dover determined that at least two bodies had not been recovered. Headed again by Major General Crosby, the new task force had the expanded mission of working closely with the RCMP in conducting a thorough search of the crash scene to recover human remains, personal effects, and military equipment that the initial search and recovery operation may have overlooked. The composition of the second Gander Response Team is indicated in *Chart 1.*

To reduce the potential for misunderstanding between the RCMP, which remained in charge of the crash site, and the Army graves registration teams working the site, Major General Crosby required that each soldier be briefed on the Army's mission and the exact relationship between U.S. And Canadian agencies at the crash site. Also, a distinct chain of command, including designated personnel at all levels to coordinate requirements with the Canadians, was maintained.

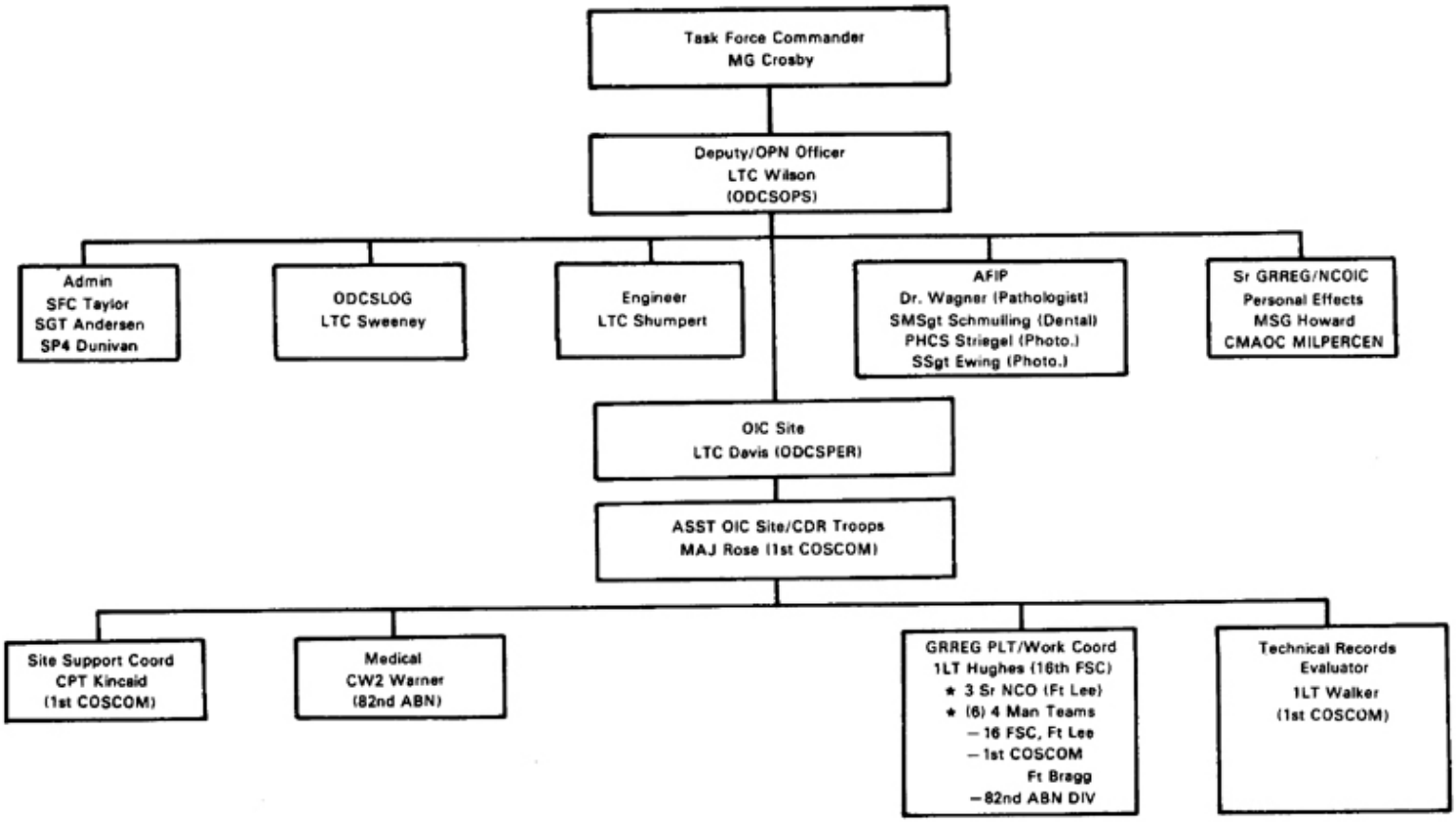
The second search effort began on 11 January and was completed successfully and ahead of schedule on 3 February. The task force returned to the U.S. on 6 February.

On 13 December HQDA formed another ad hoc organization to coordinate all U.S. Army activities at Dover Air Force Base. Headed by Brig. Gen. Claude E. Fernandez, Jr., Director of Manpower, Programs and Budget, ODCSPER, the

seven-member Dover Coordination Team was in place on the morning of 14 December. It included representatives from ODCSOPS, OCCH, and OCPA. The ODCSPER representative arrived in the late evening of 13 December and assumed responsibility for coordinating HQDA actions from the 123-member honor guard dispatched by the 101st Airborne Division, which had arrived at Dover earlier in the day.

The Army expanded the Dover Coordination Team on 15 December by adding one more representative each from ODCSPER, ODCSLOG, and ODCSOPS, as well as four administrative personnel to provide around-the-clock services until all remains had been transported to Dover. Two protocol representatives, one from the Army staff and one from the Military District of Washington, also arrived at Dover on 15 De-

CHART 1 - GANDER RESPONSE TEAM



cember to plan the arrival ceremony honoring the first remains from Gander on 16 December.

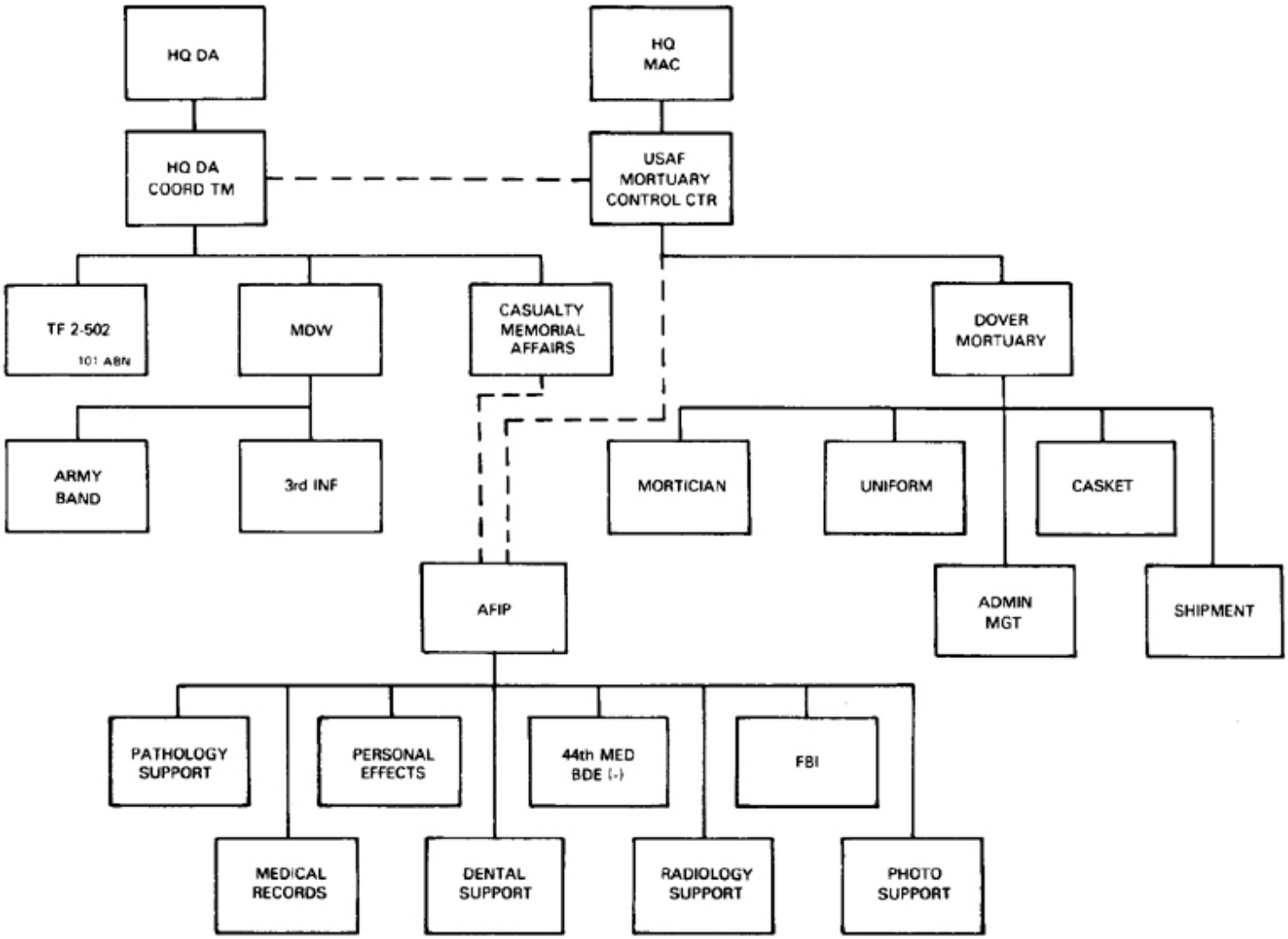
After completing arrangements for the 16 December ceremony, related tasks included providing on-site public affairs coverage, making arrangements for family members of the deceased who attended the ceremony, and making protocol arrangements for the large number of dignitaries who attended the event. The Dover Coordination Team largely accomplished its task when it provided the required personnel and materiel support for the AFIP's Dover operations. The original contingent returned to the Washington, D.C., area on 22 and 23 December, leaving a small, four-member cell to provide logistics and personnel support for the continuing identification effort and the shipment of remains for burial.

The USAF Mortuary Control Center at Dover, a sixteen-member group headed by Col. John J. Maloney, Director of Housing and Services for Headquarters, Military Airlift Command (MAC), was activated in accordance with local plans for handling mass casualty situations as contained in the 436th Airlift Wing Mass Casualty Plan. The Mortuary Control

Center issued daily situation reports on the status of mortuary operations and assisted the AFIP in coordinating mortuary activities, obtaining expendable supplies and other base support, and controlling the pool of volunteers who assisted at the mortuary. During the initial phase of operations at Dover, there was some overlap in responsibilities between the control center and the Army's coordination team which caused confusion, particularly with regards to equipment and supply matters. To reduce such interservice control problems in the future, the Dover AFB commander later recommended that visiting contingents from other services and agencies receive briefings on the mass casualty plan and be advised on their requirements to augment local resources; that special requests and requirements be coordinated with Dover AFB action offices and approved by the Director of the Mortuary Control Center-in his role as the Wing Project Officer, and that command and control responsibilities - be vested in the Wing Project Officer/Director of the Mortuary Control Center, alone. *Chart 2* shows the organization of the Dover operations.

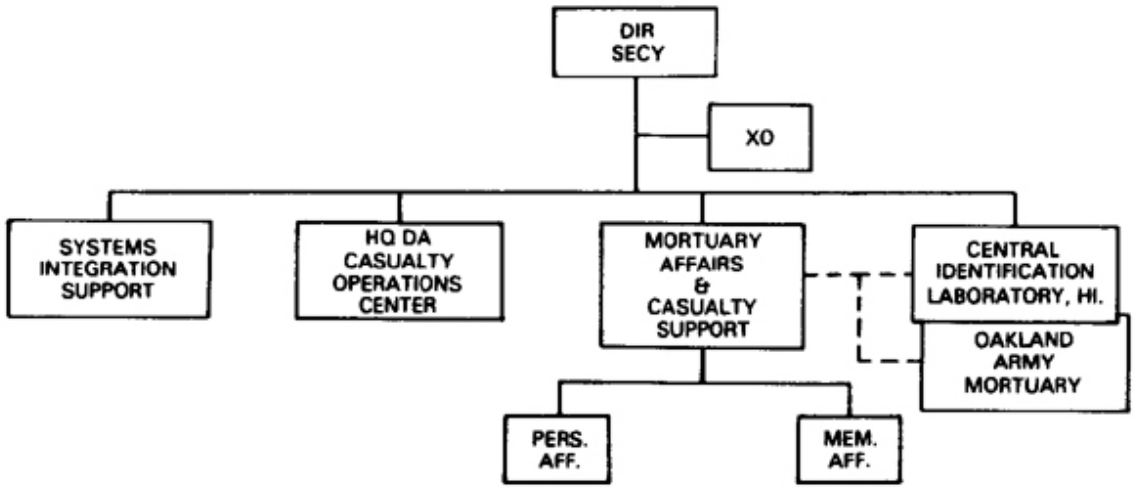
The Casualty and Memorial Affairs Operations Center (CMAOC) at the U.S. Army Military Personnel Center in Alexandria, Virginia, expanded by augmentees from other offices with MILPERCEN, operated on a 24-hour basis during the initial period following the Gander disaster. Its primary responsi-

CHART 2 - DOVER ORGANIZATION CHART



bilities were to notify the next of kin, to provide family assistance, and to perform casualty support actions such as documentation for pay and benefits, awards and decorations, posthumous promotions and reconstitution of personnel and medical records that had been lost in the crash and that were needed to help AFIP personnel at the Dover mortuary identify the remains of the crash victims. The organization and physical layout of the CMAOC are shown in *Charts 3* and *4.*

CHART 3 - CASUALTY AND MEMORIAL AFFAIRS OPERATIONS CENTER ORGANIZATION



The CMAOC worked closely with the thirty-three Casualty Area Commands in the continental United States to insure that the next of kin received notification in person of the tragedy and to select Casualty Assistance Officers (CAOs). These officers were responsible for assuring that the crash victim's next of kin received all appropriate services and entitlements. To assist the CAOs, CMAOC established and manned a telephone hotline which CAOs could call for information on financial matters, housing, transportation, and other issues related to the needs of the victims' families. The CMAOC also helped to arrange three training sessions for the 284 CAOs appointed for the Gander tragedy. One training session was held at Fort Campbell on 17 December, and the remaining two were taught at Fort Belvoir, Virginia, on 18 and 19 December.

One of the most effective ad hoc organizations formed to meet the human needs posed by the Gander disaster was the Family Support Center at Fort Campbell, Kentucky. The fami-

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lies of some sixty-nine of the crash victims either lived on post or close by, and Fort Campbell, despite being hard pressed, met their needs. Shorty after 0700 (CST) the post received news of the tragedy. Immediately, the Chief of Staff of the 101st Airborne Division called together representatives from all staff agencies, major unit commands and separate battalions to coordinate Fort Campbell's response to the tragedy. Without delay, the Public Affairs Office opened a Press Center and held the first press briefing at 0800. The Adjutant General's Office organized personnel and materiel resources to form a Family Support Center where family members could come for information, consolation, and support. By noon on the day of the tragedy the center was fully operational in a centrally located, dedicated facility which contained a large, open work area, adjoining private rooms, rest rooms, an equipped kitchen, cable TV, multiple phone lines, and controlled access.

Within the Family Support Center, family members of the crash victims who resided in the Fort Campbell area could find the assistance they needed to file for benefits, arrange quarters turn-in or extension, obtain transportation, arrange for disposition of remains, seek grief counseling, and apply for loans or grants. Staffing came from local resources. Other Army and civilian agencies represented included Army Community Service, the Social Security Administration, the Veterans Administration, the American Red Cross, Army Emergency Relief, and Army Mutual Aid.

Fort Campbell established a separate center to support families visiting the installation for the post memorial service honoring the victims of the Gander crash, which was held on 20 December. Services provided at this time included transportation, lodging and meals, and filing and payment of vouchers for travel done under invitational travel orders.

Recovery Operations

The RCMP conducted initial recovery operations at the crash site. In organizing their search, the Mounties mapped out the crash site into an area 350 meters long by 50 meters wide. Within the charted area, they staked out 10-by-10 and 10-by-30 meter grids, which were numbered. This permitted the labeling of remains, wreckage parts, and other items removed by grid number and greatly aided the identification process.

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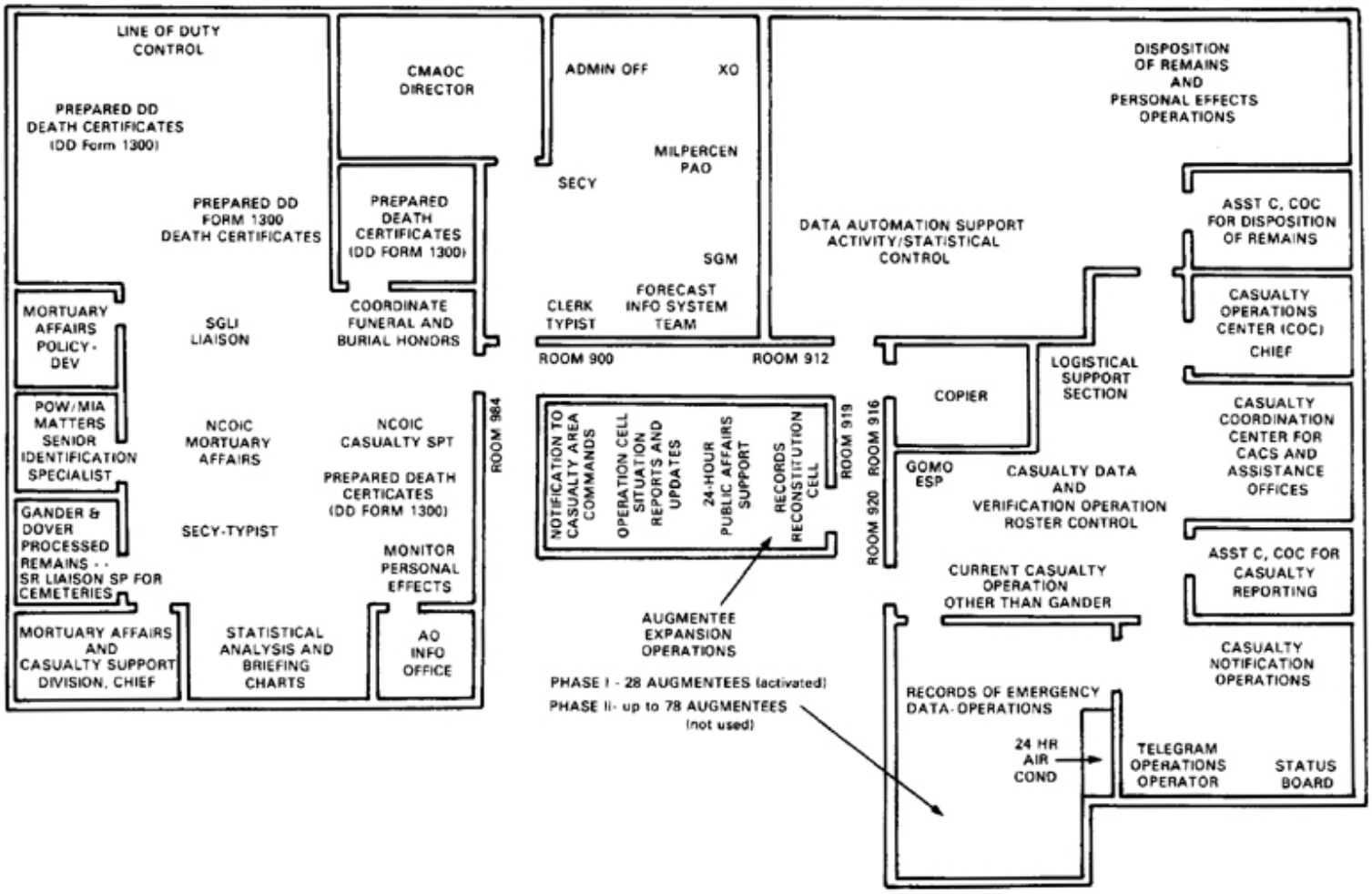
CHART 4 - CASUALTY AND MEMORIAL AFFAIRS OPERATIONS CENTER FLOOR PLAN



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After one day of recovery operations, workers had discovered about 125 bodies and moved 100 dead to a hangar at Gander International Airport, pressed into service as a temporary morgue. On 15 December the RCMP announced that all remains were believed to have been moved from the crash site and that they would conduct a final sweep of the site to certify that everything had been uncovered. A six-inch snow which blanketed the crash site area hampered the final search. Although the Mounties still thought that they had recovered all remains, Major General Crosby, the senior U.S. Army representative at Gander, and Canadian officials agreed on 18 December not to close the crash site until Canadian representatives and U.S. Pathologists at the Dover mortuary jointly agreed that an adequate inventory of remains to complete the identification process had been retrieved.

U.S. support during the initial stage of recovery operations was minimal. The RCMP performed all recovery work and did

not permit the graves registration personnel sent to Gander on 12 December on the crash site. Following the signing of the U.S. Canadian Memorandum of Understanding on 14 December, graves registration personnel assisted the RCMP by tagging and inventorying all remains, placing the remains in body pouches and transfer cases, and helping to process personal effects and military equipment, all under the strict supervision of the Mounties. The AFIP personnel on the Gander Response Team, in addition to advising Canadian and U.S. Army officials and assisting in developing the Memorandum of Understanding, visited the crash site to examine and photograph the wreckage, and document ground gouges, tree strikes, and burn patterns.

By 22 December all autopsies of the collected remains had been completed. A review of autopsies and the large number of unidentified remains on hand convinced Canadian and U.S. Pathologists at the Dover mortuary that at least two bodies had not been recovered. Planning began immediately to reopen search and recovery operations, and on 28 December a survey team headed by Major General Crosby, as mentioned, arrived at Gander to discuss with Canadian Aviation Safety Board and Royal Canadian Mounted Police officials the feasibility of resuming search operations.

These discussions centered on four alternative courses of action. The first was to conduct a search of the site immediately. A civilian contractor would remove debris, divert a stream running through the crash site, and build structures to melt

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the snow off each grid., Army graves registration personnel would then conduct a detailed sift and search of each grid with the aid of the RCMP. The second alternative involved the same kind of search as in alternative one, but would defer it until after the spring thaw, thereby requiring less contractor support. Alternative three provided for a walk-through search immediately, while alternative four called for the immediate closing of the crash site without any further search and recovery operations.

The RCMP preferred alternative two, which had the advantage of reducing the possibility of damage to remains that the construction needed to implement alternative one might incur. Moreover, better weather in the spring would enable searchers to work faster and provide better results. But the disadvantages of this approach-the perception that the Army was not taking timely action to alleviate the anguish of family members, and the likelihood of congressional and media pressure-proved compelling, and the Canadians agreed to an early and extensive search (alternative one), which would begin early in January.

The second search and recovery effort at Gander was carried out primarily by 5 four-man teams composed of Army graves registration specialists from Forts Lee and Bragg, who arrived at Gander on 8 January 1986. A sixth four-man team joined the effort on 20 January. A Mountie supervised each team and was responsible for recording what the team recovered.

Before the search commenced, a civilian contractor started constructing shelters of wood and plastic over the 350-by-50meter site. The standard 10-by-10-meter size of the shelters sometimes varied due to terrain configuration. Four to five 150,000 BTU propane jet heaters within the shelters melted the accumulated snow and ice. By 11 January the first shelter was ready for search. Three days later all five teams were hard at work. The addition of the sixth team on 20 January did not increase the number of specialists working the site at any one time, but did permit a rotation policy whereby each team received a day's rest after four days of work.

As each shelter became ready for searching, a graves registration team divided the enclosed area into one-meter-wide lanes, with one specialist working each lane. The specialist conducted the search on his or her hands and knees, using brick mason trowels and garden tools to sift through the soil and ash.

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Unusually warm weather enabled the graves registration teams to complete their arduous search of the crash site in only twenty-six days, less than one-half the time (sixty days) the operation was expected to take. Their efforts proved successful. Two complete remains, over 300 anatomical portions, approximately 100 health records, four and one-half tons of personal effects and unit equipment, and a hangar full of aircraft parts were uncovered during the second recovery mission, which was completed on 8 February.

Following the conclusion of the second Gander search and recovery mission, the Royal Canadian Mounted Police maintained security at the crash site until mid-May, when grading of the site was done, the site closed, and restoration of the site begun. During the four-day grading operation, which was completed on 15 May, small pieces of aircraft, fragments of personal effects, and four pieces of bone from a human skull were recovered. Master Sergeant Douglas L. Howard, who received the Meritorious Service Medal for his contributions to the Gander operations as Senior Operations NCO and Graves Registration Specialist, and who represented the Army at the official closing of the crash site, returned the personal items to summary court officials at Fort Campbell and forwarded the skull fragments to the port mortuary at Dover Air Force Base. In his trip report, Sergeant Howard observed that additional crash-related items might appear in the future as the soil percolated, but that additional searching was not justified as "all that is possible to recover has been recovered."

Identifying the Remains

At the Dover Air Force Base Port Mortuary, AFIP was responsible for the identification of the human remains, pathology, and autopsy examination, while the Air Force performed organic mortuary tasks (such as embalming, uniform preparation, and casketing), provided administrative support, and prepared daily situation reports. The U.S. Army Escort Detachment at Dover handled arrangements for escorts and the shipment of caskets to the bereaved families.

The identification process was performing according to the format shown in Chart 5. As each transfer case was brought into the mortuary it was weighed, placed on a gurney, and tags with corresponding reference numbers were attached to the transfer case, body bag, and remains. A volunteer with a packet of blank medical forms then accompanied the remains

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through the processing stations, assuring that postmortem medical and dental records stayed with the remains and that the remains were not misplaced or neglected. The remains and personal effects were photographed and the latter were transferred to another area for processing. Next, the remains were fingerprinted by an FBI team, given medical x-rays, surgical jaw resections, dental x-rays, and dental postmortem examinations. Finally, an autopsy was performed and a toxicology determination made.

Following the autopsy, a thorough examination of the ante-mortem and postmortem records was made. If there was sufficient evidence to establish a positive identification, the remains were embalmed, casketed, and prepared for shipment. Unidentified remains or incomplete remains were returned to refrigerated semi-trailers for additional processing.

The loss of personal health records (medical and dental), which most of the crash victims carried with them on the flight, severely hampered the identification process. Searchers recovered about 200 health record documents associated with 142 of the victims at the crash site. Another 16 medical records and 26 dental records were at Fort Campbell and the Sinai. An extensive effort to reconstitute the health records destroyed in the crash began on the day of the tragedy. Army medical and dental activities around the world searched their files to locate information on the Gander victims. By the end of the year medical records on 241 of the 248 Army casualties and dental records on 113 of the victims were available at Dover to aid the identification process. By the end of the identification process, the Army had established medical records for all the soldiers lost in the crash and dental records for 80 percent of them.

The Army also sought the help of the families of the victims in providing information to help identify the remains. Initially, casualty assistance officers requested permission from about 150 of the families to contact civilian doctors and dentists who had previously treated servicemembers who had died at Gander. Then, as the need for more detailed information arose, the casualty assistance officers returned to the families for additional information. This approach, although it extended the anguish of the families, was essential to complete an accurate identification process. Going to the families earlier would have aided the identification process. Information obtained included civilian dental records, medical records and x-rays, personal documents from which to lift latent fingerprints,

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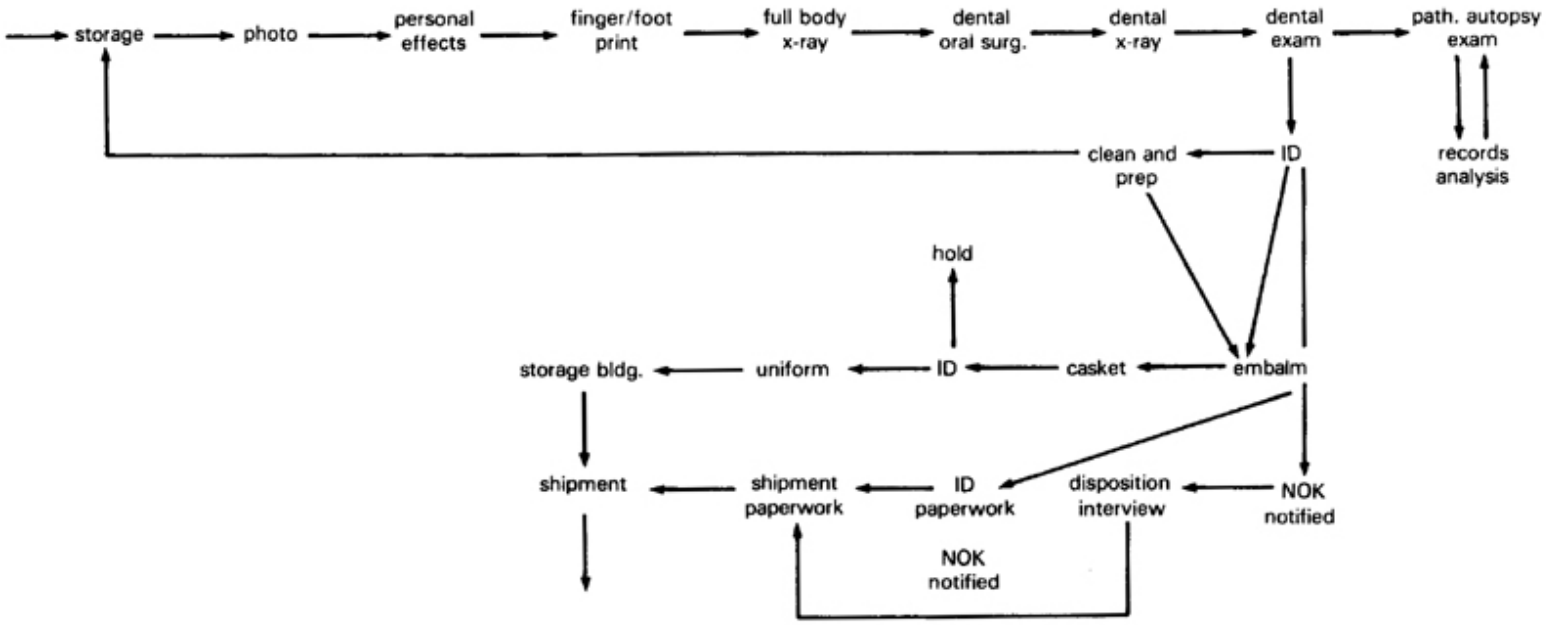
CHART 5 - PROCESSING REMAINS, DOVER MORTUARY



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birth certificates-which were used to obtain footprints, records of tattoos, distinctive jewelry, records of circumcision, and photographs-especially those showing teeth.

The success in reconstructing medical and dental records, the use of fingerprints obtained from the Federal Bureau of Investigation, the Department of State, and Army sources, the results obtained from the second Gander search and recovery operation, and additional evidence provided by grief-stricken family members gave the AFIP pathologists at Dover the ante-mortem data they required to make positive identifications of all the crash victims. They completed this task on 22 February.

They based the vast majority of the identifications (226) on fingerprint and dental comparisons. Combinations of association of personal effects, anthropologic, medical, radiographic, and dental comparisons, and facial reconstruction drawings identified twenty-two more crash victims. The eight remaining bodies, which lacked any type of identification, presented a special problem.

Working groups in the identification areas of oral pathology, anthropology, graves registration (personal effects), mortuary affairs, pathology, radiology, photography, facial reconstruction, and fingerprints (FBI disaster squad), supported by working groups in automated data processing (FORECAST System) and medical records/repository (library), formed to sort and process the material returned to Dover as a result of the second Gander mission, zeroed in on the eight unresolved cases. Each of the groups studied the postmortem data collected on the eight unidentified remains, including supplemental information supplied by co-workers and family members, all of which had been entered into the FORECAST microcomputer data base. Representatives from each group met as a cross functional identification team and developed an Exclusion Matrix that was used successfully to identify the last eight remains. The matrix incorporated medical, dental, and radiographic exclusions and exclusions based on anthropological data, such as race, age, height, and build.

Once the identification process for one set of remains was completed, embalming, casketing, and administrative paperwork were accomplished, and the primary next of kin (PNOK) was notified so that burial arrangements could be made. The Dover mortuary's administrative section began the notification chain by informing the Casualty and Memorial Affairs Operations Center that a set of remains had been positively identified and were ready for burial. The CMAOC phoned the infor-

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mation to the appropriate Casualty Area Command, which in turn directed the Survival Assistance Officer to notify the PNOK and to obtain disposition instructions. The Survival Assistance Officer (SAO) relayed these back to the CMAOC, which confirmed the information and passed it on the the U.S. Army Escort Detachment at Dover. That unit coordinated all the arrangements for military escorts and the shipment of remains to the burial site designated by the PNOK.

Generally, the disposition of remains went smoothly, although there were problems. In one instance the failure to confirm a social security number resulted in an SAO notifying a family that their son had been identified, when, in fact, the deceased was another soldier with the same last name. A more vexing problem was the fact that sixty-two of the crash victims had parents who were divorced, were themselves divorced, or had fathered children out of wedlock. These personal situations created difficulties in determining exactly who was the PNOK and therefore authorized to give disposition instructions. The SAOs sometimes found themselves in the role of detective-tracking down divorce decrees, obtaining statements to support "loco parentis" and to substantiate relationships of children born out of wedlock, obtaining ages of divorced parents, and determining whether divorced fathers had abandoned the support of their families. Determining the PNOK in these situations would have been a much more serious problem but for the delay in identifying the remains, which gave the SAOs time to investigate these personal labyrinths.

The transfer of remains from Dover to destinations designated by the PNOK began on 26 December, when 27 caskets were shipped. A total of 85 remains were shipped in December, 54 in January, 101 in February, and 8 through 8 March, when the last remains with accompanying escort left Dover.

Concurrent with the processing and identification of remains, Army graves registration personnel, primarily from Forts Bragg and Lee, and later supported by additional graves registration and logistics personnel from Forts Carson, Hood, and Ord, conducted the often tedious and repetitious task of processing the personal effects and property recovered from the crash site. They documented all military items, such as radios and weapons, on DA Form 54, Record of Personal Effects Outside Combat Area, and relayed the information to the logistics office at Fort Campbell for property accountability. They subsequently shipped these items to Fort Campbell. The DA Form 54s were also prepared for personal effect items. All

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associated personal effects were packaged in boxes labeled with the individual's name, while unassociated effects were packaged separately. Graves registration personnel labeled all the boxes according to content, sealed them, and shipped them to Fort Campbell, where they were signed over to summary court officers, who would arrange for their final disposition. Personal effects damaged by jet fuel, fire, or body fluids were recorded on Certificates of Destruction and destroyed. Shipment of the last boxes of personal effects on 28 February 1986 concluded the graves registration mission at Dover.

The labor-intensive and time-consuming manual effort required to prepare the case files, documentation, logs, and accountability records in paper copy seriously hampered the personal effects processing operation at Dover. Also, the verbal reasoning and clerical skills required to perform the administrative portion of the mission sometimes overtaxed graves registration specialists whose technical knowledge and training focused on handling human remains.

Survivor Support Activities

Army support for the survivors of the Gander crash victims emanated from several centers-Headquarters, Department of the Army; the U.S. Army Military Personnel Center; the U.S. Army Community and Family Support Center; Fort Campbell's Family Assistance Center; and the Casualty Area Commands, where the assistance officers assigned to each family were located.

At Headquarters, Department of the Army level, family matters were of particular concern to ODCSPER's Human Relations Directorate, which had a two-member representation in the Army Operations Center's Personnel Contingency Cell, and to ODCSPER's two field operating agencies located a short distance away from the Pentagon in Alexandria, Virginia, the U.S. Army Military Personnel Center and the U.S. Army Community and Family Support Center. Family support initiatives at this level concentrated on recommending changes in laws and regulations to meet family needs and expediting services and benefits that otherwise might be delayed by bureaucratic red tape. Congress changed laws to

increase Servicemen Group Life Insurance benefits from $35,000 to $50,000 (retroactive to 12 December so that the crash victims were covered); to permit families residing in military quarters to remain there for ninety days; and to grant a ninety-day quarters allowance to

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families who were not living in military housing. Government funded travel was authorized for family members who wished to attend memorial services at Fort Campbell on 20 December, and for travel to burial sites. Also, family members attending schools on military posts were allowed to continue their studies until the end of the school year, all pay and allowance settlements were expedited, and awards and decorations due each soldier were developed into special "shadow boxes" for presentation to the next of kin.

At the local level, the efforts of Family Service and Assistance Officers/Survivor Assistance Officers (FSAOs/SAOs) and the staff servicing the Fort Campbell Family Assistance Center who worked directly with the bereaved families complemented policy decisions made in Washington to ease the burden of crash victims' survivors.

The Family Service and Assistance Officer was responsible for personally notifying the next of kin of the crash and keeping the person informed of developments at Gander. Once the Army confirmed that the family member was aboard the ill-fated flight, the FSAO became the Survival Assistance Officer (Casualty Assistance Officer). The SAO or CAO took on the responsibility for assisting the next of kin in obtaining the benefits and services they were entitled to, both from the Army and from civilian agencies. In an exceptional move, Legal Assistance Officers were appointed to provide appropriate legal advice to the primary next of kin and to the SAO.

In addition to their responsibilities toward the families of the crash victims, SAOs served as the intermediary between the Army and the families in obtaining the information needed from the latter for identifying the remains at Dover.

The inconvenience to the next of kin in applying for benefits at a number of civilian and military agencies, which might well be located at widely dispersed points, even with the help of their SAO, was greatly alleviated at Fort Campbell, where the Family Assistance Center provided a single source of expertise and assistance. There the next of kin could file for all benefits, arrange quarters turn-in or extension, transportation, loans or grants, obtain grief counselling, and arrange for disposition of remains. Fort Campbell's quick and effective response in meeting the human needs resulting from the Gander tragedy was the fruition of actions begun in 1984 with the establishment of a Casualty Working Group to coordinate installation and community activities associated with casualty reporting and related matters. Fort Campbell's action was part of an

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Army-wide effort to revamp casualty and memorial affairs activities in light of the Grenada experience and the bombings of the American Embassy and Marine barracks in Lebanon.

Investigating the Crash

The Canadian Aviation Safety Board's (CASB) extensive investigation of the crash of Arrow flight 1285 is not expected to be completed until early 1987. Preliminary findings indicate that the crash was likely caused by the unfortunate confluence of a number of factors, no one of which would have been sufficient to bring the plane down. These included icing on the wings, mechanical problems, and crew fatigue. Overweight conditions in the passenger compartment due to the large amount of carry-on luggage also might have been a factor. Passenger and carryon luggage weight was not determined prior to take-off at Cairo, but the Arrow flight crew had estimated that the average weight per passenger, including carryon luggage, was 170 pounds. The CASB calculations indicated that the average weight per passenger with carryon luggage was at least 220 pounds.

The implications for safety of the wide variance between estimated and actual passenger weights led the National Transportation Safety Board (NTSB) to recommend, in February 1986, that the Department of Defense

develop a standard procedure and form for determining and documenting the actual weights of passengers, baggage, and cargo for the purpose of recording and conveying such weights to the flight-crews of commercial contract carriers of military personnel.

Prompted by the NTSB recommendation, the Military Airlift Command issued interim weight criteria guidance for charter flights. A "DOD Passenger Airline Policies and Procedures Review" issued in April 1986 confirmed the MAC action and proposed strong corrective measures for charter procedures employed by DOD, improved communications between DOD and agencies responsible for aviation safety, and additional resources for the Federal Aviation Administration so that it could carry out more effectively its oversight of air carriers.

Summary

The Army's response to the Gander tragedy and the loss of 248 of its own was characterized by a firm resolve to honor

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fallen comrades and to minister to the needs of their bereaved families. In both respects the Army, aided by the willing support of its sister services, succeeded remarkably well. Of particular note was the effectiveness of the first Gander mission in establishing good rapport with Canadian authorities, thus assuring the early return of remains to U.S. soil and laying the groundwork for a successful return to Gander to complete recovery operations; the accomplishment of the Armed Forces Institute of Pathology team at the Dover mortuary in identifying all the remains; the dedication of graves registration personnel at both Gander and Dover, who worked under conditions that were often trying and frustrating; the ability of the Casualty and Memorial Affairs Operations Center in handling the Campbell Family Support Center in meeting the needs of the victim's families; and the diligence, professionalism, and compassion exhibited by the Casualty Assistance Officers.

Of course, there were problems as well. Deficiencies in personnel for overseas replacement procedures resulted in the loss of health records, which were carried on the ill-fated flight contrary to Army regulations. The records had to be reconstituted, causing a delay in the identification process and additional anguish among the families of the deceased, some of whom were repeatedly called upon for information to aid in the identification effort. Inaccuracies in the Emergency Data Forms of the victims resulted in delays in notifying the next of kin and in other problems. Incompatible automated data processing systems delayed the timely transmission of data needed to support the identification process.

But in spite of these and other problems, the Army met the Gander tragedy with extraordinary caring and sensitivity. The words of former Army Chief of Staff George C. Marshall seem appropriate:

There is no more effective way of creating better enemies for the Army than by failing to do everything we can possibly do at a time of bereavement. Nor is there a more effective way of making friends for the Army than by showing we are personally interested in every fatality which occurs.

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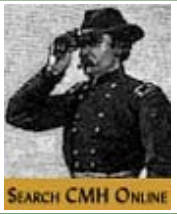

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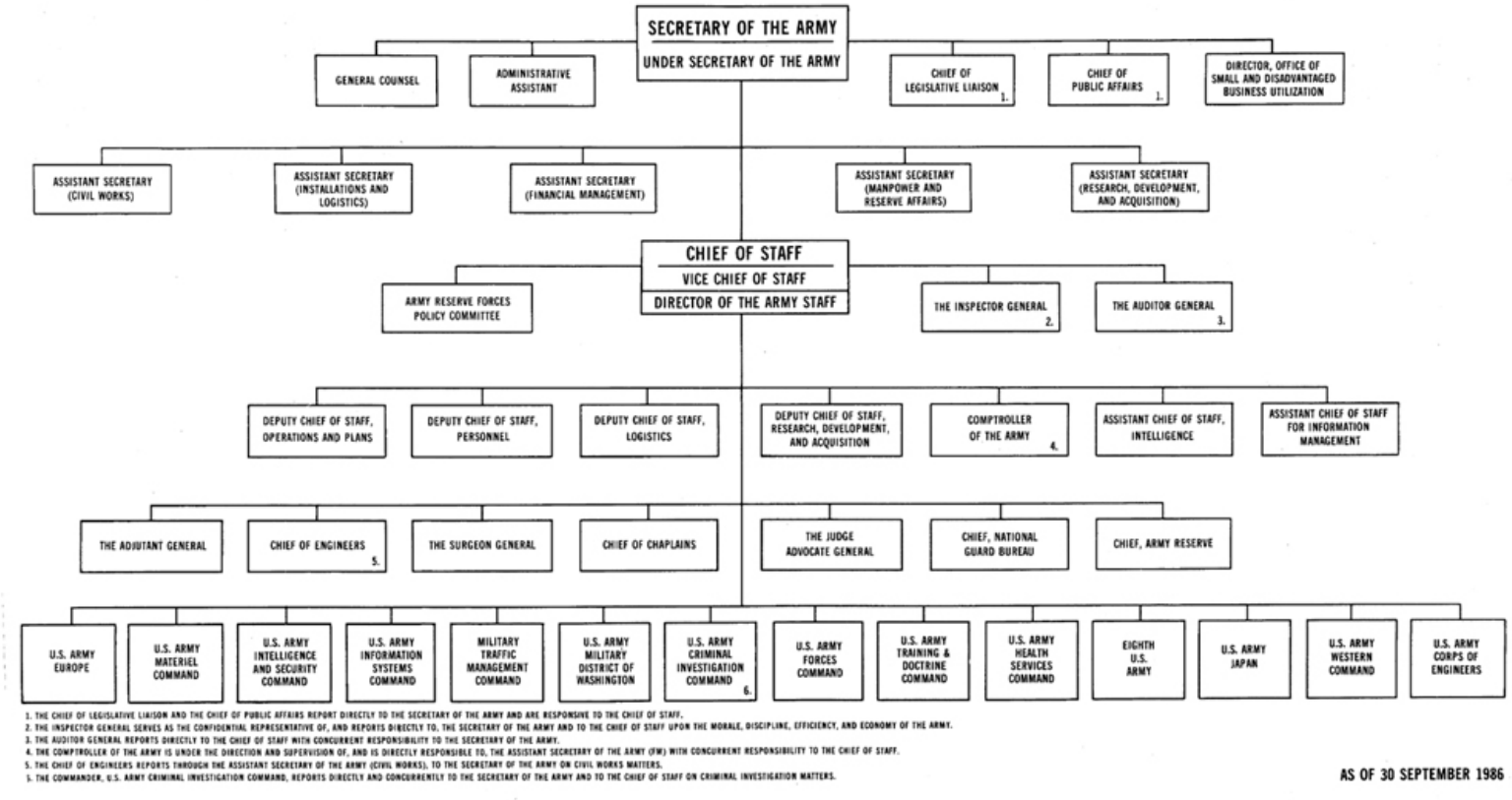
Appendix B

Organization of the Department of The Army



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Glossary

AAWS-M	Advanced Anti-Tank Weapon System-Medium
AFIP	Armed Forces Institute of Pathology
AHIP	Army Helicopter Improvement Program
AHUAS TARA 86	A command post exercise conducted by the U.S. Southern Command in Honduras.
AIDS	Acquired immunodeficiency syndrome
BLAST FURNACE	A cocaine interdiction operation in Bolivia.
CABANAS 86	A field training exercise conducted by the U.S. Southern Command in Honduras.
CAC	Casualty Area Command
CAMIS	Continental Army Management Information System
CAO	Casualty Assistance *Officer*
CASB	Canadian Air Safety Board
CERTAIN SAGE	An exercise testing mobilization procedures at the installation level.
CG	Commanding General
CMAOC	Casualty and Memorial Affairs Operations Center
COHORT	Cohesion, operational readiness, and training
CONUS	Continental United States
DIVAD	Division Air Defense
EOD	Explosive ordnance disposal
EPA	Environmental Protection Agency
FRG	Federal Republic of Germany

FSAO	Family Service and Assistance Officer
GALLANT EAGLE	A training exercise in a desert setting which provided a simulated combat environment for training, planning, and execution of joint military operations.
HAT TRICK II	A narcotic interdiction operation in the Caribbean.
HMMWV	High mobility multipurpose wheeled vehicle
HQDA	Headquarters, Department of the Army
IRR	Individual Ready Reserve
JCS	Joint Chiefs of Staff
JINTACCS	Joint Interoperability of Command and Control Systems

LASH	Lighter aboard ship
MAC	Military Airlift Command
MACOM	Major Army Command
MFO	Multinational Force and Observers
MILPERCEN	Military Personnel Center
MLRS	Multiple launch rocket system
MOS	Military Occupational Specialty
MOUT	Military Operations on Urbanized Terrain
NATO	North Atlantic Treaty Organization
NCO	Noncommissioned officer
NORTHAG	Northern Army Group
NTSB	National Transportation Safety Board
OACSI	Office of the Assistant Chief of Staff for Intelligence
OCCH	Office of the Chief of Chaplains
OCEAN VENTURE 86	A joint/combined, JCS-directed exercise in the Caribbean.

OCPA	Office of the Chief of Public Affairs
ODCSLOG	Office of the Deputy Chief of Staff for Logistics
ODCSOPS	Office of the Deputy Chief of Staff for Operations and Plans
ODCSPER	Office of the Deputy Chief of staff for Personnel
PNOK	Primary next of kin
POMCUS	Pre-positioning of materiel configured to unit sets
PORT CALL 86	A command post exercise testing crisis management procedures.
PRESENT ARMS 86	A command post exercise evaluating selected Worldwide Military Command and Control System procedures and components.
PRIMUS	Primary Medical Care for the Uniformed Services
RCMP	Royal Canadian Mounted Police
REFORGER	An exercise conducted in Western Europe to test the readiness of reserve component units in reinforcing active components already engaged in a European conflict.
RMTS	Regional Maintenance Training Site
ROTC	Reserve Officers' Training Corps
RTS-Medical	Regional Training Site-Medical
SAO	Survival Assistance Officer
SDI	Strategic Defense Initiative
SINCGARS	Single Channel Ground and Airborne Radio System
STAMMIS	Standard Army Multi-Command Management Information System

STARNET	A telecommunications network providing worldwide telecommunications for the Army.
TACCS	Tactical Army Combat Service Support Computer System

TEAM SPIRIT	A joint-combined training exercise conducted by the Republic of Korea and the United States, designed to improve defensive posture through the reception, staging, employment, and redeployment of out-of-country U.S. augmentation forces.
TOW	Tube-launched, optically-tracked, wire-guided
TRADOC	Training and Doctrine Command
USASA	United States Army Space Agency
USASDC	United States Army Strategic Defense Command
USSPACECOM	United States Space Command

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