A History of Aeromedical Evacuation in the U.S. Air Force

Dr. Thomas A. Julian

Air Force History and Museums Program
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Chapter 1

THE HISTORY OF AEROMEDICAL EVACUATION IN THE UNITED STATES AIR FORCE

In his memoir of World War II, *Crusade in Europe*, Gen. Dwight D. Eisenhower, Supreme Allied Commander in Europe, commented on the efficiency of the medical service of the U.S. Army. He noted that the fatality rate among those wounded was less than half that reported for World War I. While citing many reasons for this reduction in fatalities he singled out "penicillin and the sulfa drugs, early use of blood plasma, and an efficient system of evacuation, a great deal of it by air."[1]

Indeed, a great deal of this success can be attributed to air evacuation. In Eisenhower's European theater of operations (ETO), 82,000 patients were brought out by air from east of the Rhine River in the peak month of April 1945. The Army Air Forces (AAF) in all theaters had evacuated more than 1,172,000 sick and wounded patients during the 27-month period, January 1943 through May 1945.[2]

Eisenhower's comment at a press conference in June 1945 that "we evacuated almost everyone from our forward hospitals by air, and it has unquestionably saved hundreds of lives—thousands of lives,"[3] also applied to theaters worldwide where U.S. forces had been engaged, certainly not least in the southwest Pacific, where evacuation of wounded and sick by air had been both a medical and logistic necessity.

Aeromedical evacuation—the movement of wounded and sick military men and women by aircraft—is a twentieth-century phenomenon in spite of the romantic and widely repeated story of sick and wounded Parisians being evacuated from the besieged city by balloon during the Franco-Prussian War (1870–1871). Although plausible—after the government of Napoleon III had fallen and his

Dr. Harry Armstrong.

armies had surrendered, Leon Gambetta, the French political leader who rallied France against the Prussians escaped from Paris by balloon over the surrounding Prussian army—recent research has shown that the story of the wounded Parisians being evacuated by balloon is false.

Perhaps mildly embarrassingly to the aerospace medical community, the person likely responsible for giving the story credibility is one of the medical community's major icons, Dr. Harry Armstrong. The story appeared in the highly influential textbook, *Principles and Practice of Aviation Medicine* that was published in 1939 and written by Armstrong.[4] Dr. Armstrong obtained his medical degree from the University of Kentucky and also did graduate study in Canada. He was a pioneer flight surgeon and in the early 1930s founded the Physiological Research Laboratory at Wright Field, the forerunner of the current Aeromedical Research Laboratory at Brooks AFB. He later served as the second surgeon general of the U.S. Air Force. Far more important than his erroneous history, however, is the fact that, as his biographical data suggests, he was highly representative of the group of military doctors who early in their careers correctly envisioned the potential of the rather rudimentary aeronautical technology then available for saving lives in war and peace.

The movement of the wounded and sick by airplane originated after the successful conclusion of Wilbur and Orville Wright's 1903 experiments with a heavier-than-air machine at Kitty Hawk. Almost immediately, people tried to apply the new science of aeronautics to a realm of human activity as old as man himself—the art of healing. The initial focus was on healing within the equally ancient context of warfare.

What emerged from these initial attempts was the establishment of a symbiotic link between the rapid development of aeronautical science, embodied in aircraft of increasingly greater performance capabilities, capacities, and comfort, and the equally rapid developments in medicine, which by the end of the nineteenth century had been placed on a new scientific basis by the work of Louis Pasteur, Robert Koch, and Joseph Lister. Their cumulative and revolutionary work helped provide physicians with an understanding of bacteriology and gave them the wherewithal to perform surgical procedures that as recently as the Civil War would have resulted in massive, fatal infections.

Exemplified by the work of Walter Reed and William C. Gorgas, the conquerors of yellow fever, and advanced during Brig. Gen. George C. Sternberg's tenure as surgeon general (who had worked with Koch and himself been trained as a bacteriologist), the medical revolution essentially triumphed in the Army by the turn of the twentieth century.[5] Medical laboratories now became essential parts of the "sanitary train" of field hospitals and ambulance companies to medically support the army in the field.

The earliest known attempts to build a heavier-than-air machine to transport patients occurred between 1909 and 1910 in the United States, but indifference within the War Department caused these efforts to be quashed. It was during World War I that Americans first applied aeronautics to medical requirements. The focus was on a fairly narrow problem: how to provide more timely medical care for their aviators. The entry of the United States into World War I led to plans for a rapid expansion of Army aviation, with a concomitant increase in the number of training accidents, many occurring in remote locations. The solution, apparently arrived at independently by personnel at several flight training locations, was to reconfigure tactical and training aircraft into crash rescue vehicles.

In Europe, a few persons who deservedly can be called visionaries saw aviation more broadly. They saw it as providing several new dimensions to the sanitary services of their armies that were responsible for the rescue, movement, and medical treatment of war's casualties. The French converted a number of tactical aircraft into air ambulances which, although finding very little use in Europe during World War I, rapidly found favor in the colonial conflicts that followed.

In both Europe and the United States, although in somewhat different ways, World War I was the catalyst to initiate the development of aircraft as a tool for evacuating the wounded and sick. Air evacuation would complement the ground methods that had become routine by the end of the war, which utilized human- or animal-borne litters, horse-drawn or motor-powered ambulances, and hospital

trains and ships. The relatively small-scale but practical applications of aviation to medicine in the form of air ambulances on both sides of the Atlantic established the nexus that was to exist between aeronautical advance and the growth of medical knowledge, equipment, and procedures so notable in the post–World War I era.

As aircraft design and capability advanced during the interwar years, physicians on both sides of the Atlantic involved in the new field of aviation medicine examined how the inherently severe characteristics of this new environment might affect patients. In an attempt to identify medical standards that should govern which patients could and could not be moved by aircraft, physicians discussed the effects of lowered atmospheric pressure, reduced partial pressure of oxygen, declining temperature as aircraft climbed to higher altitudes, and even the effect of engine-induced vibration and noise on various types of wounds and illness.

However, aviation medicine—not necessarily a fully accepted subset of military medicine—struggled to establish itself within the Army Medical Department. Regardless of the work of enthusiasts for air evacuation, acceptance within the Army would depend on how this means of evacuation was perceived by the medical establishment of the time. The basic question was how air ambulances would fit into the Army's established chain of evacuation. The answer would be affected to some degree by the attitude of the traditional Army toward the Air Service—or the Air Corps, as it was renamed in 1926—and toward aviation as a military capability.

The Evolution of the Army's Chain of Evacuation

With the advent of organized mass armies during the French Revolution, 1789–1799—which were raised, maintained, and sent into battle in the name of the modern nation-state—the problem of how to succor the wounded and sick assumed two additional aspects with which European armies had not previously had to concern themselves. The first was unique in that it dealt with maintaining the morale of the new citizen soldiers who increasingly needed to be offered at least some hope of survival if they were to be wounded or become sick. The second issue, that of manpower, derived from the nature of revolutionary and mass warfare in Napoleon's time and would later became important in the United States during the Civil War. It culminated in World War I when the scale of human wastage on the western front—exemplified by British losses of almost 60,000 casualties on the first day of the Battle of the Somme in 1916—made replenishing manpower the key to staying in the fight. Thus, even more than in past wars, the preservation of the armies' strength in manpower through timely medical treatment of its members became critical. Lightly wounded men or those who could be expected to recover in a reasonable amount of time were valuable resources and needed to be recovered from the battlefield and treated so they could be returned to the army as soon as possible. For this purpose, they needed to be kept near the battlefield. Men who were more seriously incapacitated were

sent to permanent hospitals farther away from the fighting. Col. T. H. Goodwin, a member of the British Royal Army Medical Corps Commission sent to the United States in 1917 to inform his new allied counterparts what to expect, gave a series of lectures at the U.S. Army Medical School. He stated:

> We must remember that the whole object of the medical service in war is to provide fighting men for the fighting line, to keep them fit, and, if sick or wounded, to make them fit and ready for further fighting as soon as possible. If all cases, including those of a slight nature, were sent down to the base, there would be considerable delay in getting them back to the firing line and consequently much avoidable wastage [i.e., loss of manpower] would take place.[6]

To be sure, eighteenth-century monarchs also had to be concerned about unnecessary casualties among their soldiers because armies were expensive. Their armies were frequently fleshed out with mercenaries, and in a preindustrial age, arms, equipment, and the army's logistic train were costly. Soldiers usually came from the lower levels of society, had no sense of national identity, and in many cases had been pressed into service. European kings could generally assume that order would prevail in their armies' ranks, and they could disregard the morale of the individual soldier because savage discipline would keep him and his fellows literally in line during in combat, as well as figuratively at other times.

Illness, however, was a different matter. With limited medical knowledge then possessed by European physicians, only a small number of preventive actions could be taken, at least early in the eighteenth-century. Disease could quickly decimate an army, and it might also affect the enemy force as well. In fact, it is estimated that 90 percent of the deaths in George Washington's Continental Army and 84 percent of the British deaths during the Revolutionary War were caused by illness, in spite of Washington's success in having his entire army inoculated in 1777 to curb a deadly outbreak of smallpox among his troops and his efforts to ensure the addition of certain foods to his soldiers' diets as an antidote to scurvy.[7] British army hospitals were the models available for the Continental Army Medical Department, and by the time of the American Revolution they were noted for an emphasis on sanitation, good air and ventilation, and the prevention of overcrowding; critical knowledge of what caused infections in wounds, however, was not yet available.[8]

The advent of citizen soldiers in the American and French revolutions raised the issue of morale and an at least a philosophical commitment to the greater worth of the soldier as a citizen and member of a group identifiable with a nation-state. As the nineteenth century wore on, the latter characteristic tended increasingly to give the soldier special cachet, at least in comparison with men from other national groups and certainly when compared with his counterpart in the dynastic armies of the previous century. Although the army of Louis Napoleon's Second

Empire at midcentury was a professional force, the French *Zouaves*, according to a French line officer, could say to their superior in 1870, "we are willing to fight, but don't let us die like dogs if we are wounded," and expect that their call would not go totally unheeded.[9] With a commitment to provide the wounded and sick with medical care, it became necessary to evacuate casualties to hospitals staffed predominantly with surgeons. Surgeons were required because medical knowledge at the time was such that amputations were the most frequently performed medical procedure used to save the lives of men with shattered limbs.

Caring for the sick and wounded posed enormous logistic problems, particularly before the advent of railroads. The eighteenth century's fixed and rolling magazines carrying supplies to support the army were never enough by themselves to fill an army's needs under normal circumstances. Adding the requirement to provide care for the wounded and sick could threaten a breakdown of the existing system and severely hamper operations.[10]

Evacuation of the wounded and sick from the field of battle prior to the Napoleonic era was somewhat haphazard and undertaken chiefly by means of horse-drawn vehicles. This ground mode persisted into the twentieth century, although during World War I it expanded to vehicles powered by internal-combustion engines. What was conspicuous by its absence was the lack of a well-articulated system for making the evacuations. Napoleon's surgeon general, Baron Dominique Larrey, remedied the fault in 1797 when he organized a system of *ambulances volantés,* flying ambulances, units equipped with wagons to remove the wounded of the *Grande Armée* from the battlefield.[11]

Larrey's ambulances were reportedly later adopted by the other European powers. The defeat of Napoleon and the Vienna Settlement of 1815 produced nearly a half century in which Europe experienced no general war, so when the European powers fought again at midcentury in the Crimea, the scandalous conditions for wounded and sick that Florence Nightingale discovered showed that the British in the interim had devoted little real attention to dealing with the problems of evacuation and treatment. In what would provide a precedent for a subsequent U.S. organization, the private British Sanitary Commission was created and played a major role in helping expose and ameliorate these differences.[12]

The American Civil War—in which armies of unprecedented size experienced high casualty rates from battles and epidemics of various sorts, including malaria, scurvy, and even smallpox—initially exposed the same kind of medical malaise. Under pressures from public opinion and the newly created private voluntary Sanitary Commission, the Army Medical Department, despite considerable initial resistance on the part of its surgeon general, Clement A. Finlay, at length developed an evacuation system and system of treatment centers that would be the basis under which the Army Medical Department would enter the twentieth century. The process was aided immeasurably by Finlay's retirement in 1862 and the accession as surgeon general of Brig. Gen. William A. Hammond, who supported the new approach.[13]

Surgeon Jonathan Letterman, medical director of the Army of the Potomac, was responsible for creating a professional military ambulance corps of military men under the control of the Army Medical Department. Light two-horse ambulances, manned by two men and a driver and equipped with two stretchers, were deployed with regiments and corps to bring the wounded and sick from the field to dressing stations. From there they were generally transported to field hospitals, and from there to Army general hospitals, as necessary. As the war progressed, trains or ships became equipped or had been designed specifically to evacuate the wounded. Surgeons and hospital attendants had previously been required to attend evacuees, so Letterman's system meant that fewer regimental surgeons and attendants were drawn from the battlefield, and the need for tents and equipment for field and depot hospitals was reduced.

Letterman also issued general instructions to govern the operation of a system of field hospitals and successfully addressed what had been a deficient system for distributing medical supplies. He also sought to facilitate the documentation of patients' medical histories so that the Army could track each patient's treatment, condition, and location as he passed through the system until his discharge. The record would be sent with him when he was evacuated or transferred from place to place. As the historian of the Army Medical Department has noted of this development, the most important obstacle to the creation of an efficient evacuation system was overcome when the medical department recognized that a formal organization, careful planning, and trained and disciplined personnel were necessary. The support of Gen. George B. McClellan, then commander of the Army of the Potomac, ensured that the department would have the control necessary to make Letterman's system work, and ultimately led to his approach being adopted throughout the Army late in the war.[14] In view of Baron Larrey's pioneering efforts in this regard, Letterman's ambulance corps served as a model for European armies and their sanitary services until the advent of World War I, and both the French and Prussians adopted the system during the Franco-Prussian War.[15]

Letterman's attitude toward general hospitals tends to exemplify the inherent tensions in military medicine between a doctor's desire to heal the sick and wounded and his military responsibility to his commander to ensure that the unit has sufficient personnel to perform its mission. Letterman favored keeping the wounded in field hospitals under the care of their own surgeons because he strongly believed that "life in a General Hospital tends to destroy the good qualities of a soldier."[16]

In the interval between the end of the Civil War and the beginning of World War I, Letterman's chain of evacuation was of little relevance to the kinds of military campaigns that the Army was called upon to fight. In relatively small-scale actions against Indians in the West and brief campaigns in Cuba and the Philippines, few battle casualties required evacuation, and the Army Medical Department quickly became engaged in trying to deal with endemic tropical diseases. Division-sized maneuvers by the sanitary troops of the 12th Provisional

Division in November 1916, the first large-scale movement of troops since the Civil War, found that the sanitary train of ambulances and mobile hospitals was largely dependent on horse-drawn vehicles.[17] Given the scarcity of paved roads in the country at the time, this was not as backward as it might seem, but it does, however, draw attention to another type of casualty evacuation—of wounded and sick horses and mules—which had to be included in evacuation planning.[18]

By contrast, the British Royal Army Medical Corps ambulance companies, while using the same hand litters and horse-drawn vehicles to move wounded and sick away from the front lines, were heavily motorized to transport casualties from field hospitals to clearing stations, where their further treatment would be determined. Operating in a European environment that featured a dense network of metalled roads, each motor ambulance unit was equipped with fifty motor ambulances, four touring cars, eight motorcycles, and four trucks, including one for repairs. From the clearing stations, casualties whose recovery times would be too long were evacuated by rail to more permanent hospitals on the continent or by hospital ship to similar facilities in Britain.[19]

The Origins of Evacuation by Aircraft

Although the Wright brothers were the first to systematically apply scientific principles to the problems of controlled flight by a heavier-than-air machine, the international center of interest in aviation at the turn of the century lay in France, focused in the *Aero-Club de France* which had been founded in 1898 by balloonists. French aviation enthusiasts shifted their attention to heavier-than-air machines under the stimulus of the Wright brothers' initial and successful 1902 experiments with gliders, news of which reached Paris through Octave Chanute, a successful, French-born civil engineer who had become another aeronautics pioneer in the United States. His description, though actually somewhat garbled, of the Wright brothers' experiments, succeeded in engendering a burst of nationalistic feeling characteristic of contemporary educated Europeans. The bombastic pronouncements of Ernest Archdeacon, a wealthy lawyer and balloonist, conveyed in hyperbolic fashion the attitudes of many *Aero-Club* members when he wrote

> Will the homeland of the Montgolfier [the first balloonists] suffer the shame of allowing the ultimate discovery of aerial science—which is certainly imminent, and which will constitute the greatest scientific revolution since the beginning of the world—to be realized abroad?[20]

The interest stirred by Chanute's writings and such pronouncements as Archdeacon's led within months to the *Aero-Club* becoming the headquarters for a band of experimenters so determined to fly that they took to calling themselves *les aviateurs militantes*, militant aviators.[21]

Although French enthusiasts eventually came with some grace to acknowledge their loss to the Wrights, their passion for aviation was undimmed and continued unabated until the beginning of World War I. In 1909 Louis Bleriot crossed the English Channel by air, a demonstration that had profound implications for future warfare and the security of Great Britain. Among other Europeans who had begun to look at more benign wartime applications of the new flying machines was Maj. Gen. C. de Mooy, chief of the military medical service of the Netherlands. Well before the Wright brothers flew, General de Mooy had been thinking about how to transport the wounded in greater comfort, and in 1910 he formally proposed using balloons to raise stretchers into the air and to have a horseman pull along the balloon with its suspended patient.[22]

As early as February 1912, Dr. A. Duchaussoy, founder and secretary general of *L'Association des Dames Françaises*, an association of Frenchwomen who served as nurses in wartime, proposed to the association's annual convention that progress in aviation had now reached the point when a study should be conducted of how balloons, dirigibles, and airplanes could be used to find, rescue, and transport the wounded during hostilities. The doctor also announced that the question would be placed before the next international conference of the Red Cross scheduled for Washington, D.C. He also proposed that the association fund some experiments, but in spite of an enthusiastic approval of this proposal, not enough money was collected.[23]

Thwarted in his attempts to conduct actual trials, Dr. Duchaussoy managed to assemble a meeting of members of the association's council to discuss the idea at its Paris headquarters. Participating were representatives of French military aviation and medicine, including several senior medical officers and a representative of the war ministry's sanitary service. This group constituted itself as a study commission. On May 23, 1912, it submitted a report to the minister of war recommending, among other things, that each army corps be equipped with ten biplane flying ambulances, which the commission estimated would provide each corps with the capability to transport either 200 wounded if on litters, or 300 if seated.[24] Because such use of aircraft raised questions regarding their protection and neutrality under international law, the association also formally raised this issue with the Red Cross and the ministry of war, and it drafted a proposed regulation to govern flying ambulances.[25] This was published in June 1912 in *Caducée*, the French army medical and surgical journal.[26]

The first Geneva Convention of 1863, to which the United States had acceded in the previous year, established that military ambulances, hospitals, and the overall process of evacuating the wounded and sick was to be considered neutral, and that the associated facilities and personnel were to be protected against restraint or harm. The convention provided that this protected status was valid only if the personnel and facilities were and remained solely involved in succoring wounded and sick solders, and if the hospitals, ambulances, and personnel involved were identified by wearing or being marked with the distinctive symbol

of a red cross on a white background. Should these functions change and become hostile to the enemy, Geneva protections were abrogated. In 1906 the Geneva Convention extended these protections to mobile sanitary formations, which included vehicles belonging to these formations; by definition, aircraft were not included.[27]

In August 1912, almost certainly as a result of the Duchaussoy commission's proposals, Dr. Emile Reymond, a physician and pilot who was a member of the governing council of *L'Association des Dames Françaises* and a senator in the French National Assembly, was ordered by the director of the French Sanitary Service to participate in army maneuvers on September 16–17, 1912, to test how to identifygroups of wounded from the air and then how to locate them on the battlefield. Reymond and the director had previously discussed this question, and although they had agreed that aircraft capable of evacuating wounded would be built in the future, they decided the most pressing current issue requiring investigating was how aircraft then available might be used to assist the wounded.[28] Support for the idea of using aircraft to locate the wounded also came from one of de Mooy's students, Jeanne Marvignt, later a nurse and the first Frenchwoman to obtain a pilot's certificate, who made the same proposal independently, also in 1912.[29]

Reymond's enthusiastic and detailed accounts of his successful efforts convinced at least the National Aero League. It passed a resolution on November 12 inviting the government to take the initiative and convene a conference of national Red Cross societies to codify the protection and neutralization of air ambulances in a new Geneva Convention. Charles Julliot, a lawyer and member of the league's governing council and the *Aero-Club* as well, raised this issue when he published an article in November 1912 on sanitary aviation and the Red Cross conventions. He thereafter tirelessly promoted the neutrality of air ambulances until the Geneva Convention of 1929 extended this protection.[30]

The implicit faith in the efficacy of international agreements that animated these discussions seems to have been joined with a concept of war, perhaps derived from memories of the Franco-Prussian War, that would tend to be invalidated in the future conflict of 1914–1918. This concept envisaged that future battles would be followed by withdrawal of the defeated army or by other periods of noncombat when battlefields could be searched and the wounded retrieved in relative safety. Reymond believed that groups of wounded would congregate in such a lull, making them easier to see.

The war ministry was less enthusiastic about air ambulances. It saw some merit to Reymond's experiment, but it was cool to the commission's proposals of May 1912 that air ambulances be built for the transport of casualties and that they be attached the French army corps. On December 10, 1912, the minister of war responded to these proposals in a letter to *L'Association des Dames Françaises.* He stated he did not believe the idea of using aircraft to transport the wounded was practical at that time. The only current role for aircraft, he believed, was to

explore the battlefield for groups of wounded, which is what Reymond[31] had demonstrated could be done successfully. The minister's letter officially closed the matter for the prewar years, although unofficial interest remained high. A French military medical officer, M. Gautier, declared in October 1913, "we shall revolutionize war surgery if the aeroplane can be adapted as a means of transportation for the wounded."[32]

During the war, the position of the war ministry was undercut in November 1915 by news that French pilots serving with the Serbian army had successfully evacuated by air thirteen wounded and sick members of a small French expeditionary force, thus avoiding their capture by the advancing Bulgarian army. The evacuees had been carried to safety on the Albanian coast some 150 miles away in two-place tactical aircraft.[33]

In 1917 the ministry finally yielded to the entreaties of another physician, Dr. Chassaing, who represented the city of Puy-le-Dome in the National Assembly. Allowed to work with Justin Godart, undersecretary of the Sanitary Service, they modified an old tactical aircraft, a Dorand AR II, at Villacoublay near Paris, to carry two patients on stretchers, one placed above the other inside the fuselage, behind the pilot. Purportedly, Chassaing's earlier pleas to the National Assembly for money to reconfigure aircraft to carry wounded soldiers had been greeted with the withering comment, "Are there not enough dead in France today without killing the wounded in airplanes?" Given the questionable reliability of some of the pilots and aircraft of the time, an element of reason underlaid the scorn.

Cleverly, Chassaing showed his first air ambulance to members of the appropriate committees of the National Assembly, and he gave the chairman of the hygiene committee of the Chamber of Deputies a 25-minute flight in the modified aircraft. This apparently won them over. Chassaing was provided six similar aircraft for conversion, which he was allowed to use for evacuating casualties on the Aisne front in November 1917, and also in Flanders in 1918. The government subsequently withdrew its sanction because of the intensity of the fighting there, and in late 1918 it allocated sixty Breguet aircraft to Chassaing for conversion to air ambulances.[34] Pictures of Chassaing's first air ambulance showing how the aircraft had been modified to carry litters appeared in the United States in the November 1917 issue of *Scientific American*.[35]

The scale of the fighting on the western front generated such large numbers of casualties that the small capabilities of Chassaing's air ambulances must have seemed irrelevant, though they were eminently suited to the smaller requirements of colonial warfare. Chassaing received some Breguet 14 A.2s for reconfiguration as air ambulances, and they were used to good effect in Morocco in the early 1920s. Dr. Reymond had also suggested the value of air ambulances in the colonies at a meeting of reserve doctors in March 1913 when he recounted the aerial search for the wounded during the 1912 maneuvers.[36]

A Breguet 14A.2 aircraft, of the type configured as an air ambulance.

The Emergence of the Air Ambulance in the United States

Charles Julliot, the tireless French lawyer and advocate of extending the protections of the 1906 Geneva Convention to air ambulances, had attributed the birth of sanitary aviation to France. Conceptually and practically, that honor belongs to the United States.[37] Although the Wright brothers had less interest in exhibiting their aircraft than in securing proprietary rights to their invention through proper patents, in France they had been accorded recognition and admiration through a series of demonstration flights in the summer of 1908. Demonstration flights conducted for the U.S. Army later that summer and the following year at Fort Myer, just across the Potomac River from Washington, D.C., resulted in the Army's purchase of its first aircraft.[38]

Perhaps, and not altogether coincidentally, in late 1909 at Fort Barrancas in Pensacola, Florida, an Army doctor, Capt. George H. R. Gosman, and an officer from the Coast Artillery, Lt. A. I. Rhoades, used their own funds to begin construction of an aircraft specifically designed to transport patients. They planned a side-by-side configuration to accommodate a litter patient and the doctor-pilot.[39] The aircraft first flew in January 1910 as a glider; the subsequent first and only powered flight of some 500 feet at an altitude of 100–150 feet ended disastrously when an oil line broke. Without financial resources to proceed on their own, Captain Gosman went to Washington to solicit the War Department for money to continue his experimentation. According to the officer, the department thought the idea fantastic but turned him down. Long afterward, Gosman still believed in the project, commenting, "I clearly saw thousands of hours that would be saved by an ambulance plane."[40]

Gosman and Rhoades were indicative of the growing interest in Army aviation and in the possibility of using aircraft as ambulances. In May 1912, Secretary of War Henry L. Stimson received a recommendation from Army aviators that airplanes be used to transport patients. Again, no action followed.[41] In October of that year, Col. A. W. Williams, an Army surgeon, appeared before the Committee on Transportation of Wounded in War of the Association of Military Surgeons then holding its annual convention in Baltimore, Maryland. Williams received a favorable response to his recommendation that airplanes with specially constructed ambulance bodies be used in wartime to transport severely wounded soldiers requiring immediate treatment to emergency operating stations.

Appearing with Williams before the committee at his request was Lt. Henry H. Arnold, the future World War II chief of the AAF. In a memoir written much later, Williams reported he had raised the subject of airplanes as ambulances in conversation with Arnold the preceding summer in Philadelphia and that, at Arnold's invitation, he had flown with him as a passenger in a hydroplane over Washington, D.C., just a week before the Baltimore meeting.[42]

The reaction of the *Baltimore Sun* to Colonel Williams's proposal, however, was strongly negative. In words similar to those with which Dr. Chassaing's proposal would be greeted several years later in France, the *Sun* editorialized, "the hazard of being severely wounded was sufficient without the additional hazard of transportation by airplane."[43] When the United States entered the war, Williams was appointed president of the new Army Ambulance Board, and in this position he undertook to secure aircraft for use as air ambulances by the Army Medical Department, only to be told that all airplanes were needed for combat purposes.[44]

Whatever the official policy of the War Department, necessity soon prompted similar but uncoordinated and seemingly spontaneous responses to the frequent accidents by student pilots at training bases as the Air Service began to expand rapidly in preparation for World War I. When the United States declared war on Germany in April 1917, the Aviation Section of the Signal Corps, which constituted Army aviation, consisted of 65 officers and 1,120 enlisted men. It conducted flying activities with some 200-odd aircraft which were mostly training types and generally obsolete. At the time of the armistice, some nineteen months later, the new Air Service comprised some 190,000 officers and men—112,000 in the United States and 78,000 overseas—and more than 11,000 aircraft.[45]

In the interim, thousands of applicants for flying training were processed at sixty-seven examining centers throughout the United States using standards developed by a panel appointed by Surgeon General Rupert Blue and promulgated by the War Department in May 1917. Lt. Col. Theodore C. Lyster headed the panel and would later be hailed as the father of aviation medicine.

In 1914, the seven-year-old Aviation Section of the Signal Corps had begun a search for a set of physical standards more relevant to the requirements of flying than the standards the Army used when normally selecting recruits. Unable to obtain the criteria that other nations used, Dr. Blue developed his own on the basis

Lt. Col. Theodore C. Lyster, father of aviation medicine.

of standard physiology texts. He incorporated existing requirements for vision and hearing as defined in Army and Navy regulations. When the Army began to expand in 1916, the board headed by Colonel Lyster began to develop the examination that was promulgated in May 1917. After the United States entered the war, the surgeon general gave Lyster the responsibility for recruiting for aviation.

Valid standards were critical because the British discovered that 60 percent of the fatalities suffered by their aviators during the first year of the war were due to physical defects, a situation obviously reflecting deficiencies in the selection criteria. This was perhaps not surprising, given the lack of knowledge about the physiological and psychological demands of this new medium. The British learned from experience and cut the death rate radically in successive years through a program that sought to determine what special physical and mental stresses affected aviators.[46]

The United States approached the selection issue by identifying and applying the most relevant standards from the outset. The question posed by British experience was, what are they? Using Lyster's standards, some 71 percent of the applicants who wanted to fly for the U.S. Army were accepted, but what Harry Armstrong called the appalling death rates suffered by flying cadets at the train-

ing centers in the United States and among the allies in France indicated to Colonel Lyster that more analysis was needed.[47]

When he became the first chief surgeon of the Aviation Section of the Signal Corps in September 1917, Lyster recommended that a permanent research board be established to investigate all conditions affecting the physical efficiency of pilots, to conduct experiments and tests at the several flying schools, to provide a suitable apparatus for supplying oxygen, and to act as a standing organization for instruction in the physiological requirements of aviators.[48] The result was the foundation of the aviation medical laboratory at Mineola, New York, and with it, the implicit acknowledgement that medical aspects of aviation were different from those of the traditional Army branches. Somewhat later, two events marked an even more explicit recognition of those differences: establishment on January 9, 1918, of a separate medical service for the Aviation Section of the Signal Corps, independent of the control of the medical department of the Army; and the official designation of specially trained doctors as flight surgeons.[49]

Although recruiting was successful, a disturbing pattern of accidents emerged from the training bases. The Army had entered the war with three airfields in the United States: the Aviation School, founded in 1912 on North Island, San Diego, California; a facility at Mineola, New York, later designated Hazelhurst Field, which trained candidates for the National Guard and the Reserves; and a temporary training field at Essington, near Philadelphia, Pennsylvania. During the war, however, the Army acquired forty-five additional flying fields, nineteen depots, and various other facilities scattered across the country. Many of the new flying fields were located in sparsely settled areas in the South and Southwest to capitalize on the region's advantageous flying weather. These included Brooks Field and Kelly Field at San Antonio, Texas; Gerstner Field at Lake Charles, Louisiana; and Ellington Field at Houston, Texas.[50]

Having met the Aviation Section/Air Service selection standards, cadets still had to learn how to operate in an unfamiliar medium. In the process, many accidents occurred. This should not have been surprising given the society from which the cadets came. Few if any of them were familiar with internal-combustion engines, the speeds that could be attained by vehicles so powered, or the principles of aeronautics, the knowledge of which was vital to safe control of the aircraft in flight. In addition to the considerable unfamiliarity with aeronautical principles, the aircraft themselves were not totally reliable; furthermore, they were underpowered, which exacerbated problems of aircraft control.

From April 6, 1917, when the United States declared war on Germany, until January 1, 1920, the Air Service suffered 2,311 airplane crashes that killed 135 men and injured another 303. An analysis of these crashes for which flight surgeons filed reports showed that almost half were characterized as having been due to bad judgment, somewhat fewer were attributed to engine trouble, far less were deemed to have been unavoidable, and an insignificant number were reported to be caused by pilot inexperience. Most accidents occurred during landing,

although substantially more accidents occurred fifteen or more miles away from the home station than occurred closer to the training site.[51] Such crashes, usually involving aircraft that went down in remote areas with either poor or no access to nearby roads, were particularly troublesome because it was extremely difficult to provide timely medical care to surviving pilots and passengers. The ultimate solution to this problem of crash rescue was to convert tactical aircraft to carry injured pilots, a solution that seems to have been independently arrived at by commanders and medical personnel at several flying training fields in early 1918.

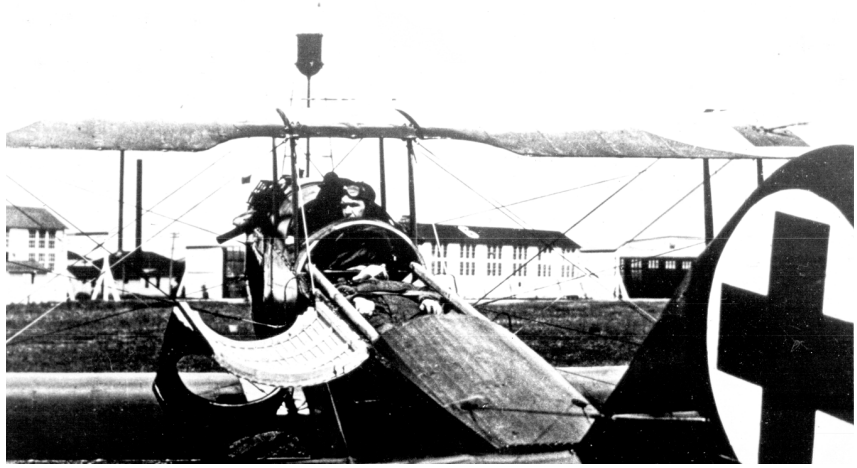
Flying medical personnel to crash sites to provide immediate first aid before the arrival of an ambulance was practiced in Europe. It was a procedure that a senior British Royal Air Force surgeon, writing in the autumn of 1918, claimed to have originated, asserting that he had conducted between thirty and forty such journeys.[52] Given fortunate conditions and geography, it was a fairly obvious solution to the problem of providing timely assistance to crash victims. It was one that Maj. W. R. Ream, a flight surgeon stationed at Rockwell Field, San Diego, reported to Chief Surgeon Lyster that he had put into effect on February 12, 1918, without having previously consulted with Lyster.[53] The procedure had the potential for providing timely aid, but if ambulances were unable to reach the area, or if the injuries of the downed airmen were too serious to permit evacuation over rough terrain or roads, then a major and perhaps fatal problem remained.

This was of particular concern to Capt. William Ocker who was in charge of flying training at Gerstner Field, Lake Charles, Louisiana. According to Ocker, the field was located in low, swampy country surrounded by bayous. The area had few roads, none were good, and all became impassable after heavy rains. The first flying accident by a Gerstner pilot convinced Ocker that a means for getting surgeons to crashes, as well as transporting patients back to a hospital, was a necessity.

> As early as February, 1918, it was evident to me that airplane transportation was the only way of getting to the site of crashes. Authority was therefore obtained to convert a JN–4 airplane into an ambulance. This plane demonstrated its great usefulness at once.[54]

Enlisting the help of Maj. Nelson E. Driver, a reserve medical officer, Ocker directed that a standard Curtiss JN–4 training plane be modified to accommodate a patient in a semirecumbent position in the rear cockpit. Sometime during the late winter of 1918 Driver and Ocker made the first recorded aeromedical evacuation in the United States.[55]

It is not known what role, if any, Dr. Chassaing's air ambulance experiments in France may have played in the United States in initiating the development of aircraft for the same purpose. The experience of at least one Air Service surgeon on duty at Mather Field, California, in 1918, who acknowledged having seen the *Scientific American* article of November 1917, suggests that Chassaing's experi-



A Curtiss JN–4D, a training plane modified to accomodate patients, circa 1918.

ments probably had no effect at Gerstner Field, but it is likely that other information channels were available through which related communications could have passed.

Capt. Norvelle Sharpe, who before his assignment at Mather had been the chief surgeon at Gerstner Field, reported in an *Annals of Surgery* article published in November 1918 that he had studied an air ambulance constructed at Gerstner during his earlier tenure, but he was not convinced from either his own observation or opinions expressed by medical, flying, or engineering officers that an air ambulance was the best aircraft for the task. His interest was based on personal observations that, although providing medical assistance to aircraft accidents near a flying field presented no major difficulty, crashes at more remote sites, which because of obscuring environments could take time to reach, or even to find, and were quite different. They entailed an enormous waste of time and effort together with an unavoidable prolonging of the suffering and shock to the crash victim, who frequently suffered serious injury to his cranium, spine, thorax, and abdomen.[56]

It was evident to Sharpe that the usual ambulance equipment and service provided were inadequate, and the most satisfactory solution would be to replace motor ambulances controlled by the Army Medical Department with ambulance aircraft controlled by the Air Service. He noted the implicit issue of whether such aircraft should be dedicated solely to ambulance work or whether they should be used for other purposes as well, but he took no position. He did offer his own suggestion for configuring a JN–4D training aircraft to make it more effective when being used as an ambulance. Sharp's engineering drawing shows a JN–4D modified to carry one patient recumbent on a litter inside the fuselage behind the pilot's

cockpit. In a lengthy footnote, he revealed that he had written to the librarian of the surgeon general's office on August 6, without specifying the year, for information on ambulance airships, but that the librarian could find "nothing of this sort on file." Sharpe pursued the matter, learning from a troubleshooter that he had seen such an aircraft in Great Britain the year before and that a memorandum concerning the plane had recently appeared in *Popular Mechanics*. Perusal of issues for 1918 revealed no such memorandum, but Sharpe indicated that he did find the November 24, 1917, issue of *Scientific American* with its brief account and pictures of Chassaing's experiments at Villacoublay.[57]

Several things are interesting about Sharpe's account. His letter to the surgeon general's office followed the publication of the *Scientific American* article and the construction of the first air ambulance at Gerstner Field in early 1918. He wrote in August 1918, which strengthens the presumption that the Gerstner air ambulance was strictly Driver's and Ocker's idea. Had Sharpe seen the *Scientific American* article, nothing precludes either Driver or Ocker from having done so too. With regard to a possible British source for the idea, assuming that the troubleshooter was truthful, British cadets were learning to fly in the United States, and their presence meant the existence of liaison officers who constituted an information channel through which such communications could have passed.[58]

Aside from the issue of where in the United States the idea for air ambulances originated, Sharpe's comments are all the more important because they tend to typify the concern of the more clinical approach of the aviation surgeon. His focus was on wounded aviators, in contrast to the tendency of most military surgeons who focused on medical treatment to relieve pain and suffering and then return the soldier to duty. It seems clear that flight surgeons got caught up in the early mystique of aviation, which is why they were attracted to aviation medicine in the first place.[59]

Flight surgeons were charged by regulation with acting as advisers to the commanding officer of flying schools and squadron groups and, although formally under the post surgeon, were given the freedom of independent initiative in all questions regarding the flying fitness of aviators or cadets. Subject to approval by the commanding officer, flight surgeons were expected to institute such measures as rest periods, recreation, and temporary excuse from duty as they deemed advisable. To ensure that the flight surgeon knew the condition of his charges, the regulation specified that "he will live in as close touch with the aviators and cadets at his station as is consistent with the conditions."[60]

After completion of training as flight surgeons and assignment to flying fields for duty, flight surgeons were encouraged to take flying instruction and qualify as pilots. When placed on flying status, flight surgeons were required to fly a minimum of ten flights a month, either as a passenger or pilot. Being required to fly at least as a passenger to maintain flying status clearly caused flight surgeons to identify with aviators and aviation. The division of perspective within the ranks of Army Medical Corps surgeons created by this familiarity would grow.[61]

Additionally, Sharpe illuminates for the first time an issue regarding aircraft used as ambulances that would persist throughout the subsequent history of aeromedical evacuation. It was whether ambulance aircraft should be dedicated to the task, that is, reserved exclusively for it, or whether they should be available for other missions. Beyond the potential for an impact on military operations, this issue went to the heart of extending protections to ambulance aircraft under the Geneva Convention.

A lack of knowledge of Chassaing's experiments on the part of the surgeon general's office may indicate that the surgeon general's librarian had not noticed the brief article on the Villacoublay tests in the 1917 *Scientific American* because the library itself did not subscribe to this periodical.[62] What is odd is the denial of any data on ambulance airships. The surgeon general had to be well aware of the Gerstner Field air ambulance by mid-1918 when, by chance, similar aircraft were deployed at all U.S. Army flying fields.

On June 26, 1918, Congressman Ladislas Lazaro, a physician and representative of the congressional district in which Gerstner Field was located, had written to Maj. Gen. William L. Kenly, director of military aeronautics, citing a newspaper story about air ambulances being used to rescue crash victims at the Army's flying fields. Identifying his own medical background, Lazaro indicated he thought this was a good idea and was anxious to know if it was being done at all the Army fields, particularly at Gerstner Field.[63] The whole subject was clearly news to the Kenly, who was an artilleryman recently returned from France and given the responsibility for training officers and enlisted men for aviation duty. Not a pilot, Kenly had become the director of military aeronautics on May 20, the month before receiving Lazaro's letter, when President Woodrow Wilson removed Army aviation from the jurisdiction of the Signal Corps and created two new agencies under the Secretary of War—the Bureau of Aircraft Production, and the Division of Military Aeronautics.[64]

Kenly's initial reaction was that air ambulances were an excellent idea, and he asked the commanding officer at Gerstner Field for particulars.

> Have you airplane ambulance in use at your station? Wire particulars with reference to any use you have made of an airplane in conjunction with ambulance or first aid work.[65]

His query was timely for reasons other than obtaining information to satisfy a congressional inquiry. For the preceding several months, pleas for heavy ambulances had been made to Colonel Lyster's office from surgeons at the training fields. The surgeons wanted better-sprung vehicles capable of traveling over rough terrain with less severe motion than that experienced in the current ambulances, which could add serious injury to crash victims.

Colonel Lyster sent an urgent request to the Army surgeon general on May 18 that a special type of ambulance, preferably a heavy-duty Packard or White vehicle, be supplied for use at all flying fields, and he attached extracts from the sur-

geons. Typical was one from Maj. Isaac Jones at Carruthers Field near Fort Worth, Texas, who had worked with Lyster in developing the Aviation Section examinations. Jones characterized the current ambulance as abominable and the aerodrome as so rough that "the commanding officer and post surgeon feel very strongly that when a man has crashed he has very little chance of being brought safely to the hospital with these old ambulances."[66] Two days after Lyster's memorandum to the surgeon general, Director of Military Aeronautics Kenly, in an effort to pressure the surgeon general to respond rapidly to Lyster's request, and at the urging of his staff of aviators, including Col. Henry H. Arnold, officially noted Lyster's action. In a letter to Lyster intended to be sent with Lyster's original memorandum to the surgeon general, Kenly heartily endorsed Lyster's efforts and added his own expression of dissatisfaction with the present ambulance equipment at the flying schools, which he contended were in most cases Ford and GMC trucks converted into ambulances. He also wanted to impress upon everyone the necessity of obtaining an ambulance capable of transporting an injured aviator from place to place at extremely high speed, because "a few seconds may mean the life or death of the injured man."[67]

Maj. Maxwell Kirby, the commanding officer at Gerstner Field, answered Kenly's query about the air ambulance affirmatively on July 3. Twelve days later he supplemented his earlier communication with two photographs and a tracing showing the plan of the rear cockpit of the Gerstner air ambulance. Kirby wrote that it had been continuously in use since approximately May 1, had been found to be satisfactory, and had been used "to great advantage since completion."[68] In response, on July 27, 1918, Kenly issued a directive to the commanding officers (COs) of all flying fields. He informed them that they would soon receive photographs and drawings from the CO of Gerstner Field containing all information necessary to build an ambulance plane, which had been found to be very useful in responding to accidents occurring at distances difficult to reach quickly by automobile. With this data, each CO was to construct such a plane and put it into operation as soon as possible.

Three days earlier, Kenly's office had finally responded to the questions posed by Congressman Lazaro, which had started the chain of events that produced the general's directive. Lazaro was told that air ambulances had first been adopted at Gerstner Field and had proved so satisfactory that they were being adopted at all flying fields.[69] A month later, Maj. W. H. Frank, the CO at Ellington Field, Houston, Texas, informed Kenly in a letter that, with reference to his directive and the Gerstner air ambulance, Ellington had for several months been operating an air ambulance of its own design. The Ellington air ambulance had a number of advantages over Gerstner's. Most important was the fact that patients could be loaded lying on a stretcher in a specially constructed compartment in the fuselage in back of the rear cockpit, whereas patients carried in the Gerstner air ambulance had to be carried in a sitting position. In his letter to Kenly, Major Frank included six photographs showing various stages of the loading procedure which

look remarkably like the configuration of the first French air ambulance of Dr. Chassaing.[70]

The rapid proliferation of differing models of air ambulances—a third variant was flying at Kelly Field by May or June of 1918, the result of an initiative of the base flight surgeon, and a fourth, also sometime in 1918, at Eberts Field, Lonoke, Arkansas, the design of another flight surgeon, Maj. S. M. Strong—led to attempts to conduct a census of such aircraft and to establish a standardized configuration.[71] Col. Albert Truby, who became chief surgeon of the Air Service in 1919, called for reports from all fields with air ambulances then in use, but he was not satisfied that any of those reported to him were totally suitable because each required a different type of litter. He subsequently asked the Air Service Engineering Division at McCook Field to design a plane that would accommodate a pilot, medical officer, and two patients in standard Navy wire-basket Stokes litters.[72] The result was a modified DeHavilland DH–4A that carried two patients on litters, one above the other, with space for a medical officer in a rear cockpit, just ahead of the litter compartment. Several of these modified aircraft were produced for service on the Mexican border.[73]

Truby, whose only direct association with U.S. Army aviation was his service as Air Service chief surgeon from 1919 to 1922, was something of a visionary in his own right.[74] His book on the history of air ambulances, published by the Air Service in 1923, clearly envisioned the aeromedical evacuation mission as much broader than just the crash rescue function that at the time essentially defined it. His perspective implied that in the future a number of aircraft, each with different capabilities, would be required to perform different aspects of the total mission. These he specifically identified as crash rescue, as it was currently being done; transportation of patients from isolated medical facilities to larger hospitals for better medical treatment; casualty evacuation of the seriously wounded from the front lines to hospitals in the rear; and the delivery of medical supplies. His view that different kinds of aircraft were needed to perform as air ambulances began to appear in official Air Service publications.[75]

Aeromedical Evacuation in the United States during the Early Interwar Period

Commensurate with the new enthusiasm of the U.S. Army Medical Department for air ambulances and what could be described as the emerging concept of aeromedical evacuation versus crash rescue, the Medical Research Laboratory and School for Flight Surgeons secured authority to convert a Curtiss Eagle aircraft into an air ambulance. Completed in 1921, the modified aircraft could transport, in a closed cabin, either four litter-bound and two seated patients, or six seated patients. It clearly fit Colonel Truby's concept of a patient transporter; in fact, Truby was able to convince Army Surgeon General Maj. Gen. Merritte W. Ireland to approve the transportation of patients from Mitchel Field

on Long Island to Bolling Field at Washington, D.C., for transfer to Walter Reed Army Hospital in Washington. Brig. Gen. William "Billy" Mitchell, assistant chief of the Air Service, had test-flown the Eagle and pronounced the whole enterprise "a very progressive step, and one that is no way hazardous." Nevertheless, the War Department disapproved the flight with the notation that "in case of accident, the use of airplanes for the transportation of sick and wounded soldiers when other, safer means of transportation is [*sic*] available, could not be justified." Several weeks later, the Eagle did crash, stultifying further developments along this line for the foreseeable future.[76]

The fundamental problem was money, and it would remain so during most of the rest of the interwar period. Air Service appropriations fell from wartime appropriations of $450 million for fiscal year (FY) 1919 to $25 million for FY 1920; to $33 million for FY 1921; to just under $20 million for FY 1922; and then to below $13 million for the next three fiscal years, rising slightly to $14.7 million for FY 1926.[77] Prioritizing available funding was difficult, and in April 1927 the Army adjutant general reported that funds were inadequate even to deal with the continuing problem of having enough motor ambulances to provide timely assistance to crash victims.[78]

In addressing aeromedical evacuation, priority went to crash rescue aircraft, and the Air Service for the first time obtained two experimental aircraft designed specifically for air ambulance work. The Cox-Klemin Aircraft Corporation delivered two XA–1 (experimental ambulance) biplanes in 1925. These aircraft proved to be excellent crash rescue vehicles capable of operations into very short unpaved fields. They could carry a medical officer and two litter patients in an enclosed cabin behind the open cockpit, where the pilot was ensconced. The two modified Stokes litters could be placed one above the other so that the medical officer could attend the patients in flight.[79]

The Cox-Klemins performed extremely well during their relatively short life. One was destroyed in a 1929 accident; the other met a similar fate in 1931. They were the last airframes specifically built to be used exclusively for aeromedical evacuation. The future would belong to transport aircraft that could be converted, as needed, into air ambulances. This was the approach recommended by General Mitchell, Lt. Clayton Bissell, and aeronautical engineer Alfred Verville upon their return from a European inspection tour in the winter of 1921–1922. Based on their discovery that the British were, as standard practice, adopting passenger-carrying transport planes into air ambulances, their report recommended that development "of a convertible multi-motored type of troop carrier and ambulance plane should be undertaken as one of our new types."[80] In the spring of 1923, this idea was tested successfully when litters and medical paraphernalia were installed into a twin of the Fokker T–2 transport that flew nonstop coast-to-coast in May, temporarily converting it into an air ambulance. Consequently, the Air Service contracted to buy nine Douglas C–1 biplane transports equipped with attachments on the floor and walls of the passenger

compartment to allow for the installation of four ambulance stretchers.[81] These specially designed transports were distributed across the United States and in its possessions and territories where aeromedical evacuation was most useful in the absence of a well-developed ground transportation system.

The Postwar Development of Sanitary Aviation in Europe

European activities addressing sanitary aviation after World War I were much more vigorous and widespread than they were in the United States, and even came to include the Soviet Union. Great Britain, France, and, to a lesser degree, Italy were particularly active for reasons primarily having to do with their respective colonial enterprises. Germany was a latecomer to sanitary aviation because Germany was prohibited by the Treaty of Versailles from having an air force. Within just a few years after its unilateral abrogation of the disarmament clauses of the treaty, however, Germany was to demonstrate the effectiveness of aeromedical evacuation on a relatively large scale in Spain. All these developments had a definite effect on thinking about aeromedical evacuation in the United States, a result of the information flow across the Atlantic, a consequence of professional meetings and reports from military observers and professional journals, especially *The Military Surgeon.* This journal, a publication of the Association of Military Surgeons of the United States, frequently carried translations of foreign articles on sanitary aviation.

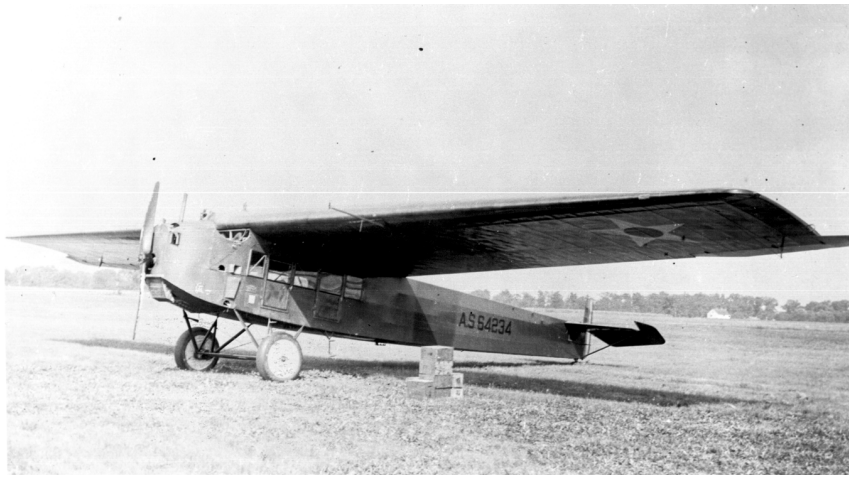
Col. Robert Picque, one of the most vigorous French and European proponents of sanitary aviation in Europe, was an honorary member of the association, and several of his articles were translated into English for publication in the journal. He attended the annual meeting of the group in San Antonio, Texas, in November 1924. He subsequently toured various Air Service installations and other aviation-related locations. His visits included the School of Aviation Medicine (SAM) at Mitchel Field; the eastern terminus of the transcontinental airmail system at Hazelhurst Field, Long Island; and the dirigible hangar at Lakehurst, N.J. He spoke before the association meeting, the U.S. Red Cross in Washington, and the Army and Navy and Union League Clubs in New York. His European colleagues learned of his experiences in the United States and the state of U.S. sanitary aviation in an article he published in *Les Archives Medicales Belges* in 1925. Picque was unimpressed by U.S. air ambulances, which he thought inadequate to support an aeromedical evacuation system he considered necessary for a country as large as the United States. To his European audience he later remarked, "we could help them in this regard." On the other hand, Picque was very impressed with two aspects of aviation medicine that he encountered in the United States: the separate medical department for Army aviation, and an institution of flight surgeons.[82] Sources of dialogue expanded with the beginning of an aviation analogue to *The Military Surgeon;* in 1929, Louis H. Bauer founded *Aviation Medicine*, the journal of the Aero Medical Association. Bauer had commanded SAM in the mid-1920s.

A Douglas C–1, Air Service aircraft modified to accomodate patients.

Developments in European sanitary aviation also formed part of the dialogue conducted in various international forums that arose after World War I. One was the International Congress of Military Medicine and Pharmacy. The congress evolved from the surgical conferences held by the allies in Paris during the war, and it held its first meeting in Brussels in February 1922 under the patronage of King Albert. Its objective was to exchange medical, surgical, and sanitary lessons learned during the war and in reconstruction. To facilitate this exchange, it sponsored a journal, the *Bulletin International*, published monthly with side-by-side English and French texts as a supplement to the *Annales Belges de Médecine Militaire*. Articles about pertinent developments in participating countries, including the United States, appeared in the bulletin from time to time.

More than thirty nations sent delegates to the first meeting, including twenty that sent official representatives from the medical departments of their army or navy. The United States had a representative, Commodore William Seaman Bainbridge, a reserve Navy doctor who had been authorized by the government to attend, but at his own expense. Bainbridge was made a member of the executive committee that was responsible for arrangements for future congresses, and the *U.S. Naval Medical Bulletin* devoted an entire issue to his report of the proceedings.[83] At this first meeting, Dr. Uzac and Dr. Vincent of the French ministry of war discussed the evacuation of the wounded and noted that the use of air ambulances, or sanitary airships, already initiated on a limited scale in some theaters of war seemed to promise good results for the evacuation of wounded men under the best possible conditions of security, rapidity, and comfort.[84]

Bainbridge was also a delegate to the second congress and to meetings of the executive committee held in Rome in May and June of 1923. Speakers, who once



A Fokker T–2, Air Service aircraft modified to accomodate patients.

again included Dr. Uzac of France, discussed medical and organizational aspects of evacuation by various means, including sanitary airships.[85] These discussions were highly relevant to issues regarding the selection and preparation of the wounded for evacuation by air, which emerged as the performance of transport aircraft increased and their use to evacuate the sick and injured became more common.

The executive committee of the congress also sponsored the First International Congress of Medical Aviation which met in Paris during May 1929. Here too, discussions dealt with some very pertinent medical, legal, and practical questions, although Major De Block, the rapporteur, expressed regret that none of the major powers, including the United States, had seen fit to provide information about their experiences with sanitary aviation in their colonial experiences. This definitely restricted the value of the conclusions reached and presented, he believed, only a partial impression of sanitary aviation during 1929.

The congress did discuss materiel and personnel aspects of aeromedical evacuation, including prospects for pressurized aircraft, the safety of transported patients from fire and other aviation hazards, practical difficulties of using commercial aircraft as air ambulances, and the advantages of using autogyros for landing in a densely populated country.[86]

What De Block considered the big question—medical-surgical indications for transport by air—was barely touched upon. He expressed some of his own observations and cited the work of a physician who was addressing this issue by subjecting guinea pigs with various kinds of wounds to reduced pressure in a caisson. The experimenter's conclusion was that all superficial wounds and wounds of the extremities were perfectly suitable for air transport, but he warned that pen-

etrating wounds of the abdomen, chest, or stomach required extreme caution. Obviously shaped by the war just past, De Block's evaluation of these warnings was that they were fine for peacetime, but in merciless war he would rather take deliberate risks than wait for the problematic arrival of essential help.

Under the rubric of "personnel," the congress dealt with the question of keeping aviators and medical personnel of sanitary aviation wholly separate from the operational forces. Pointing out inconsistencies rooted in the prevailing imperialism of the major European powers, the session rapporteur noted, apropos of the utilization of the French air force against insurgents in Morocco, that

> The conditions in Morocco permitted the employment of the Air Service on bombing duty during the morning and transporting wounded in the evenings, reconnoitering under the illusory protection of the Geneva Cross. It must be different in civilized *war*.[87]

The congress also commented upon three decisions made by the Twentieth Conference of the International Red Cross in 1925 regarding the immunity of medical aviation. These repeated the need to extend the 1906 Geneva Convention protections for mobile sanitary formations to materiel and personnel employed exclusively in transporting or treating the wounded by air; reaffirmed the loss of these protections if the formations or personnel committed hostile acts against the enemy; and repudiating the innocence of the prewar period, declared that sanitary aircraft should not be employed in searching for the wounded on the battlefield. In a somewhat dry aside, De Block agreed, noting that whereas in 1912 sanitary aircraft had been viewed as an instrument to be used in the evening after a battle to locate the wounded who were left, perhaps in small groups, or nests, battles now had no evenings, and "nests of wounded" existed only in the imagination of "correspondents in the Balkans."[88]

De Block disagreed with a consensus of the Red Cross conference that sanitary aircraft should be allowed to fly with impunity over enemy lines; as the Red Cross representatives had put it, "the carrying of wounded comes before anything." De Block commented that the Red Cross should not be overindulged because the enemy could not reasonably be expected to give sanitary aircraft permission to survey his lines and positions. For this reason, De Block stated his own preference for forgoing immunity for sanitary aircraft in the forward area of an army in the field, while admitting that no one, in Paris or elsewhere, agreed with him.[89]

The International Committee of the Red Cross (ICRC) was active during the 1920s, particularly regarding proposals to extend the protections of the Geneva Convention of 1906 to air ambulances, an objective that was finally achieved in the Geneva Convention of 1929 in line with the decisions of the Twentieth Conference. The ICRC journal, the *Revue Internationale de la Croix-Rouge,* published numerous articles about developments in sanitary aviation and the relevant

work of the various ICRC subcommittees.[90] The *Monthly Bulletin of the League of Red Cross Societies*, published in Paris in English, also had frequent short articles about sanitary aviation, including notices of periodic meetings of the International Air Ambulance Congress which began in Paris in 1929, and similar organizations such as the International Study Commission on Air Ambulance Services formed in 1934.[91]

The ICRC was also involved with sanitary aviation in other ways. One of its subcommittees, the Permanent International Commission of Standardization of Field Medical Equipment, worked with the Executive Committee of the Congress of Military Medicine and Pharmacy to standardize patient litters for aircraft and other conveyances in which litters might be carried.

The United States contributed to this work, but its views on sanitary aviation do not seem to have been accorded much weight, probably because the development of aeromedical evacuation in the United States during the 1920s and 1930s was so limited compared with that developed by the United States' European counterparts. This was rather graphically demonstrated in 1930 when the ICRC standardization subcommittee chairman rather summarily dismissed the opinion of the U.S. Army surgeon general, General Ireland, that an internationally standardized litter for carrying patients in aircraft was not needed, deeming Ireland's opinion insufficient against the collective judgment of the Commission on Standardization.[92] Whatever the respective merits of the two cases, certainly underlying the European attitude toward any U.S. position was the fact that the European powers had gained far more experience with aeromedical evacuation since the war than the United States had.

For the French, the utility of air ambulances outside metropolitan France had been demonstrated even before World War I ended. They had proved particularly useful in Morocco, where France fought a running war for a number of years with relatively small forces against insurgents in the rugged countryside, far from the coastal cities under French control. The French experienced the difficulties of evacuating wounded by land transportation in western Morocco under hostile conditions during a campaign from October 1911 to April 1912. During this period, an evacuation of 53 wounded from the interior to Casablanca, a distance of some 125 miles, had taken nine days, including a two-day rest stop in Rabat.[93] In September 1918, 15 of some 60 soldiers wounded during a battle in southern Morocco were evacuated in an hour and ten minutes in tactical aircraft flying some 68 miles over country controlled by the insurgents. In January 1919, a French general who had been seriously wounded during fighting in the Sahara was saved through medical aviation. As one of the attending French physicians described it, a surgeon was flown more than 185 miles over the Atlas Mountains to administer to the general within hours. Because the available medical facilities proved inadequate for the general's effective treatment, he was evacuated by a tactical aircraft in less than an hour to a hospital center, where he was treated and later recovered. Had it been necessary to move him by surface means to receive

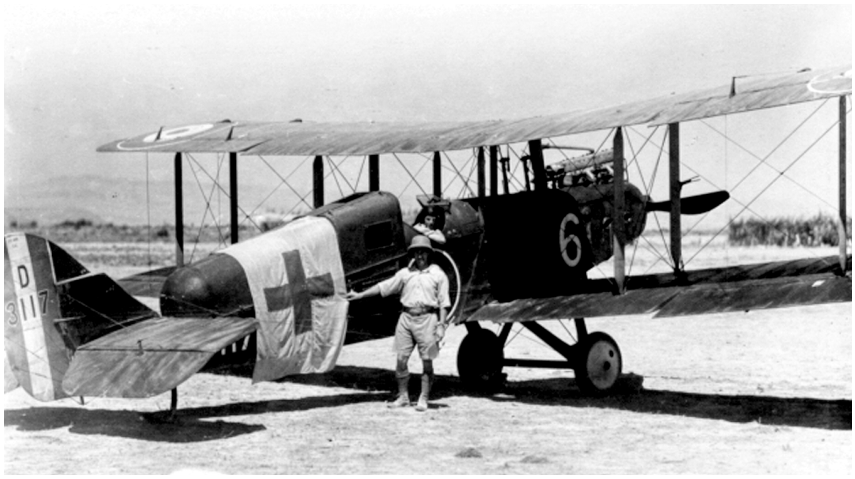
the proper care, it would have meant a journey of nine days, from which he probably would not have recovered.[94]

By 1921, Dr. Chassaing's air ambulances began to arrive in North Africa and the Middle East, where similar difficulties of terrain and hostilities generated combat and casualties. Both tactical aircraft and air ambulances were used extensively to evacuate casualties from Morocco during the Riffian war in the 1920s and from Syria during the same period. By the end of 1925, almost 3,000 cases had been evacuated by aircraft, without accident, and air ambulances were stationed in Indochina and French West Africa.[95] By the early 1930s, a senior French medical officer could hail sanitary aviation as part of the normal sanitary equipment of North Africa and all areas outside metropolitan France, without which it was inconceivable that the French Sanitary Service could perform its mission.[96] Notably, at the twelfth aeronautical exhibition held in Paris in December 1930, aircraft manufacturers showed seven different aircraft designed to be used as air ambulances. Among them was a trimotor made by the *Société Provençale de Constructions Aéronautiques* that had many specialized features, including a table, chair, and cabinet in which to store medicines and equipment, a washbasin, a cooling and heating system, and large doors through which sick and wounded could be loaded easily. It was advertised as having the ability to fly at an altitude approaching 3,300 feet with one of its three engines inoperative.[97]

The experience of Great Britain in the Middle East and India was similar. The British had experimented with aircraft to carry its wounded prior to 1914, but the official position of the War Office against evacuating the wounded by air precluded any serious attempt during the war to develop an aeromedical evacuation capability. In 1913, Lt. Col. J. D. F. Donegan of the Royal Army Medical Corps conducted experiments with a biplane amphibian aircraft that had been fitted as a flying operating room and was capable of evacuating two wounded men. Aware of Dr. Reymond's work, Donegan apparently approached the War Office with some sort of air ambulance proposal before the outbreak of war, but his proposal was not accepted.[98]

As with air evacuations conducted by French pilots operating with the Serbian army in 1915, the first British evacuation of a wounded soldier came in 1916 in response to both a medical and a tactical necessity. During the British campaign against the Turks in the Sinai desert, a trooper of the Imperial Camel Corps had his leg shattered by a bullet fired by armed Bedouins. He was apparently the only casualty because, although an attack had been planned on the Turkish garrison, its occupants surrendered without a fight. The local medical officer prevailed on a pilot from the Royal Flying Corps to fly the trooper in a tactical airplane to a casualty-receiving station some 45 minutes away by air, versus the 2½- to 3-day trip that would have been required by camel and rail.

British tactical aircraft were also used during the war to fly surgeons to areas where their skills were needed, but it was not until after the war that aeromedical evacuation was officially undertaken. As Billy Mitchell and his inspection team



DH–9 Air Ambulance with Z Force in British Somaliland, 1919.

reported, the British began to plan for the use of transports as air ambulances in the early 1920s. After the British experienced the same difficulties in their areas of colonial interest that the French had experienced in theirs, the British began almost immediately to use converted tactical aircraft as air ambulances. During the Zed Expedition in British Somaliland against the rebel Dervishes, a DH–9 was fitted out as an air ambulance and used extensively to evacuate casualties from the interior to hospital care at British bases.[99] An RE8 reconnaissance aircraft was also used as an air ambulance in 1920 during a British expedition on the Syrian-Iraqi border. Surrounded in a small town, the British evacuated a British officer suffering from a bullet wound in his liver the 200 miles to Baghdad in the RE8 in a flight lasting more than three hours.[100]

Air evacuation became a standard British practice in the Middle East, particularly in Iraq where the British mandate faced stiff resistance during the 1920s. In many respects, the use of aircraft to evacuate casualties seems like a wholly natural counterpart to the policy of air control that the British adopted after World War I. Their objective at the time was to coerce, at reasonable cost in money and lives, the acceptance of British authority over the former Turkish territories that Britain had acquired as League of Nations mandates. Air control mitigated the difficulties and lowered the costs of maintaining expensive ground forces with which to coerce recalcitrant tribes into accepting British authority and the authority of the Hashemite king Faisal I, whom they had installed in Baghdad.[101] The Royal Air Force made use of converted tactical aircraft until 1923 when the new convertible transports that Mitchell and his party described were deployed. Vickers Vernon transports fitted as air ambulances were used extensively thereafter with considerable success. The Royal Air Force medical officer who described the

whole effort, after making recommendations for improvements in both air ambulances and the evacuation system as a whole, noted that the use of the Vickers Vernon troop carriers configured as air ambulances, though invaluable, was "still not clear under the Geneva Convention."[102]

Conclusion

As what might be called the decade of the dictators, which ended in World War II, was about to begin, aeromedical evacuation—or sanitary aviation, its broad European synonym—was flourishing among the European nations. In Europe, events of the 1930s would pointedly raise issues under international law, and conflicting military requirements for the operational forces and their supporting medical establishments would begin to be seen more clearly. In the United States—in spite of the continuing efforts by the Air Corps medical division and others to move the Army beyond its narrow focus on crash rescue and other air ambulance functions by pointing out new opportunities to eliminate elements of the chain of evacuation by literally moving over them—little was accomplished.[103] The appeals by the surgeon general in his annual reports to the War Department requesting a replacement air ambulance as accidents eliminated the Cox-Klemins and use began to erode other modest capabilities found in aircraft like the Douglas C–1s speak loudly about the priorities of the Army and the War Department and the continuing fixation of those agencies with the lessons of World War I. It would take extraordinary leadership, a growing perceptible threat, and the beginnings of rearmament to change the situation in the 1930s.

Chapter 2

DAVID GRANT AND THE EMERGENCE OF ORGANIZED AEROMEDICAL EVACUATION IN THE UNITED STATES ARMY

Advances in aeronautics achieved in the 1930s led to aircraft with markedly greater capability. Transport aircraft could travel longer distances and carry more than the handful of litter patients associated with the air ambulances still found on most Army airfields as the decade began. Over the course of the 1930s, rudimentary aeromedical evacuation systems were being developed in many European countries, including the Soviet Union. These systems used a variety of aircraft as air ambulances to meet peacetime medical emergencies, and the Spanish Civil War and Russo-Finnish War showed that aeromedical evacuation could be useful not only in civilized warfare but in colonial conflicts as well. The Luftwaffe's evacuation flights to Germany were particularly valuable in the development of an aeromedical evacuation doctrine because they provided the U.S. Army's proponents of transporting patients by air with empirical data on the effects of aeromedical evacuation on patients suffering different kinds of wounds and illnesses. Such data permitted validation of the theoretical criteria for patient selection derived from the expanding knowledge about the physiological effects of flying on the human body. The Aeromedical Research Laboratory established in 1934 symbolized the search for increased knowledge and contributed to its attainment.

Information on aeromedical evacuations outside the United States was widely available to the Army's medical professionals. Journals like *The Military Surgeon* contained articles by U.S. proponents who came chiefly from the ranks of the medical section of the Air Corps. However, the direct experience of the

Army Medical Department and the surgeon general with the transport of patients by aircraft was limited essentially to emergency medicine and further constrained by limited budgets. Consequently, the Army's medical hierarchy tended to view aeromedical evacuation as a potential supplement to the chain of evacuation in the context of war. The medical department's evacuation planning was in accord with organizational and doctrinal changes to the Letterman scheme that the Army had made after World War I. These changes were based on a model of essentially static conflict using casualty rates drawn from those the service experienced on the western front, though the model's limitation with regard to mobile warfare was acknowledged.

Perceptions of aeromedical evacuation by the surgeon general and his planners were also influenced by strains emerging within the Army between its airmen and the General Staff that were reflected within the Army Medical Department. The maturation of aviation medicine as a separate body of specialized knowledge, as well as the development of doctrine at the Air Corps Tactical School (ACTS) that emphasized an autonomous strategic mission for the Air Corps, contributed to a growing corporate sense among flight surgeons which they shared with the Army's fliers. More importantly, it helped deepen a cleavage within the Army Medical Department that had existed to at least some degree since World War I. The difference was basically between officers in the department who were flight surgeons and had essentially cast their lot with the AAF and the more traditionally minded Army surgeons who identified with the surgeon general and embraced therapeutic rather than preventive medicine. At least some of the latter group revealed a rather jaundiced view of both airplanes and aviators, as did some members of the prewar General Staff.

David Norval Walker Grant was instrumental in overcoming these constraints and on the eve of war successfully secured War Department recognition of a larger role for aeromedical evacuation. A member of the Army Medical Department since 1916, Grant became a flight surgeon only in 1931. Assignment immediately following graduation to Randolph Field, Texas, the newly opened center for Air Corps training, and in 1937 becoming the first flight surgeon to attend the ACTS informed Grant of the problems faced by the Army's aviators and flight surgeons. It also brought him into contact with the spirited and definitely separatist group of young Air Corps pilots who would emerge as the wartime leaders of the AAF. Assigned to the medical section of the Office of the Chief of the Air Corps in 1939, Grant's institutional and personal loyalty won the respect of Hap Arnold, chief of the Air Corps and soon to be AAF commanding general. Having Arnold's confidence was a major asset in Grant's success in two important endeavors: first, in evading an effort by the surgeon general to end the autonomous status that the Air Corps medical department had essentially realized, and second, in working with the surgeon general's office and the General Headquarters (GHQ) surgeon to develop and promulgate an official table of organization (T/O) for aeromedical evacuation units. The status of aeromedical evacuation in the U.S. Army when the

The Cox-Klemin aircraft, designed for and dedicated to aeromedical evacuation.

Japanese attacked Pearl Harbor was, therefore, basically twofold: an official Army recognition of the value of evacuating patients by aircraft, as exemplified by the publication of a War Department T/O; and an implicit commitment to use aeromedical evacuation units in ways yet to be determined, should war come.

The Evolution of Air Ambulance Requirements in the United States

Albert Truby, director of the Air Service medical department from 1919 to 1923, had envisioned air ambulances as fulfilling different functions related to the varied medical conditions of individuals being transported.[1] Victims of aircraft accidents requiring emergency first aid and movement to the nearest medical facility required aircraft capable of taking off and landing in short distances on unprepared ground. The transport of patients whose conditions were stable but who required definitive treatment at one of the Army's general hospitals required aircraft with different characteristics. Because the Army had only a few such hospitals and they were typically some distance from the training bases, aircraft used for this type of aeromedical evacuation required features to permit patient comfort and space for attending medical personnel. Although the War Department had accepted Truby's concept, funding constraints and the more obvious need for effective crash rescue vehicles led during the 1920s to an emphasis on air ambulances. As aeronautical engineering advanced rapidly during the same decade, development of larger, longer-range transport aircraft indicated that they might be considered for use as air ambulances in the narrow sense as well as for patient transport as envisioned by Truby.

Procurement of the two Cox-Klemin airplanes specifically designed for and dedicated to aeromedical evacuation had been one result of the obvious need to replace the hodgepodge of modified trainers and tactical aircraft used for crash rescue that had proliferated independently at Air Service flying training fields during World War I. As a way of providing additional ambulance capability and following the British lead, the Air Corps directed that all transport aircraft purchased after 1924 have brackets installed to permit the installation of litters for carrying patients in emergencies.[2]

The Douglas C–1 transports procured in the late 1920s incorporated attachments on the floor and walls of the cabin that allowed them to be converted to litter carriers, and their assignment to various Air Corps stations together with the Cox-Klemins provided a distributed air ambulance capability that was widely used.[3] One of the Cox-Klemin aircraft, based at Kelly Field, had carried twenty-six patients in its first six months of service in 1926, and it responded to crashes and other emergencies within a radius of several hundred miles of San Antonio. In April 1927 this aircraft evacuated tornado victims from Rocksprings, Texas. Also during 1927, the C–1 stationed at March Field made numerous flights carrying emergency patients to Army general hospitals in San Diego and San Francisco.[4] Air ambulances were also used to good effect in Central America, in Panama, where C–1s stationed at France Field flew mercy missions transporting both military and civilian patients from remote locations in the jungle to Albrook and France airfields, and in Nicaragua during the U.S. Marine operation against the Sandinistas. In Nicaragua, using an improvised air ambulance, eighteen wounded marines were flown to safety in ten flights from a besieged detachment in January 1928.[5]

As the Cox-Klemins began to wear out, their imminent demise helped determine what requirements should be given priority in their replacement. Designed primarily for the purpose of rescuing downed fliers, the Cox-Klemins had relatively short ranges and were unique in their ability to land and take off from extremely short and unprepared fields. Reserving them for or dedicating them to crash rescue or similar emergencies was a decision essentially inherent in their design and acquisition. As the Air Corps began to procure commercial transports having longer range and greater lifting capability, which became increasingly useful for carrying passengers or cargo in logistic support of Air Corps stations, new questions arose regarding their use and the wisdom of dedicating some aircraft exclusively to aeromedical evacuation.

The issue of which approach to adopt—whether to design special aircraft and dedicate them to perform as air ambulances, or whether to use commercially developed transport aircraft fitted with attachments permitting them to be converted into air ambulances in emergencies—was decided in 1930 by Maj. Gen. James E. Fechet, chief of the Air Corps. Despite the urging of his chief flight surgeon, Lt. Col. L. M. Hathaway, that at least a few special hospital planes be constructed to continue further development of the type, particularly in the area of patient com-

fort, Fechet opted for using transports for air ambulance work.[6] He may have been partially influenced by Hathaway's enthusiastic comment that a temporarily modified Ford Trimotor transport used during annual field exercises at Sacramento, California, in the spring of 1930 represented "a long forward step toward development of the ultimate air ambulance."[7] The Air Corps chief directed that suitable installations be developed for converting transports for aeromedical evacuation, and his successor, Benjamin Foulois, ratified the decision in 1933.

Responding to a request from the Army adjutant general for a description of the military characteristics desired for future air ambulances, Foulois's deputy, Oscar Westover, submitted a statement of military characteristics that essentially duplicated the characteristics submitted for a future cargo airplane that the Air Corps also requested. The air ambulance was to be a single-engine or multiengine land plane with a maximum speed of 150 mph, a service ceiling of 16,000 feet, and a range of 500 miles or more at a cruising speed of 125 mph. Its mission was to evacuate the sick and wounded from airfields in a theater of operations to the rear areas while carrying a pilot, a medical attendant, and either ten seated or six litter patients.[8]

Because, as the adjutant general noted, cargo plane characteristics had already been approved by the War Department, no separate air ambulance approval was made. The surgeon general acknowledged that the large aircraft would provide a practical air ambulance for emergencies, but he reaffirmed the need for a new crash rescue type. Speaking for the surgeon general, his assistant Lt. Col. T. E. Darby asserted the urgent need for about four small rescue type air vehicles capable of transporting a pilot, medical attendant, and two litter patients and of landing and taking off in a minimum distance on rough terrain, all of which in effect duplicated the Cox-Klemin's capabilities.[9]

Statistics on flying accidents continued to reflect the dangerous nature of flying, particularly during flight training, bolstering the surgeon general's view. In FY 1931, the Air Corps suffered 456 accidents in which 26 people died and 75 were injured. The next fiscal year had an even higher casualty rate: 50 were killed and 89 injured in 423 accidents. Because approximately 1,900 Air Corps regular and reserve personnel, including pilot trainees, were engaged in flying operations, these accident and death rates are quite high.[10]

Consistent with its new emphasis on converting transport aircraft for aeromedical evacuation, the Air Corps had procured a specially modified Fokker transport in 1930. Its capabilities and characteristics were quite close to those described as ideal for future air ambulances and, three years later, for cargo planes.[11] This aircraft, when used as an air ambulance, had storage facilities for medical equipment. It performed effectively in the first large-scale Air Corps maneuver of 1931, which was also the first maneuver that included the medical division. However the Fokker proved unsuitable for crash rescue work, and this led the flight surgeon, who was serving as surgeon for the maneuver, to review the surgeon general's response to the 1933 Air Corps statement of air ambulance characteristics. He rec-

ommend that two types of air ambulances be used in future maneuvers: one would be used to transport patients; the other would be used for crash rescue work.[12]

Some members of the Army medical community had begun to stress the potential value of aeromedical evacuation in war. These individuals viewed the development of advanced transport aircraft as providing more than just a way to move patients quickly and efficiently in an emergency. Army medical officers began to write and lecture about using aeromedical evacuation to meet wartime requirements, noting that this form of evacuation might well be the method of choice in any future conflict. Two seminal articles appeared in *The Military Surgeon*, which required the surgeon general's approval for their publication. Each author pointed to the commercial transport as a basis for a new system of aeromedical evacuation that would materially improve the wartime treatment of casualties. The article by flight surgeon Capt. Robert K. Simpson appeared in January 1929; the other by Lt. Col. Darby appeared in August 1932.[13] Both reached wider professional audiences through other media. Simpson's article appeared, unattributed, in *The Army Medical Bulletin* in September 1931; Darby's was presented as a lecture to the students at the ACTS in January 1932.[14]

These two articles are quite similar in concept and approach; they contain the first truly comprehensive statements of how an aeromedical system for the U.S. Army could be organized and operated. The authors identify many of the tactical, strategic, and logistic arguments for such a system.[15] Their assumptions are also useful for revealing their frameworks of reference. To the degree that the leadership of the Army Medical Department viewed an aeromedical system similarly, and evidence shows that they did, serious problems could arise if their views turned out to be inconsistent with the realities of the coming global conflict. The medical department could find itself having to reorder its evacuation planning in unanticipated ways and thus be forced into using aeromedical evacuation in ways that its members might find difficult to deal with.

Simpson and Darby essentially describe the same advantages and offer generally the same prescriptions for organizing an evacuation system to supplement or replace the Army's then-current Letterman-based system, which was keyed to dividing a theater of operations into a combat zone and a communications zone (COMZ). The COMZ adjoined the rear area of the combat zone and was under separate command authority, although both zones came under jurisdiction of the theater commander. Simpson and Darby both saw evacuation by air as offering a significant advantage over the Army's ground-based system because air ambulances made it possible for the seriously wounded to receive much earlier definitive treatment. The generally agreed-upon window during World War I for the most effective surgery was six to eight hours post-incident, and greater aircraft speed, a lack of obstacles to their flight, and elimination of steps in the Army evacuation system were used to achieve this time frame.

In the Army system, individuals whose wounds were serious enough to justify their evacuation from the combat zone to the COMZ passed through aid sta-

tions, hospital stations, and evacuation hospitals on their way to general hospitals for definitive treatment, the whole system being staffed by medical personnel of the medical regiment attached to each infantry division. The regiment comprised collecting, clearing, and ambulance companies manned with personnel possessing medical skills to provide first aid and interim treatment and the personnel and equipment needed to transport patients along the evacuation chain as far as their condition dictated. Included along the way might well be a stop at a mobile surgical hospital for the unevacuables—those so seriously wounded that they could not yet stand the rigors of being moved to a general hospital.

For those who could be moved, the journey would be continued by hospital train or possibly hospital ship. Where depended on whether or not mobile forces or forces fighting on a fixed front were being supported. Simpson and Darby postulated removing patients from points close to the front lines in the combat zone and transporting them rapidly by air to general hospitals in the COMZ, thus eliminating several links in the chain of patient transit toward the rear areas. The resultant compression of time when moving and processing casualties would mean that a wounded patient could receive definitive care in a general hospital in the COMZ sooner than if he had been subjected to being processed through the Army's normal ground-based evacuation system.

The reduced stress experienced by a patient transported by air compared to motor ambulance or hospital train would mean that previously unevacuable wounded, which Simpson identified as the most seriously hurt, especially those with wounds of the head, neck, or abdomen and those with fractures of the long bones, the femur in particular, could be moved to general hospitals for definitive surgery. This additional benefit was important because it would reduce the prospect of having to undergo surgery twice: once at a mobile surgical hospital, at which unevacuables were given interim treatment, and later, definitively, at a general hospital.

Medical personnel could be conserved by eliminating links such as the mobile surgical hospitals, which would allow them to be reassigned from hospital facilities in the combat zone to general hospitals in the COMZ. Because casualty rates were unaffected, the total number of patients to be treated would remain the same. The aeromedical system would make it possible to redistribute medical personnel more efficiently and make it possible to perform surgery more quickly and under better conditions than those available in the field.

Darby, who provided a bit more specificity in his article than Simpson did, calculated that a practicable aeromedical evacuation service could probably reduce the Army medical service in the combat zone by ten surgical hospitals, eight evacuation hospitals, and two army medical regiments. He also calculated that, because air ambulances returning to the forward areas could carry medical supplies, aeromedical evacuation could reduce by approximately one-third the amount of medical supplies maintained in the army medical depot. Other savings would also be possible, such as reducing the number of hospital trains in the COMZ.

Darby and Simpson both commented upon how air ambulances would ease pressures on ground lines of communication (LOCs), and they described the proposed aeromedical units in some detail. They addressed the number of aircraft in a flight and the number of flights in a squadron, their assumed litter and ambulatory patient carrying capacity, and the command echelon at which control of the air ambulance units should be exercised.[16] Although Darby believed that the great mobility of air ambulance units dictated that they be centrally controlled as part of GHQ aviation and operated under the direction of the GHQ surgeon, Simpson proposed that such units be assigned to ground commanders, for instance, assigning an air ambulance squadron to each infantry division. Both authors explicitly stated that aircraft used as air ambulances would have to be designated for their protection in accordance with the prescribed 1929 Geneva Convention.

Neither author discussed medical regulating criteria—parameters for selecting or rejecting patients for evacuation—with respect to the physiological stresses induced by the lower oxygen level and reduced atmospheric pressure encountered during flight. Their solution to the problem of securing aircraft and crews to equip their proposed wartime aeromedical evacuation systems foreshadowed the future Civil Reserve Air Fleet (CRAF) arrangements, whereby airlines in return for subsidies accept modifications to their aircraft to make them suitable for military use. Both men recommended the wartime mobilization of civilian commercial aircraft and their crews and their conversion into air ambulances.[17] An Air Corps officer, whose favorable commentary was published with Simpson's article, anticipated the CRAF even more strongly by suggesting that aircraft manufacturers be advised of this prospective use so they could facilitate a future conversion by taking appropriate design actions like increasing the size of loading doors and including devices that would permit an immediate installation of litters.[18]

Although quite prescient about future aeromedical evacuation in general, Darby and Simpson made several assumptions that have other implications. The framework for their analysis was based on the Army's experience on the western front in World War I. The casualty rates they used to calculate the possible number of necessary aeromedical evacuation missions therefore might not be relevant for the type of war the nation's military might fight in the future or, more importantly, for the size of the aeromedical evacuation capability required because, in effect, the rates were postulated on a war of fixed position dominated by frontal attacks against strong defensive lines, a tactical scenario that tends to generate large numbers of casualties.[19] On the basis of warfare of fixed position, as Simpson put it, with the enemy having the capability, as it did in France, to shell possible landing fields with artillery, he and Darby assumed that air ambulances would not be able to operate any closer to the front lines than the vicinity of the station hospitals, approximately five to six miles behind the front. Still obviously thinking of France, neither man apparently considered this a major problem because they assumed that roads in the combat zone would allow motor ambulances to bring in the seriously wounded from the collecting stations to evacuation airfields.

Lt. Col. G. P. Lawrence immediately challenged Darby's assumption that air evacuation was constrained to the rear areas of the combat zone. This reserve officer argued in the pages of *The Military Surgeon* that restricting air evacuation to the rear areas was an unnecessary abdication of that part of the medical department's responsibility to evacuate casualties from the combat area as rapidly and safely as possible. The solution Lawrence offered was the autogyro, an unconventional helicopter-type aircraft first brought to the United States in 1928. The autogyro could descend essentially vertically to points immediately behind the front lines and rise again with, depending on the wind, a very short or virtually no takeoff roll.[20] The seriously wounded could then be flown directly to general hospitals, thus reducing the various elements in the chain of evacuation as both Darby and Simpson envisioned.

Another medical department surgeon had also recently written in *The Military Surgeon* about the possible use of autogyros as air ambulances, and the whole minidebate indicated considerable intellectual ferment within the Army Medical Department.[21] The concept proved to be impractical for most of the 1930s because, as Lt. Col. Louis H. Bauer, a former SAM commandant, ruefully lamented in a paper read to the Association of Military Surgeons in the autumn of 1929, in spite of the vast strides that the United States had achieved in aeronautics it was hopelessly behind Europe in the development and use of the airplane ambulance.[22] In fact, progress would remain static until events in Europe generated interest in U.S. rearmament and until lessons learned from the European use of aeromedical evacuation might be applied to improve medical support for the U.S. Army.

Factors Affecting the Development of Aeromedical Evacuation in the 1930s

The lack of material progress stemmed largely from the lack of money allocated to the War Department during the Great Depression, which made the Air Corps unwilling to expend funds on new air ambulance aircraft when it needed to modernize its combat fleet. This continued to be true during the period after September 1939 when the Air Corps and the Army as a whole began to expand. This greater priority on modernization was coupled with the growing dependence of the Air Corps on air transport to support training and other operational activities and its consequent reluctance to divert transports from their primary function. The surgeon general's annual reports to the Secretary of War for 1930 through 1941 repeatedly contain statements that no additional ambulance planes were procured during the preceding year although they were urgently needed.[23] In 1932, the chief of staff of the field service section at Wright Field even attempted unsuccessfully to reacquire four transports that had been converted into air ambulances because they could carry aircraft engines more easily than could the other available cargo planes.[24]

Another factor was clearly at work with regard to the lack of push within the Army for a more expansive view of the military value of aeromedical evacuation.

It is difficult to document or assess its scope and what specific effect it might have had on the development of aeromedical evacuation during this period, but evidence suggests that a strain of skepticism, if not hostility toward aviation and aviators, existed among some senior members of the army General Staff and the Army's Medical Department. Presumably intensified by the Air Corps leaders' open struggle with the General Staff during the 1930s for recognition of the value of an air force—an offensive action centrally directed—this critical attitude undoubtedly colored the opinions of military surgeons toward their colleagues involved in aviation medicine. It would be a visible factor in the evolution of aeromedical evacuation when the United States returned to war.

This skeptical attitude had a lengthy pedigree. In 1917 the headquarters of the American Expeditionary Force (AEF) stifled Colonel Lyster's bid for autonomy at the behest of the chief surgeon of the AEF's LOC. This might be explicable as a bid to preserve sound organizational principles, but the hostility that Gen. John Joseph Pershing and his senior staff had shown toward giving aviators with the AEF in France extra pay for flying to compensate for the activity's inherent danger reflects a lack of understanding about the very nature of flying.[25]

General Mitchell's challenge to the General Staff, for which the former head of the Air Service had been court-martialed in 1925, won no friends in the Army hierarchy either for him or for the Army's other aviators. The most interesting reflection of skepticism by the Army's brass and seemingly by the medical department is to be found in a lengthy review of a book published in 1927 by the pseudonymous Briton, "Neon." Pershing's former chief of staff of the AEF and his deputy chief of staff after the war Maj. Gen. James G. Harbord reviewed the book, *The Great Delusion (A Study of Aircraft in Peace and War)*, for *The United States Naval Institute Proceedings*, the U.S. Navy's professional journal. Harbord presented an extraordinarily long review.[26]

The book and Harbord's own lengthy approbatory text are both unrelievedly negative toward the idea that either military or commercial aviation has anything of value to contribute to modern civil society or warfare. Harbord accuses the press of complicity in helping convey an erroneous picture of aviation's progress by allowing itself to be manipulated "by every artifice known to propaganda," and he singles out for condemnation aviators, who, while soldiers and sailors are still studying the lessons of World War I, "make claims in peace far out of proportion to their accomplishments and already assert the obsolescence of armies and navies."[27]

Neon's negativism, which Harbord vigorously embraced, was rooted in two things. First, and primary, was Neon's assertion that the aircraft engine, now improved continuously for thirty years, had reached the upper limit of its development and, because an aircraft's engine was its very soul, there could be "no real scope for generally effective improvement in performance." Second was a lengthy list of aviation's purported inadequacies in peace and war to date. While acknowledging the gallantry and heroism of someone like Charles Lindbergh, Harbord

Maj. Gen. James G. Harbord

agreed with Neon's dire analysis. For example, Neon asserted that after fourteen years of an exhaustive search for efficiency, carrying a pound of freight one mile in an airplane cost about as much as carrying one ton one mile in a railroad train. To Neon, commercial aviation was "inherently unable to operate on a profit-making basis." He made several other comparisons purporting to show the great disparity in cost between commercial transport by aircraft and various surface modes, including tramp steamers and passenger liners.[28]

With regard to his own area of direct experience—war—Harbord approvingly quoted Neon's propositions: "1. that aerial reconnaissance is unreliable, 2. that aerial combats in themselves have no influence upon the advance of the enemy or the ultimate result of the war, 3. that bombing is inaccurate and therefore can only be indiscriminate and against non-military population (including women and children), offending civilized opinion and international feeling if not international law, [and] 4. that such bombing is inherently expensive, is utterly ineffective so far as winning the war is concerned, and that air operations can only be carried on at enormous and disproportionate cost."[29]

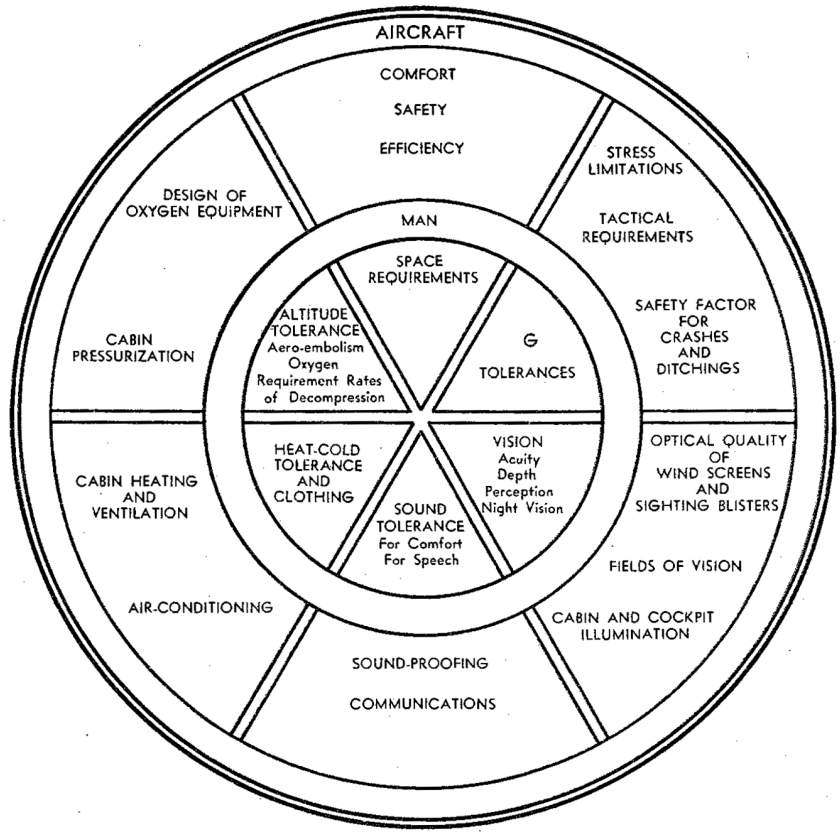
Harbord concluded his review by recommending that everyone with a role or interest in national defense should read Neon's book and that every national leg-

islator should study it to understand the excess to which propaganda for aviation had led the country. He was clear in his own mind that air service "in proper proportion" would always be an auxiliary arm for both the army and the navy, albeit an unreliable one, because factors like weather were beyond man's ability to control. That aviation would ever replace armies or navies was a "neurotic dream," because wars were won on land by taking and holding hostile soil, and aviators could do neither. As far as civil aviation was concerned, Harbord expressed his complete agreement with the idea that although a nation might choose to subsidize civil aviation for strategic reasons, it should never fool itself into believing that civil aviation could have commercial success.[30]

Perhaps useful as an example of how even captains of industry sometimes misunderstand the limits of technology—Harbord was president of the Radio Corporation of America when he published his review—or perhaps useful as an example of the persistent strength of institutional loyalty, *The Military Surgeon* article is relevant for two reasons. The first is the fact that the reprint had to be sanctioned by the surgeon general before its publication, which suggests that the surgeon general agreed in considerable measure with its contents; the second is that the one-page editorial prefacing Harbord's review implicitly agrees with his approbatory comments about Neon's book and its conclusions about aviation propaganda. The editor, a retired Army surgeon, thought that if a mind as able and acute as Harbord's believed Neon had said something worth listening to, readers of *The Military Surgeon* would probably also think the same. The editor agreed with Harbord that a calm estimate of the present status of aviation was in order, a need that arose not just because of the heavy loss of life among aviators trying to emulate Lindbergh's heroic feat, or even the lamentable death of the Association's friend and member, Robert Picque, who the editor characterized as the "foremost exponent of the airplane ambulance," but rather because of the special qualities of medical men who it behooved

> as good citizens and as a stabilizing and influential class, who can diagnose hysteria in the mass as in the individual, to apply the brakes when we see that the public is traveling too fast and not in a safe direction.[31]

Although Neon and Harbord were both correct that aviators sought to gain public support of their cause through well-publicized record flights, altitude and speed firsts, and so on, they were obviously wrong about many things, notably that aeronautical engineering had achieved its potential. The opprobrium with which Harbord castigated aviators as a whole could not help but be carried over to flight surgeons by at least some of their colleagues in the Army's Medical Department. Perhaps rooted in the fundamental difference in their approach to military medicine, with flight surgeons oriented toward preventive measures and the more typical Army doctor toward treatment, flight surgeons were not necessarily held in high regard. In the view of a number of their fellow military doc-



Human factors in aircraft design.

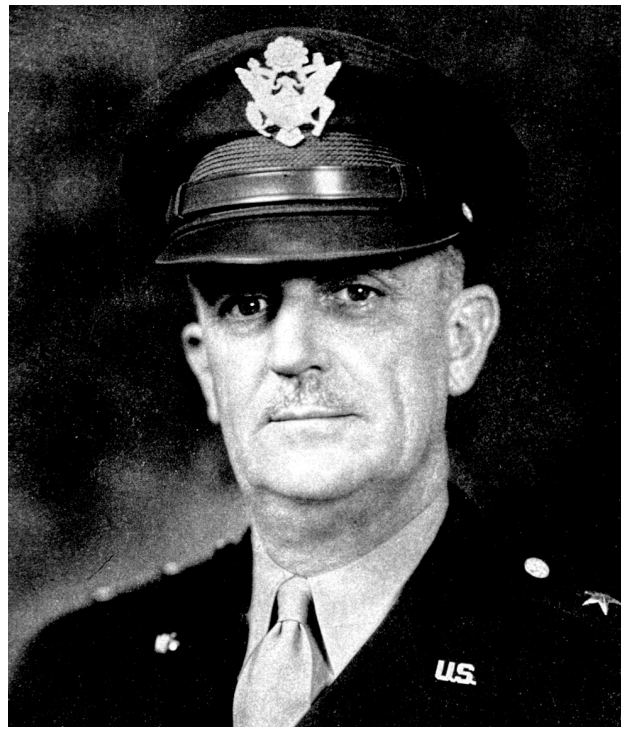
tors, they did not do real doctoring most of the time; they did not go into the field with troops, make rounds in hospitals, or handle routine sick calls for large numbers of the enlisted. They seemed to prefer becoming both flier and doctor and were sometimes almost indistinguishable in their conduct from airmen, who were regarded by some, like Harbord, as irresponsible braggarts, or worse.[32]

Although one should not make too much of the then-current sociology of the Army Medical Corps, what is known suggests several reasonable questions to ask about how the serious consideration of using aircraft to evacuate casualties in war might have been affected. For example, why should credence be accorded to propositions advanced by Army doctors involved with aviation medicine, an area of medicine so far removed from the traditional concerns of military medicine, like surgery, epidemiology, or internal medicine? If aircraft development had indeed reached the limit of its development, what real value could aeromedical

evacuation contribute to medical support of the army, beyond its already demonstrated value in emergency situations, particularly crash rescue?

Another factor could well have conditioned the way flight surgeons were perceived. The fact that at least some received flight pay, particularly during the depression years when Congress required officers to take a cut in pay, surely must have generated some resentment against flight surgeons.[33] Because funds allocated to the War Department had higher priorities than those allotted to aeromedical evacuation, it is probable that the development of aeromedical evacuation within the Army beyond the status of the limited emergency service it had achieved by the early 1930s would not have occurred had it not been stimulated by outside events. The Army Medical Department was committed to the evacuation system that had evolved from its experience in World War I, and aeromedical evacuation was not included as an integral part.

Quasi-official descriptions of the Army's evacuation planning appeared during this period in the pages of *The Military Surgeon.* In 1924 the former First Army surgeon, Lt. Col. T. L. Rhoads, published an exhaustive four-part piece, of "Principles of Evacuation," in which he discussed the possibility of a future aeromedical evacuation capability in very positive terms. He identified the tremendous advantage for patient care that the air service of the future could provide. By solving the problem of how to conduct the speedy transfer of nontransportables to general hospitals, it could achieve the ancillary benefit of eliminating surgical hospitals and redistributing their personnel and equipment to perform other functions. As a corollary, Rhoads argued that, because the practice of using air ambulances to move seriously ill and wounded patients would likely become common, sites selected for new general hospitals would also have to accommodate a nearby landing field.[34] An article published some three years later, and based on a comprehensive lecture on the subject of the Army's system for casualty evacuation, makes no mention of the possible use of air ambulances.[35] Nor did a fairly extensive report on the 1935 First Army Maneuvers in *The Army Medical Bulletin* include any mention or recommendation concerning evacuation by air. Rather, the author, one of the umpires in the exercise, concluded at the end of his lively report that "evacuation to Regular Army station hospitals over considerable distances can be accomplished by motor ambulances without undue hardship upon patients." At almost the same time, Lt. Col. C. L. Beaven, surgeon of the First Air Division (Provisional) during the 1931 Air Corps maneuvers, was making a plea in *The Military Surgeon* for enough air ambulances to equip the Air Corps' training schools and large tactical units for rescue purposes, and for familiarizing the medical department with the value of aerial transportation in evacuating battle casualties.[36] The only people seriously interested in the subject of aeromedical evacuation in the early 1930s were flight surgeons and some Air Corps officers, including Hap Arnold.[37]



Maj. Gen. David N. Grant

David Grant

In 1931, David Grant, then a major in the Army Medical Corps, entered the aeromedical milieu when he graduated from SAM at Brooks Field and qualified as a flight surgeon. A bit older and more senior in rank than his contemporaries at SAM, within ten years, he would be instrumental in convincing the Army to create air ambulance units.[38] He completed both his undergraduate education and his medical school requirements in five years and received his degree from the University of Virginia in 1915. His Army career had begun with enlistment in the Army Medical Reserve Corps, and when he was called to active duty he attended the Army Medical School and was commissioned a first lieutenant in 1917. His selection to attend SAM had a strong element of luck about it, but it was supported by an excellent service record that included assignments in Panama and the U.S. Army of Occupation in Germany. In Germany, he had commanded the occupation force's sanitary train, forerunner of the medical regiment, charged with the evacuation and treatment of casualties. After a year in command, he was transferred to the obstetrics service at the base hospital at Coblenz.

The luck in his selection to attend SAM lay chiefly in his timing. Apparently for the previous four or five years, Grant had thought about applying to become a

flight surgeon but had not done so for family reasons. In 1930, when he made his decision, he had just been assigned as chief of the obstetrics service at the station hospital at Fort Sam Houston, in San Antonio, Texas, which was close to Brooks Field and SAM. A friend, Colonel Hathaway, the chief flight surgeon, provided both encouragement and personal knowledge to the surgeon general's personnel section about Grant's record and suitability. Qualifying as a flight surgeon by graduation from SAM did not ensure service with the Air Corps, so Grant approached Hathaway to ascertain what his chances were to being assigned to SAM. Hathaway warned him that, although things looked promising if his present commander could spare him for three months to attend the school, once qualified, he might have to wait some time for service with an Air Corps unit. Approximately thirty flight surgeons had applied ahead of him for a flight surgeon assignment, and none were currently serving with flying organizations.

Fortunately for Grant, who applied for such an assignment immediately after graduation from SAM, the Air Corps found itself in need of some additional flight surgeons. Randolph Field, a completely new installation located only some fifteen miles northeast of Fort Sam Houston, was about to open as the Air Corps' primary flying school and would soon become the largest Air Corps training base. Within a month of receiving his flight surgeon designation, Grant was ordered to Randolph as both a flight surgeon and the post surgeon.[39]

Grant remained at Randolph for five years, when he aggressively pursued his duties as flight surgeon, enriching the theoretical understanding of aviation medicine gained at SAM with first-hand knowledge of the physical and psychological problems suffered by aviators. Considering his duties as post surgeon, he flew a great deal, although he never soloed to win a pilot's designation. He logged 159 flying hours in 204 flights from July 1932 to July 1933. This compares well with the War Department restriction on flying time to 175 hours in FY 1933, on average, per pilot.[40] It is reasonable to conclude that one useful byproduct of Grant's flying experience when coupled with his previous medical experience must have been a better appreciation of how aerial transportation would affect the medical condition of patients with various types of wounds or illness.

His flying time also put him in touch with some of the young pilots assigned to Randolph who would later rise to senior positions within the AAF and with whom he would later be associated during World War II.[41] His work in the obstetrics service had introduced him to other officer corps members, but his flying time is what introduced him to the Army's fliers. Randolph gave him the opportunity to get to know the then-current group of Air Corps leaders as well as younger officers.[42]

Grant's five-year assignment at Randolph was unusually long, and it ended in March 1936 when he was ordered to ACTS at Maxwell Field, Alabama, as a student.[43] This was a distinct kudo because he was the first flight surgeon ever assigned to this prestigious Air Corps school. It also most probably reflected a certain degree of high-level guiding of his career from above, based on his excellent

record and pleasant personality. In fact, shortly after reporting to ACTS, Grant was selected for promotion to lieutenant colonel.[44] Although formally a professional school, ACTS may have been seen as less prestigious than seditious by the Army General Staff and those who still thought like General Harbord, because the school was in the process of developing a strategic theory of precision daylight bombardment that codified the various claims made by previous airpower enthusiasts for a new primacy in warfare of air force.[45]

Whatever Grant may have thought of the theory of strategic bombardment, his attendance at ACTS again exposed him to some of the most talented and imaginative Air Corps officers of the time—Haywood Hansell, Laurence Kuter, Hal George, Donald Wilson, Hoyt Vandenberg, Muir Fairchild, and Robert Olds, names familiar to students of World War II—men who were to be found on the faculty and among the student body of what he was now a part. Grant was also among men with whom he would be dealing with as commanders and important staff officers during the war. The curriculum was actually broader than might be gathered from most accounts, which assert that ACTS emphasized strategic theory. The nine-month course was divided among the departments of Air Tactics and Strategy (280 hours), Command, Staff and Logistics (172 hours), and Ground Tactics (221 hours). Of the 280 hours allocated to Air Tactics and Strategy, only 110 were devoted to air force, with an additional 41 devoted to bombardment aviation. Attack aviation actually had one more hour in the curriculum than bombardment did.[46]

Grant's Maxwell experience further enhanced his identification with the Air Corps and expanded his circle of aviator friends. In keeping with the major thrust of the curriculum, Grant chose as the subject of his required ACTS thesis the value of autogyros to military operations, rather than focusing on their exclusive use as air ambulances. Within this broader context, he identified the medium-sized autogyro as capable of being used advantageously as a medical ambulance, fulfilling a need for a more mobile ambulance service to support mechanized armies that extended over large areas served by congested roads. His evaluation of the prospects for the procurement of autogyros for this purpose was coldly realistic. He concluded:

> It is questionable, if in time of war, air ambulances of any type would be available, principally due to the question of production of airplanes for this purpose, in the face of the requirements in production for the combat services.[47]

Grant's view seems curious at first glance, given repeated calls during much of the preceding decade from within the medical department for the Army to seriously consider aeromedical evacuation as either a supplement to or a replacement for the ground-based Army evacuation system. One can only conjecture why, but perhaps the most reasonable explanation is that his close association with Army aviators at Randolph and Maxwell together with the broader perspective on mili-

tary affairs provided by the ACTS curriculum gave him a more realistic view of what priorities the Army's airmen had and what the United States would need to fight another war successfully. This may well have been the time, rather his assignment to Randolph Field, when, as he was to tell General Arnold in 1943 in a different context, he "had cast his lot with the Air Force."[48]

Upon graduation from ACTS in 1937, Grant was assigned to Barksdale Field, Louisiana, as base surgeon and surgeon to the 3d Wing of the GHQ Air Force, which was commanded by his friend, Maj. Gen. Frank Andrews. Grant remained there for the two years that saw conflict in Europe and in retrospect seem to have been the rehearsal for the global conflict that erupted in 1939. For medical department officers who had vainly sought to interest the surgeon general and the Army hierarchy in the value of aeromedical evacuation during wartime, these preparatory wars provided for the first time empirical evidence of aeromedical evacuation's medical and military value.

The evidence had been accumulating in the United States to support a serious consideration of casualty evacuation by air. Regardless of the negative official view of the surgeon general and the War Department, a vast body of information had become increasingly available to the U.S. military medical community, arrived at through personal exchanges and reports on aeromedical evacuation systems and through developments in Europe. Both Simpson and Darby in their *Military Surgeon* articles prefaced their discussions with brief histories of the French and British use of air ambulances.

In 1931 the War Department had finally sent an official (and funded) U.S. delegation to the sixth in the series of international congresses on military medicine and pharmacy, which had been meeting biennially in Europe since 1921 and where developments in sanitary aviation were periodically discussed in some detail. Maj. Gen. Robert U. Patterson, U.S. Army surgeon general from 1931 to 1935, served, in his retirement, as a U.S. representative at the Eighth Congress in Brussels in 1935. Dr. Bainbridge, the reserve U.S. Navy medical officer who had participated at his own expense as an unofficial U.S. representative in the congresses throughout the 1920s and into the 1930s also reported on the conferences. His reports were available in various service journals or as separate publications, including his report on the Fifth Congress in 1929 when the extension of neutral status to air ambulances under the Geneva Convention was extensively discussed. By 1935 the United States was also sending official delegations to periodic international congresses on sanitary aviation.[49]

Information on the use of aeromedical evacuation outside the United States was widespread. At approximately the same time Grant expressed his disbelief that aircraft would be made available for air ambulance work in any future war, a flight surgeon stationed at Randolph Field was publishing another passionate plea for the U.S. Army to adopt aeromedical evacuation for the seriously wounded. His rationale was not just that moving a patient by air was better for the patient, it was that U.S. soldiers should be able to receive the same efficient treatment afforded

patients of other nations that had obtained and were using air ambulances. The journal literature of the time indicates that these other nations included Argentina, France, Sweden, Poland (whose chief of aviation medicine visited Randolph in 1937), Great Britain (whose first dedicated air ambulance was put into service in 1936), and even the former pariah nation, the Soviet Union, which had decided to develop an aeromedical evacuation system in 1933. By 1935 the Soviet Union was reported to have a system with more than ten air ambulances supported by detachments of personnel in forty-one towns. Several hundred specially trained doctors and nurses attended patients in flight.[50]

In June 1939 the International Congress of Military Medicine and Pharmacy was invited to the United States, and delegates to the Tenth Congress met at the Willard Hotel in Washington, D.C. An exhibit produced by SAM was reportedly well received by the attendees. Many of the highest-ranking medical officers of their respective countries attended, among them, General A. Savornin, surgeon general of the German army; Senator Count Aldo Castelloni di Chisimaio, recently in charge of medical activities in the Italian campaign in Ethiopia; surgeon Vice Admiral P. T. Nichols, surgeon general of the British navy; Rear Admiral Fikentscher, surgeon general of the German navy; Air Commodore H. E. Whittingham, surgeon general of the Royal Air Force; and Maj. Gen. Erich Hippke, director of the medical service of the German air force and a proponent of aeromedical evacuation.[51]

Whether the actual aeromedical evacuations being undertaken by the fascist powers, Germany and Italy, were discussed is unknown, but there is reason to believe that at least the Germans were reticent. Many years later, Gen. E. Evrard, retired medical director of the Belgian air force, recalled somewhat wryly his memories of what he termed the inanities introduced into the Geneva Convention in 1929 concerning air ambulances. From his perspective, lawyers had injected provisions that were utopian, limiting protection under the Geneva Convention to aircraft reserved exclusively and permanently for aeromedical evacuation and painted white and marked precisely in accordance with rules regarding the size and location of the prescribed red crosses. He pointed out that their impracticality was demonstrated during the Spanish Civil War when the Germans and Italians quietly ignored these restrictions and used their unmarked three-engine transports—their Ju–52s and Savoia-Marchetti S.73s, respectively—to evacuate their sick and wounded who had been fighting with Gen. Francisco Franco in Spain.[52] Information obtained the following year on the use of Luftwaffe transports to evacuate casualties from the German Condor Legion would apparently serve as the catalyst to move the U.S. War Department to act finally on developing an aeromedical evacuation system for the Army. If news of the Luftwaffe's successful use of transport aircraft as air ambulances in Spain was the catalyst, Lt. Col. David Grant, U.S. Army Medical Corps, was to be its agent.

After two years at Barksdale Field as flight surgeon and base surgeon, Grant was summoned to Washington to assist Colonel Beaven, chief of the medical sec-

tion in the Office of the Chief of the Air Corps, apparently on Beaven's initiative.[53] By the time Grant arrived, Beaven was in the Army and Navy General Hospital at Hot Springs, Arkansas, and Grant became the acting chief of the section, an elevation that he viewed as somewhat problematic, confiding to his diary that it "looks like a busy place" where he could see "a great deal of grief ahead, especially as I do not see eye to eye with Beaven, but will have to carry out his policies."[54]

He soon learned the truth of his prophecy when he had to deal with the case of the chief of staff of GHQ Air Force, Col. Clint Russell, who had just been discharged from Walter Reed Hospital as "fit for full military duty," even though his diagnosis was "generalized Arterio-sclerosis, hypertension, and beginning aortitis," and Lt. Col. Malcolm C. Grow, the local flight surgeon, had recommended that Russell be placed on flying status in spite of a blood pressure of 180/98. Grant reluctantly approved Grow's recommendation as a matter of policy, and when he pursued the matter he found that General Arnold, now chief of the Air Corps, had established a policy that in effect left the decision whether to continue on flying status up to a pilot, should he become physically disqualified for flying.[55] Professionally, Grant felt this policy of returning Air Corps officers to full duty when they were obviously unfit for flying of any type was wrong, and he raised the issue with the surgeon general's General Hospital Disposition Boards.[56]

In spite of or perhaps because of Grant's demonstration of professionalism and decisiveness in the months that followed, he was able to transcend several major crises involving General Arnold's sometimes arbitrary policies while earning and maintaining the general's respect. These crises included Arnold's vocal unhappiness with a flight surgeon who grounded his crew in Hawaii without Arnold's knowledge and the unsuccessful attempt of the surgeon general, Maj. Gen. C. R. Reynolds, and his successor, Maj. Gen. James McGee, to recapture for the surgeon general's office the disturbingly autonomy-minded flight surgeons in the Office of the Chief of the Air Corps medical section.[57]

With the proclamation of a limited national emergency in September 1939 in response to the German attack on Poland and the beginning of World War II, the Army Air Corps was reorganized, and the AAF was officially established on June 20, 1941, as a body coequal with the Army Services of Supply (SOS) and the Army Ground Forces. The surgeon general was placed under the commanding general of the SOS rather than directly under Army Chief of Staff Gen. George C. Marshall. Grant now became the first air surgeon in control of the new AAF medical division, with Arnold's confidence and support.

Having earlier earned that confidence, Grant was able to take advantage of the information that emerged in 1940 about the Luftwaffe's successful use of aeromedical evacuation. The information was obtained from translations of articles in German military journals that discussed in some detail the use of the Luftwaffe to evacuate casualties from Spain during the Spanish Civil War and from Poland during the 1939 German campaign. The Spanish experiences involved flights up to 1,600 miles long and averaging 10 hours over a route across

the Mediterranean to northern Italy before they crossed the Alps at altitudes over 18,000 feet.[58] The articles were particularly significant because they discussed in detail medical issues and problems associated with the transportation of patients by aircraft, and they carried descriptions of the evacuation process and the effect of evacuation by air on patients with specific wounds and illnesses.[59] This information provided important empirical data that could be used to establish criteria for deciding whether a candidate for aeromedical evacuation was in fact evacuable. In technical terms, it provided crucial data with which to validate theoretically derived regulating criteria that would have to be part of any scientifically based aeromedical evacuation system established by the U.S. Army.

Certainly energized by this new wealth of information, and perhaps with the assistance of Dr. Richard Meiling who had been studying in Germany and who would become the air evacuation officer in the air surgeon's office, Grant worked in concert with the Army surgeon general and the surgeon of GHQ Air Force in 1940 to develop a T/O for an air ambulance unit composed of Air Corps and medical personnel. Air Corps personnel would operate and maintain the air ambulances, and medical personnel would provide the patient care. As initially conceived, such organizations would operate under the control of the theater commander to augment surface evacuation and perhaps be assigned one to a field army. Finally approved just before the United States entered the war, T/O 8–455 dated November 19, 1941, called for a medical air ambulance squadron to be paired with an air transport group consisting of four squadrons: one headquarters squadron, and three airplane ambulance squadrons. Two of the latter squadrons, designated heavy, were to be equipped with twelve multiengine transports similar to the commercial DC–3; the third, designated light, would have eighteen single-engine aircraft similar to the newly developed L–1 liaison aircraft. The medical air ambulance squadron was to consist of a headquarters section, a single-engine transport ambulance section, and two multiengine transport ambulance sections. It was to be manned, literally, by 45 medical department officers and 218 enlisted men, with no nurses, who at this time in the nursing profession were exclusively female. With regard to this proposed organization, it was asserted it "would lighten and speed the task [of transporting casualties] due to its extreme mobility, and would be able to render service at a time and place where other means of transportation are relatively at a minimum."[60] It would remain to be seen whether aircraft would be available for such dedicated service, something Grant had previously doubted; whether a system for use of these units could be developed, and how such units would figure in actual theater planning; and whether a role would be found for female nurses within the new organizations.

Conclusion

If one were to analyze the development of aeromedical evacuation and air ambulance aircraft to support evacuation by air during the 1930s, certain factors

would emerge, for example, the state of aeronautical engineering, the reaction of officials to the sometimes exaggerated claims for military aviation, and the effect of recent wartime experience on the Army's Medical Department. In spite of this conflicting milieu, imaginative individuals proposed that the Army consider using air ambulances to develop evacuation systems because they perceived that better patient care and speedier access to definitive treatment could be achieved. *The Military Surgeon* provided a venue for a such a dialogue, but it was incapable providing results until the end of the war because of financial constraints and a certain institutional traditionalism within the Army Medical Department. The emergence of a growing sense of corporateness among the Air Corps flight surgeons only strengthened as the decade wore on.

Events in Europe were key to the Army's eventual formation of air ambulance units capable of conducting the kind of aeromedical evacuation work proposed by various medical officers. In Europe, sanitary aviation had been developed to a relatively high degree, and both Germany and Italy demonstrated the medical and military value of transporting patients by air during the Spanish Civil War, although in ways that made the Europeans' prior fixation on legal protections for air ambulances under the Geneva Convention appear irrelevant. The German attack on Poland on September 1, 1939, led President Franklin D. Roosevelt to proclaim a state of limited national emergency and begin a program of rearmament which at least eased fund restrictions that had constrained the War Department's interest in developing an aeromedical evacuation capability. Through the forceful personality of David Grant and with the strong support of Gen. Henry Arnold and aided by organizational changes within the War Department that placed Grant in a better position to press the idea, a T/O for an air ambulance unit, one that did not yet include flight nurses, had been approved on the eve of war. It would remain to be seen how this organization would evolve and how the nature of a global war with far differing geographic and climactic factors than the U.S. Army had encountered in France in 1917 and 1918 would condition when and how aeromedical evacuation would be used.

Chapter 3

AEROMEDICAL EVACUATION AND THE LOGISTIC AND TACTICAL REQUIREMENTS OF GLOBAL WAR

Although a shortage of funds for the Army during the late 1920s and 1930s had constrained procurement of air ambulance aircraft and stultified any large-scale experimentation with an aeromedical evacuation system, this problem eased with President Roosevelt's declaration of a limited national emergency on September 8, 1939. War Department budgets increased sharply, and historians of the AAF in World War II described the Air Corps' share of the funds as "such staggering sums as to be almost embarrassing to an air arm long nurtured on economy."[1] From direct cash appropriations in FY 1939 of $71 million, the Air Corps appropriation more than doubled to $186.5 million in FY 1940 and reached $2.2 billion in FY 1941.[2] The principle that Chief of the Air Corps General Fechet enunciated in 1931 barring procurement of special air ambulances still held, and transport aircraft were to be converted for aeromedical evacuation. No specially designed aircraft, such as the Cox-Klemin, would be procured until many years after World War II. The issue of the use of smaller air ambulances in wartime was left formally unresolved although liaison-type aircraft were used for aeromedical evacuation in both the Pacific and Europe.

Aeronautical engineering and aircraft design, mocking the pessimism of the pseudonymous "Neon," advanced exponentially after 1927. During the 1930s Douglas Aircraft produced a family of comfortable and efficient multiengine transports that found commercial application in U.S. airlines. The first of these, the DC–2, proved so revolutionary that it played a role in commercial aviation similar to that played by the battleship HMS *Dreadnought* in the British Royal Navy prior to World War I. Once the DC–2 entered service with a single airline, its competitors were compelled to discard their existing transports, even if they

C–47s were used to evacuate the wounded.

were relatively new. Indicative of its capabilities, a DC–2 on its maiden attempt at transcontinental flight broke all records by crossing the United States in 13 hours and 4 minutes. Capable of 200 miles per hour and having cabin space for fourteen passengers, the DC–2 forced the airlines into what one historian has characterized as a period of profitless prosperity because of the DC–2's higher cost and the number of airplanes that each airline needed. Perhaps more importantly, the wide-scale use of the DC–2 and later of Douglas twin-engine transports by the U.S. airline industry helped create not only a surplus of modern transports but also a surplus of pilots familiar with them and with their use in airlift operations. Many of these pilots would later participate in aeromedical evacuation operations in World War II.[3]

The Air Corps viewed air transportation in the 1930s primarily as a logistic tool with strong strategic implications. Increasingly, the Air Corps saw aircraft engines and other materiel moved through its bases by air as vital in exploiting the intrinsic mobility of its combat forces. Beginning in 1935, the Air Corps began to add small numbers of Douglas transports to the Air Transport Group (ATG) controlled by its Air Corps Materiel Division. By December 1941 the size of the transport forces controlled by its successor organization, the Air Service Command (ASC), had grown to six ATGs under the command of ASC's 50th Transport Wing.[4] In 1942 the recently created AAF, reflecting the Army's reaction to the Germans' successes with airborne troops, particularly in the conquest of Crete, gave its ATGs a new combat mission and reassigned them as the nucleus of a new troop carrier command.[5]

While focused on using its new financial resources to buy combat aircraft, particularly heavy bombers, the Air Corps nonetheless expanded its purchase of

Ground transportation took the wounded from the C–47 air ambulance.

transports, largely Douglas DC–3 variants, which made the possibility of developing an aeromedical evacuation system realistic. The prospective availability of transport aircraft and dissemination of information about the Luftwaffe's evacuation activities in Spain and Poland led Dr. David Grant in 1940 to press the Army Medical Department to consider organizing a unit to conduct aeromedical evacuation. He achieved success, although it was not a high priority of the Army's surgeon general, who had other problems.

Not surprisingly, given the unprecedented situation that the Army faced, the surgeon general's office, like some other agencies of the War Department, was having a great deal of difficulty adjusting to the unprecedented demands of a truly global war. In 1942 these difficulties led to the appointment of a special committee to investigate the surgeon general's office, which had the underlying but ultimately unrealized purpose of removing its incumbent, Maj. Gen. James Magee. Magee had lost the confidence not only of the chief of staff, General Marshall, and the commanding general of the Army's SOS, Lt. Gen. Brehon B. Somervell, but also apparently of Secretary of War Stimson.[6] The Wadhams Committee, under retired Army Medical Corps Col. Sanford Wadhams took testimony from General Grant, now the air surgeon responsible to General Arnold for the AAF Medical Service, about aeromedical evacuation, but it ignored the topic in its final report to the Secretary of War and made only a passing reference to evacuation in general. It noted that, although a few hospital trains and air ambulances were in-theater, no hospital ships had as yet been procured. The committee's principal comment with regard to the AAF in its summary conclusions was to deplore the surgeon general's lack of control over the AAF Medical Service. It found the "existence of a semi-independent medical department within the Air Forces" that cre-

C–47 air ambulance.

ated "unnecessary duplication of effort, unwarranted segregation of functions, and undesirable confusion and conflicts of administration which should promptly be corrected." It recommended that "every practicable effort should be made to bring medical service in the Air Forces under the supervision, authority and control of the Surgeon General." It added that if this was not a practical course of action, a clear delineation of authority between the Air Surgeon and Surgeon General should be established.[7]

The organization for conducting aeromedical evacuation that the War Department finally approved, the Medical Air Evacuation Transport Squadron (MAETS), was composed entirely of medical personnel and included, for the first time in the short history of military aviation medicine, female flight nurses to provide care for patients in transit via aircraft.

The production of twin-engine Douglas transports, particularly C–47s, a military version of the DC–3, increased rapidly throughout the war years, greatly expanding the transport capability of the AAF.[8] The C–47 was the most prevalent of the DC–3 variants. It first entered the Air Corps inventory in 1940 when 115 were accepted, and orders were placed for 953 more. Ultimately, more than 10,000 were procured between January 1940 and December 1945, as well as 193 C–53s, another version of the commercial DC–3.[9] The AAF also purchased large numbers of the larger capacity but trouble-prone twin-engine Curtiss C–46s and the longer range, four-engine Douglas DC–4s, which became the C–54, the standard Army transport flying the global air routes operated by the new AAF Air Transport Command (ATC).[10]

ATC's origins lay in the Air Corps Ferrying Command established in May 1941 to fly combat aircraft from factories to delivery points for transfer to Great

C–54 aeromedical evacuation aircraft.

Britain under the Lend-Lease agreement.[11] The Ferrying Command pioneered transatlantic air routes to Britain and Africa to provide a courier service for military personnel and later for critical military cargo. In June 1942, to rationalize a growing patchwork of air transport routes and clarify responsibilities, the AAF Ferrying Command was redesignated the AAF ATC and given sweeping responsibilities which provided, among other things, an implicit basis for aeromedical evacuation of casualties. ATC's responsibilities were for

> a. The ferrying of all aircraft within the United States and to destinations outside of the United States as directed by the Commanding General, Army Air Forces.
>
> b. The transportation by air of personnel, materiel and mail for all war department agencies, except those served by Troop Carrier units as hereinafter set forth.
>
> c. The control, operation, and maintenance establishments and facilities on air routes outside of the United States which are, or which may be made, the responsibility of the Commanding General, Army Air Forces.[12]

The same directive establishing the ATC redesignated former air transport organizations as troop carrier units and assigned them to the AAF commander within a theater of operations. This expansion of transport capability ultimately made it possible to dedicate excess capability to aeromedical evacuation on a temporary and sometimes basically permanent basis in the theaters of operations and

Interior furnishings of a C–54 air ambulance.

the continental United States (CONUS), which was termed the zone of the interior (ZI). However, the AAF formally maintained the policy of not dedicating transports for evacuation and instead relied on retrograde airlift, that is, on the space available on troop carrier command transports returning from forward airfields after delivering men and supplies to support frontline troops. This same principle held true also for the ATC's long-range aircraft that provided intertheater airlift.

Although the civilian medical profession still viewed aviation medicine largely as something of a stepchild, the Air Corps' aeromedical laboratory at Wright Field focused on the man–machine interface. Their investigations of the problems aviators faced in the new medium in which they would operate—low temperature, reduced partial pressure of oxygen, reduced atmospheric pressure, and intensified gravitational forces—inferentially provided a basis for judging which patients could be moved safely by air.[13]

When war came, aeromedical evacuation in the various theaters generally began without prior planning and was largely dictated by logistic and medical requirements determined by the local tactical situation and the sharply varied climactic, geographic, and resource circumstances in which U.S. forces found themselves. Many ground force medical officers were indifferent or openly hostile to the concept of evacuation, although command involvement early in the North African campaign incorporated aeromedical evacuation as an element of planning for subsequent operations.

By contrast, the fragmented organizational nature of the Pacific theater and the lack of command emphasis at the highest levels resulted in a less than optimal application of aeromedical evacuation as a logistic and medical tool for prosecuting the war. As in all theaters in which U.S. forces faced unforeseen challenges,

medical officers learned from sometimes difficult experience what was required to make an aeromedical evacuation system work. As U.S. ground forces entered combat against Axis forces in different parts of the world during 1942, AAF medical personnel worked with their ground counterparts at the tactical level to develop procedures through trial and error to meet the requirements for successful aeromedical evacuation.

The development of the global air routes operated by the AAF's ATC using the new four-engine C–54 aircraft provided a new means to return the sick and wounded to the ZI. Such air transport was especially applicable to those who required definitive treatment unavailable in the theater and for whom a lengthy and perhaps rough ocean transit was not desirable. ATC aeromedical evacuation to the ZI complemented surface means like hospital ships, returning troop transports, or commandeered ocean liners, which were the basic means for returning casualties to the United States. Generally, patients selected for evacuation to the ZI were those whose recovery would take longer than the theater's evacuation policy, that is, the maximum number of days allowed for recuperation and return to duty after which a patient, if not recovered, would be scheduled for evacuation to the ZI.

The policy was not immutable because its validity depended on casualty rates, medical facilities available in-theater, and the rate at which evacuations could occur. The speed and flexibility inherent in transporting patients by air made aeromedical evacuation an extremely valuable tool for a theater chief surgeon.[14] The medical department discovered that aeromedical evacuation was valuable in easing the problem of redistributing patients to general hospitals for definitive treatment or discharge when the evacuees arrived at ports of entry by ship as well as on aircraft. The AAF gave responsibility for the domestic movement of patients to the ATC Ferrying Division, which throughout 1944 and 1945 moved increasingly large numbers by air among medical facilities in the ZI, complementing the more conventional hospital railroad car.

The organizational changes in the War Department that occurred in 1941 and 1942 unquestionably helped foster the development and acceptance of aeromedical evacuation in the Army. The creation of the AAF gave the Army's airmen control over all their air bases and assigned personnel, including medical personnel. The War Department reorganization of March 2, 1942, creating a General Staff and the tripartite Army Ground Forces, AAF, and SOS essentially made the AAF semiautonomous. David Grant, as head of the medical division in the Office of the Chief of the Air Corps until June 1941 and formally a member of the Army's Medical Department, came under AAF command by the first organizational change. He became chief of the AAF Medical Service on October 30, 1941, and reported directly to General Arnold, commanding general of the AAF. By the 1942 changes, Grant found himself no longer subordinated to the much more traditionally minded and conservative surgeon general's office. He was then perfectly placed to press vigorously for incorporating air transport into the tradition-

al Army chain of evacuation. The War Department assigned responsibility for aeromedical evacuation to the AAF in July 1942, and it placed the Army surgeon general and his office under the commanding general of the new SOS, the strong-willed General Somervell. Somervell was brilliant, tough, and abrasive, an innovator who constantly strove to find ways to get the job done. He prized aggressiveness and efficiency in his subordinates.

By the end of the war in Europe in April 1945, the contribution of aeromedical evacuation to saving the lives of U.S. servicemen and to easing the logistic requirements for the victorious U.S. Army was well recognized by most in the Army Medical Department, and General Eisenhower, the U.S. Supreme Allied Commander, publicly hailed the effort. In spite of a lack of uniform command emphasis in the Pacific, this type of evacuation became a major factor in the successful prosecution of the war against Japan, notably in the earliest campaigns in the southwest Pacific when aeromedical means provided the only method for moving Allied sick and wounded out of the combat zone. As the end of the war in the Pacific approached, planning for the invasion of the Japanese home islands included aeromedical evacuation, and at the war's conclusion this method was firmly established as the preferred means for moving sick and wounded U.S. servicemen.

The Organizational Context

The most significant organizational factors in the evolution of aeromedical evacuation were the creation of the AAF on June 20, 1941; the War Department reorganization of March 9, 1942, effected by War Department Circular 59; and the approval of T/O 8–455, Medical Air Ambulance Squadron, of November 19, 1941, and T/O 8–447, MAETS, of February 15, 1943. The first, creation of the AAF and the devolution of command authority over its facilities and personnel to the commanding general of the AAF, resulted in the removal of the Air Corps Medical Service from the command authority of the Army surgeon general; the second created the tripartite War Department consisting of Army Ground Forces, AAF, and SOS (shortly to be named more descriptively the Army Service Forces, or ASF) with which the United States prosecuted the war successfully and which gave the AAF a strong sense of mission and enhanced the role of the AAF Medical Service in its achievement. The T/Os represented the Army's first institutional recognition of aeromedical evacuation as a formal element of the Army's evacuation planning. They authorized the organizational structure of the AAF's aeromedical evacuation squadrons that actually provided medical care for air evacuees globally during World War II. The initiative that led to both War Department T/Os originated with the Army's airmen in early 1940 led by the then-Lt. Col. David Grant, chief of the medical division of the Air Corps, and prompted by the war in Europe.[15]

T/O 8–455 grew from discussions among the Air Corps medical division, the surgeon of the Air Force Combat Command, and the surgeon general's office.[16]

Their discussions focused on the issue of formalizing an organization for aeromedical evacuation in light of the imminent threat of war and given the precedents in the Luftwaffe's evacuations of German casualties during the Spanish Civil War and the Polish campaign. The Luftwaffe's operations during the former had been observed by Richard Meiling, an American studying medicine at Erlangen, near Munich. His clinical experience in the Bavarian capital that served as the German terminus of the Luftwaffe's air chain of evacuation from Spain enabled him to learn firsthand how the system was organized and what medical and operational issues the Luftwaffe faced. Meiling joined the air surgeon's office in the autumn of 1942, so he was not a contributor to the discussions that led to the War Department's approval of T/O 8–455 in November 1941. He later became a key figure in the air surgeon's office as Grant's air evacuation officer for most of the war.[17]

Grant proposed creation of an air ambulance battalion consisting of an Air Corps Transport Group plus attached medical personnel. He envisioned a group composed of a headquarters squadron and three flying squadrons that would operate and maintain airplane ambulances. Two of these squadrons would contain twin-engine ambulances similar to the C–39 or DC–3 commercial transports; the third would contain eighteen single-engine ambulances similar to the liaison airplane just developed for the Army.[18]

The first of thirty-five C–39s purchased by the Army entered the inventory in 1939. Like a number of other Douglas transports purchased by the Air Corps as it expanded its transport fleet, the C–39 was based on the Douglas DC–2 that had entered commercial service in April 1934 and had revolutionized commercial air transportation. The Army used its FY 1936 funds to purchase its first modern Douglas transport, a DC–2, which went into service as a C–32. Unlike the C–32, the C–39 had no direct commercial counterpart; it was sometimes dubbed a DC–2½ because it had a DC–2 fuselage with a DC–3 tail assembly. During the war, the AAF purchased a large number of variants of the DC–2 and its more capable successor, the DC–3. The most numerous and heavily militarized version of the DC–3 was the C–47.

David Grant assumed that, when assigned, the ambulance battalion would operate from a large field somewhere between 15 and 50 miles from the front. He asserted that the single-engine ambulances in flights of two or three carrying a flight surgeon would be able to land well forward in the division area, possibly as far forward as the battalion aid station, provided there was air superiority. Although he indicated that the aircraft used would be commercial airplanes with minor changes, and not aircraft specially designed for aeromedical evacuation, it is clear that he wanted both types of aircraft dedicated to aeromedical evacuation and, implicitly, painted in accordance with the Geneva Convention. He identified the desirable flight characteristics of the smaller ambulance, citing the German Fiesler Storch liaison plane as a possible model. He also noted that the autogyro's possibilities had not yet been exhausted. The characteristics he specified—slow

landing speed, high angle of climb, short takeoff roll, and maneuverability—sounded very much like those of the Cox-Klemin.[19] Grant saw the air ambulance battalion as operating under the control of GHQ but attached to subordinate commands as necessary to augment the currently planned surface evacuation. He asserted, prophetically, "it will be able to both lighten and speed the task [of evacuating casualties], due to its extreme mobility, and will be able to render service at a time and place where most needed—specifically, where other means of transportation are relatively at a minimum."[20]

A T/O for an aeromedical evacuation unit was initially discussed while the Air Corps medical division was still formally part of the Army Medical Department. The Army surgeon general concurred with dedicating aircraft as air ambulances and brought the initiative to the General Staff. In July 1940 the General Staff disapproved the T/O for an aeromedical evacuation unit. It reasoned that airplane ambulances were included as organic elements of the medical department rather than belonging to Air Corps units.[21] Their decision was influenced at least in part by Air Corps comments during staff discussions of the proposed T/O. Because the air evacuation service was seen as a composite task force for which existing T/Os would suffice, no need was seen to modify them. The General Staff suggested that the medical department prepare T/Os for the companion medical organizations and transport elements of the task force: an ambulance battalion to be paired with an air transport group of three squadrons, and an ambulance company to be paired with a transport squadron.[22]

The surgeon general revised and resubmitted the rejected T/O to the General Staff in October 1940, but it languished without action until the late summer of 1941 when the Air Corps medical department and the surgeon general's office agreed it needed further revision in light of the quickening pace of events. The surgeon general submitted the revised T/O, which was finally approved in November, three weeks before Pearl Harbor was attacked.[23]

The delay could well have stemmed from a low priority accorded the subject by the General Staff during the busy summer and autumn of 1941. However, Mae Mills Link and Hubert A. Coleman, the historians of the AAF Medical Service during World War II, portray Grant as having believed that the surgeon general was at least partly responsible. Writing of this episode, they state that Grant submitted a plan to the surgeon general early in 1941 for the evacuation of sick and wounded by air, only to have the surgeon general pigeonhole it without comment or action until nine months later. This purportedly led Grant to go out of channels, carrying a carbon copy of his plan to the General Staff, which led General Magee, who still considered himself Grant's superior, to go personally to General Arnold and demand that Grant be disciplined for this action. Arnold's reaction was to state to both officers that Grant was directly responsible to him and not to the surgeon general.[24]

In keeping with the General Staff's previous objection and the Air Corps' recommendation, the T/O that the War Department approved was one for a medical air ambulance squadron to be paired with an air transport group identical in com-

position to the one Grant had proposed. The medical squadron was to comprise a headquarters section, a single-engine ambulance section, two multiengine ambulance sections, 45 medical department officers, no nurses, and 218 enlisted men. Pursuant to T/O 8–455, the Army activated the 38th Air Ambulance Battalion as a test unit on May 25, 1942, at Fort Benning, Georgia, under the command of Headquarters Second Army.[25] Reference to the use of regular transports implicitly called attention to the need for these aircraft to be capable of being converted into ambulances in accordance with the policy laid down by General Fechet nine years previously. In early September 1940, the War Department directed the chief of the Air Corps to maintain plans to convert standard transport airplanes and suitable single-engine airplanes for ambulance use.[26]

General Arnold personally directed General Grant to get a Douglas C–39 and draw up plans for fittings required to convert it into an air ambulance. Grant had the Air Corps Engineering Division at Wright Field adapt a C–39 to carry litters and fly it to Bolling Field in Washington, D.C., for inspection. He later recommended that all Air Corps transports be equipped to carry the standard Army field litter, and the Douglas Aircraft Company began producing metal bracket-type litter supports for its DC–3-type aircraft. When installed on the aircraft cabin walls, these brackets could support three tiers of standard Army litters, for a total of eighteen litter patients.[27]

The litter-bracket assemblies collectively weighed 218 pounds and were designed to be stored under the rear cabin floorboards when the aircraft was not being used for evacuating casualties. Not being permanently installed, the assemblies were subject to removal or loss, as troop carrier units in the theaters would discover during the war. Douglas also provided metal litter supports for its C–54s, the militarized version of its four-engine DC–4s. When installed, these permitted carrying a maximum of twenty-four standard litters.[28]

In spite of this directive and the progress made in its implementation, responsibility for evacuation by airplane still formally belonged to the Army surgeon general as part of his overall responsibility for hospitalization and evacuation for the Army as a whole, but this changed when the War Department assigned responsibility for aeromedical evacuation to the AAF, and Arnold directed Grant to develop a plan. On October 30, 1941, Grant was reassigned from the Office of the Chief of the Air Corps to the newly created position of air surgeon in Headquarters AAF. The governing AAF regulation stated, "the Air Surgeon is responsible for the Medical Service within the Army Air Forces," specifying his duties as advisory as a member of the commanding general's special staff, and administrative in conducting the medical department as a technical service. Free from the surgeon general's control, it seems clear that Grant felt free to push much harder for aeromedical evacuation and a wide range of initiatives which he believed would benefit the AAF and its personnel.[29]

The later T/O 8–447 for a MAETS flowed from this reassignment of responsibility to the AAF and the consideration by Arnold's Air Staff of the plan that

Grant and his office developed at Arnold's direction. Prepared by Col. Wood S. Woolford, surgeon of the I Troop Carrier Wing whom Grant had brought to Washington, the plan differed from Grant's original proposal in one respect: it included the use of nurses to attend patients during flight. Precisely whose idea this was is unclear.[30]

Woolford proposed that the 38th Medical Air Ambulance Battalion be moved to Bowman Field, Kentucky, near Indianapolis, Indiana, headquarters of the I Troop Carrier Command, and that its personnel be used as the nucleus of an Airplane Evacuation Group (Medical). Each group would consist of 49 medical department officers, 20 AAF officers, 78 nurses, and 458 enlisted men, distributed among a headquarters squadron and four airplane evacuation squadrons, three of which would be designated heavy, and one light. A group would be assigned to the troop carrier command of each air force. Heavy squadrons would be staffed with medical personnel normally associated with standard C–47 transport groups. Light squadrons would be assigned twenty small aircraft to provide air ambulance service from the front lines, and their staffing would include personnel to operate and maintain the aircraft. Heavy squadrons would include nurses whereas light squadrons would consist only of officers and enlisted men.[31]

Grant accepted Woolford's proposal and submitted it to the Air Staff on July 24, 1942, as a Plan for Development and Operation of Air Evacuation Groups. The chief of the Air Staff approved it for implementation. The AAF activated the first of these groups, the 349th Air Evacuation Group, on October 7, 1942, at Bowman Field and assigned it to the I Troop Carrier Command with an authorized strength of 49 medical department officers, 20 Air Corps officers, 78 flight nurses, and 458 enlisted men. One month later, three heavy squadrons and one light were activated and assigned to the 349th, which was given the mission of training personnel for aeromedical evacuation operations. Although General Grant was the principal planner, he was assisted by Colonel Woolford, whom he formally designated Air Evacuation Officer in November 1942.[32] Grant also worked closely with Col. E. L. Berquist, a flight surgeon whom he had assigned to the I Troop Carrier Command to replace Woolford and with whom he was in frequent contact regarding the training of the aeromedical evacuation units.[33]

Apparently the plan had not been coordinated with the Air Staff Directorate of Military Requirements or the Directorate of Air Support, which were separately attempting to deal with a different requirement for air ambulances. They approached the traditional crash-rescue function, and the issue of liaison-type aircraft for casualty evacuation (such as the L–1, which Grant had referred to) became bound up with the question of small air ambulances for crash rescue. As the Air Service flying schools had discovered during World War I, now, in 1942 and 1943, the AAF Flying Training Command was realizing that its training bases needed small, crash rescue–type aircraft capable of carrying one or two litters to permit the speedy recovery of injured fliers whose crash sites were either difficult to reach or entirely inaccessible by ground means.

The headquarters of the AAF Southeast Training Center raised the issue with the commanding general of the Flying Training Command as early as May 1942, prompting the Air Staff to survey the smaller aircraft present in or scheduled for the AAF that might be modified to meet the air ambulance requirement.[34] The development of liaison aircraft added to the requirement. The Army Field Artillery School at Fort Sill, Oklahoma, was conducting liaison pilot training with some 250 liaison aircraft at twelve satellite bases. Pointing to two incidents in which injured students had been subjected to extensive delays in reaching hospitals via ground ambulance, the commandant of the school requested in March 1943 that a light aircraft ambulance be issued for use in aircraft training accidents.[35]

Headquarters AAF Flying Training Command noted too that it had repeatedly requested the assignment of hospital aircraft to flying schools, but it had had little success. It was now requesting that 114 L–1s previously used for glider towing be modified as hospital aircraft and assigned to its training bases. Similarly, in December 1943 the commanding general of the AAF Western Technical Training Command at Sheppard Field, Texas, requested that a converted L–1A be assigned as an air ambulance to support the imminent training of enlisted glider pilots. Two auxiliary fields were to be used, and although the general said he expected few accidents, he believed that serious crashes would be likely to occur at considerable distances, "in regions not easily accessible by highway."[36]

The problem with such requests was that, as Chief of the Air Support Directorate Col. David Schlatter pointed out months before, the AAF had procured neither the light planes for such a task nor the pilots to fly them. All the L–1 liaison planes that the AAF had procured were being assigned to the Flying Training Command as tow aircraft in the glider training program, and the other light aircraft being procured—L–2s, L–3s, and L–4s—would need to be modified to carry litters, which Schlatter did not feel were practical.[37]

Director of Military Requirements Maj. Gen. Muir Fairchild also objected on both policy and practical military grounds. Addressing the issue in a broad context, he pointed out that the reasons the AAF had consistently followed the general policy of not providing special airplanes for ambulance purposes were twofold: first, any cargo plane could be used if provisions for carrying litters had been made, and second, evacuating casualties by air would be limited to areas well behind the front lines, where larger-type transports normally operated. From a tactical point of view, he pointed out that "to operate well marked ambulance airplanes near the front lines cannot but serve to indicate to the enemy the general location of our lines." He noted further that ground forces required even automobile ambulances be well hidden near the front lines to prevent their detection by the enemy. If air ambulances were indeed to be restricted to operating only in rear areas, he saw no requirement for lightweight ambulance airplanes.[38] He did acknowledge that if AAF tactical doctrine was going to call for light aircraft capable of carrying one or two litters, the L–1 was probably the most suitable airplane, although the Piper aircraft that the Navy was using for these purposes might suf-

fice. He called for clarification in the form of a clear statement of policy on air ambulances.[39]

The formal statement of policy was not published until May 25, 1943, but in many ways it only codified practices already in use, including retrograde airlift to evacuate casualties from the combat zone to rear-area hospitals. In August 1942, at the request of the air surgeon's office, the chief of the Air Staff had directed ATC to make aircraft available for evacuating casualties from Alaska, Canada, Newfoundland, Greenland, Labrador, the Caribbean, and other theaters where practicable, but only in connection with routine transport operations.[40]

The policy of using transports on return flights from the front for casualty evacuation had been proposed by Chief of the Air Staff Maj. Gen. George E. Stratemeyer and accepted by Arnold in a personal exchange in November 1942. Both men had agreed that modifying L–2, L–3, or L–4 liaison aircraft as air ambulances should be avoided.[41] The formal policy statement of May 1943 reaffirmed the AAF rejection of designing and dedicating an aircraft solely as an air ambulance, but it took a positive stance toward the idea that helicopters, procured for liaison purposes, could incorporate the capability to carry standard Army litters. This possibility was one in which both the air surgeon and the surgeon general's office had been interested. The statement also addressed how the air ambulance requirements at flying training bases might be met.[42] The policy statement framed, with one exception, the process of aeromedical evacuation as it generally was to be conducted until the end of the war. It laid out a chain of evacuation in which specific roles were allotted to particular types of aviation units, namely, troop carrier transports and transports of the new AAF ATC:

> a. Wounded of Ground Force units are evacuated from collecting stations through clearing stations to Evacuation Hospitals by Army Service Forces Medical units (ground ambulance).
>
> b. Wounded requiring further movement to the rear to General Hospitals and which cannot be safely moved by surface transportation, are evacuated from airdromes near the Evacuation Hospitals to General Hospitals within the Theater by transport aircraft.
>
> c. Any patient requiring air evacuation from a Theater to the Zone of the Interior is carried out by aircraft of the Air Transport Command.
>
> d. Air Evacuation Medical units, organized similarly to the "Army Air Forces Air [Ambulance] Squadron, Heavy" are furnished by Army Service Forces to render necessary medical assistance during the air movement of wounded.[43]

It also stated, "all cargo and transport airplanes can be used for ambulance purposes" and it required that all cargo-type aircraft assigned to troop carrier com-

mands or ATCs have installations for carrying standard Army litters and, when practicable, standard British litters. If these installations were removable, stowage was to be adequate to ensure that the items would remain with the aircraft at all times.[44]

The allocation of responsibility for rendering medical assistance during air transit to ASF aeromedical evacuation units is at best puzzling because reference to the AAF heavy air ambulance squadron—meaning after November 1942, a unit manned by medical personnel only—acknowledges the existence of an AAF unit already constituted to perform exactly this function. It was these AAF units that performed this mission during organized aeromedical evacuation.

The rejection of air ambulance aircraft as a distinct type was ringing: "the incorporation of the above general requirements *eliminates* the necessity for an airplane designated and designed solely as an *ambulance airplane* [emphasis in the original]." The policy did explicitly recognize a special requirement at certain training stations where flying was conducted with such intensity that an ambulance airplane was required to be in readiness at all times. In such situations, the policy allowed modification and conversion of appropriate small utility-type transport aircraft, provided such conversions were held to the absolute minimum and had been approved on a case-by-case basis by Headquarters AAF.[45] A byproduct of Air Staff discussions on how to meet requirements for crash rescue vehicles would prove extremely useful in 1944 in the European theater when the Air Mobility Command (AMC) decided to provide C–64 liaison aircraft with factory-installed litter brackets sufficient for three patients, allowing these aircraft to be used for casualty evacuation in an emergency.[46]

General Fairchild's opposition in the autumn of 1942 to activate what he called puddle-jumper squadrons for evacuating the wounded was embodied in the formal adoption of Military Policy 41 the following May. His successful opposition undercut completely the rationale of the light, air ambulance squadrons proposed in Grant's plan, one of which had actually been assigned to the 349th Air Evacuation Group in November 1942. The irony was that the month before, when the 349th was being activated, Maj. Gen. Carl A. Spaatz had asked for an air evacuation group with both light and heavy squadrons in preparation for the forthcoming North African invasion.[47] With the underlying premise of T/O 8–455 now invalid, Grant and his staff revised their concept of an aeromedical evacuation unit.

The result was T/O 8–447 for MAETS that was published in November 1942. It called for a unit staffed only with medical personnel. Each MAETS was organized into a headquarters section and four flights. The headquarters section comprised the squadron commander, chief nurse, a medical administrative corps officer, and twenty-nine enlisted men; each flight, headed by a flight surgeon, consisted of six flight nurses and six enlisted medical technicians. One flight nurse and one medical technician constituted a flight team.[48] Because the 349th Air Evacuation Group lacked a body of experience in aeromedical evacuation, the AAF disbanded it and activated the School of Air Evacuation on June 23, 1943,

at Bowman Field. In the interim, the 349th had been conducting training with units organized according to the T/O for MAETS. Responding to urgent calls from both the Pacific and the North African theaters, the group deployed two squadrons, the 801st and the 802d MAETS to New Caledonia in the southwest Pacific and Tunisia in North Africa before the end of 1942. A third squadron, the 804th, left Bowman for the southwest Pacific in May 1943, arriving first in Australia, then going to Port Moresby before traveling to New Guinea.[49] Starting in late autumn 1942, nurses had been trained at Bowman Field for aeromedical evacuation duty, although Grant had experienced considerable delay in getting his first levy from the surgeon general to train six nurses. The surgeon general's office was also initially opposed to establishing a nursing division in the air surgeon's office, but control of nurses who served in the AAF's aeromedical evacuation squadrons clearly fell to the commanding general of the AAF by virtue of the powers of command given him in June 1941. On November 30, 1942, Grant's office made an urgent appeal for graduate nurses, particularly airline hostesses, to serve in the Army Nurse Corps with subsequent assignment to the AAF Evacuation Service.[50] Indicative of the kinds of problems MAETS might have was that theater authorities in the Pacific initially would not allow nurses, then exclusively females in the Army, to fly into combat areas.[51] Events would show that the value of casualty evacuation by air would need to be proved to some ground force medical personnel, but formal aeromedical evacuation units were now in the field, and they would soon be joined by others.

The development of aeromedical evacuation at this point was largely a function of General Grant's energy and drive and support from General Arnold, and Grant's willingness to do whatever was necessary to accomplish his goals even if it required bending regulations. Grant strongly identified with the AAF and its mission, and it was this that undoubtedly influenced General Arnold's wholehearted support of him throughout the war, particularly in the face of repeated attempts by the surgeon general to regain control of the AAF Medical Service, and the ASF commander's attempts to bring it under his control.[52]

In the case of the surgeon general, a bureaucratic imperative was clearly at work—no director willingly gives up a part of his organization—but underlying his commitment was an unwillingness to accept as valid the sense of separateness held by flight surgeons that they were different from other members of the Army Medical Department. If the medical requirements of the Army's airmen were no different from those of the other troops, as the surgeon general seems clearly to have believed, then there was no basis for treating AAF patients differently or for a separate medical service. In the case of the commanding general of the new ASF, General Somervell's attempts probably had more to do with his strong personality and confidence in his own management philosophy, which stressed a centralized function.[53]

Somervell seems to have had more in common with Grant than either of the two surgeons general who served under him in the SOS/ASF. According to the historian of the ASF, John Millett, Somervell's best-known characteristics were

his energy and drive. He was not afraid of responsibility nor loath to cut bureaucratic red tape, and he had a strong sense of urgency in dealing with problems. In the War Department circular establishing the three major Army commands, each of their commanders had been enjoined to make use of "judicious shortcuts in procedure to expedite operations." Perhaps the most descriptive characterization of Somervell is Millett's comment, "there were probably few officers in the Army in 1942 better prepared to carry out this injunction to the full."[54]

Grant differed from Somervell in having a good relationship with his subordinates and not being feared for his temper, as Somervell undoubtedly was. Maj. Gen. Norman Kirk, who would succeed General Magee, was known for his energy and combativeness. In a letter to Brig. Gen. Paul Hawley, Colonel Hillman, a member of Kirk's staff, noted that Kirk was keeping things hopping in the office and had lots of fine ideas, adding that "you may remember that he [Kirk] does not try very hard to avoid an occasional scrap, so when things do not please him, he personally goes to the top and not infrequently puts his ideas over against strong opposition."[55] Both Grant and Somervell were much more flexible than Kirk in their approach to reaching their objectives.

The similarities between Grant and Somervell in this regard provide credence to Grant's diary entry of early March 1943 that Arnold told him that with Marshall and Somervell, the three had decided that he, Grant, would succeed Magee as surgeon general. However, Grant demurred. He would have actually lost much of his ability to control the AAF Medical Service and the Army Medical Department as a whole because the surgeon general was organizationally subordinate to the SOS. Grant told Arnold he had no interest in becoming surgeon general and "had cast his lot with the Air Force and would sink or swim with it."[56] In practical terms, that meant using his stewardship to ensure that the surgeon general took due account of the AAF's need worldwide.

From the air surgeon's point of view, neither General Magee, the surgeon general from 1939 to mid-1943, nor anyone in his office displayed any understanding of aviation medicine or the requirements necessary to keep a highly trained aircrew physically healthy and operationally poised to carry out the AAF mission. The enhanced status of the AAF after the War Department reorganization of March 1942 and memories of the whole prewar history of the Air Corps' struggles with the General Staff helped give Arnold and his commanders a strong sense of mission which David Grant and his staff shared. History shows that senior air commanders in the major theaters of operation developed good relations with and served their respective theater commanders loyally throughout the war. It also clearly indicates that generals like "Tooey" Spaatz and George Kenney pressed the use of airpower and demonstrated its value to their superiors effectively. This outlook extended to the application of aviation to the medical department in support of the Army's combat operations.[57]

General Magee and the surgeon general's office not only seem to have lacked an understanding of aviation medicine, they also seem not to have had much inter-

est in the concept of aeromedical evacuation. This was true even though Grant had successfully stimulated enough interest in the idea to move the surgeon general's office to initiate the process of securing a T/O for an aeromedical evacuation unit. Maj. Gen. Robert Patterson, Magee's predecessor from 1931 to 1935, had sought unsuccessfully to secure funding for twenty-one air ambulances that he wanted assigned to ground force headquarters. By contrast, even with Magee's office engaged in staff discussions about a formal War Department authorization of an aeromedical evacuation unit in 1940 and 1941, it does not appear that the surgeon general gave any thought to injecting a test of aeromedical evacuation into the important Louisiana maneuvers, which concluded just on the eve of war.[58]

The Louisiana maneuvers, conducted without any provisions for casualty evacuation by air, convinced AAF flight surgeon observers that aeromedical evacuation was not just a technique for shortening the Army's traditional evacuation chain; it would be essential for supporting air force combat operations. The long ground evacuation routes in isolated stretches of the maneuver area and lengthy delays in proper medical care called to mind the airmen's experience with downed cadets during flying training. The Air Force Combat Command surgeon, I. B. March, who had expressed the same view in the mid-1920s, reaffirmed his belief that motor ambulances could never fully support the operations of a tactical air force because they could not cover the kinds of terrain over which planes could fly. Malcolm Grow, Third Air Force surgeon to whom March expressed his opinion, concurred and indicated that he would do all he could to promote aeromedical evacuation. He noted:

> our chief stumbling block in the way of ambulances has been the lack of interest on the part of the Surgeon General. After all, the evacuation not only of the ground troops, but also the Air Corps casualties are the problem of the Surgeon General, and until he accepts the airplane as a vehicle I doubt if very much can be done about it.[59]

In a small way, the Louisiana maneuvers probably further exacerbated the growing chasm between the Army Medical Department and the Air Corps' flight surgeons. When the AAF was charged with responsibility for aeromedical evacuation, Grant dispatched part of the 349th's cadre of medical personnel, including nurses, to participate in the Texas maneuvers of late 1942.[60]

As Grow had implied, Magee gave the appearance of being uninterested in anything having to do with the AAF except getting control of its medical service. Whatever else may have been involved, the activities of the AAF Medical Service in 1942 were creating some invidious comparisons with the Army Medical Department that the surgeon general was now administering as a technical service for the commanding general of the ASF. According to Grant, in September 1942, at a time when the discussions on the proposed T/O for an air evacuation unit were in progress, he asked Magee to accompany him on a trip. The surgeon general

acknowledged that "he did not like planes and in fact had never been in one." Grant's comment to his diary was "no wonder the medical apathy towards the Air Force," an attitude that seemed confirmed by Magee's disinterest in the activities of the AAF Medical Service when Grant tried to brief him on it.[61]

An implicit comparison that was obviously embarrassing to the surgeon general was the air surgeon's "pernicious practice" of getting medical supplies to AAF units in the United Kingdom outside of the surgeon general's supply system when it could not supply the air force units there. General Hawley, chief surgeon of the ETO, had complained of this in early October 1942 in a personal letter to Col. Francis C. Tyng, the surgeon and General Staff officer responsible for medical supply. The issue was not, as Tyng implied in his response to Hawley, another example of increasingly arrogant and irresponsible behavior by an AAF bent on independence. It was the simple fact that the normal medical supply process for which the surgeon general was responsible was failing to meet the medical supply requirements of the ETO. This included the Eighth Air Force that in October 1942 was the only U.S. combat force in action with the enemy in the theater, although Operation Torch, the allied invasion of North Africa, was about to be launched.[62]

Grant knew of this pejorative characterization of his unauthorized supply activity because someone had given him a copy of the letter in which this characterization had appeared. Neither Grant, who told Arnold that he was putting some medical supplies on almost every aircraft headed for England, nor the Eighth Air Force surgeon, Malcolm Grow, whose fliers were the beneficiaries of the practice, were at all apologetic. Even General Hawley, who had complained initially, acknowledged later that with the "supply situation being what it is," he couldn't really blame Grow for requisitioning items from him while getting them directly from Grant. Hawley opined that he would have been "sorely tempted to get supplies where and when I could" if, like Grow, he knew there were things he could not be supplied with through normal channels.[63]

Ironically, in view of Col. Tracy Voorhees's later critical role in helping extricate both General Magee and General Kirk from situations ranging from merely embarrassing to those that were potentially disastrous, Tyng had given Voorhees what the latter termed a really chilly reception when he first reported to the surgeon general's office. Voorhees, then still a civilian, had been assigned to Magee's office to assist with contractual aspects of the Army's purchase of medical supplies. He learned quickly that the surgeon general had not wanted outside help, and he certainly did not want a lawyer who had been president of a hospital and who would probably think that he knew something about medical matters. Voorhees's predecessor, a civilian referred to only as Mr. Huyler, had been brought into the surgeon general's office by Brig. Gen. A. J. Browning of the SOS to help install business practices in the surgeon general's supply service, but Huyler had left after several months of this treatment.[64]

Other items nurtured Grant's and Arnold's distrust of the surgeon general's understanding of AAF problems and his willingness to help solve them in a way

they thought he should. Some of the more significant issues of contention between the surgeon general and his office with the AAF and the air surgeon from 1943 to the end of the war included recruiting doctors and nurses to staff the AAF Medical Service, something Grant was forced to do independently when the surgeon general could not; overseeing convalescent hospitals; using nurses' aides; assigning recovered aircrew to SOS Disposition Boards; and managing AAF control of general hospitals. The official histories cited previously—particularly Link and Coleman's volume on wartime medical support of the AAF, together with Grant's diaries—provide rich insights into the relationship between the offices of the air surgeon and the surgeon general and its on the AAF Medical Service.

Among the issues affecting the development of aeromedical evacuation during the war were the continuing efforts of the surgeon general and the surgeon general's superior, General Somervell, to regain control of the AAF Medical Service. These included General Magee's vociferous complaints in the autumn of 1942 to the Wadhams Committee, which was investigating his stewardship of the Army Medical Department; General Somervell's attempt to enlist Robert Lovett, the assistant Secretary of War for Air, to support his efforts, based on the fact that the AAF's medical needs would be met better if handled by his SOS; and the offer to Grant by General Kirk when he replaced Magee to get him promoted to major general if he would accept a position in his office as deputy surgeon general, thus bringing the AAF Medical Service under Kirk's control.[65] Somervell and Kirk even tried to have Grant, the moving force of the AAF Medical Service and apparently a special object of Kirk's dislike, transferred to the China–Burma–India (CBI) theater in 1944 to replace an ineffectual command surgeon whom Colonel Voorhees recommended for replacement on one of his periodic field trips to try to fix the still deficient medical supply system.[66]

There can be little doubt that had the AAF Medical Service reverted to control by the surgeon general, such a change probably would have slowed if not stultified the development of the aeromedical evacuation system. This is not to say that the logic of various tactical and logistic situations might still dictate the evacuation of casualties by air, as happened in the early days of the campaigns on New Guinea and Guadalcanal. On New Guinea in November 1942, when Australian and U.S. forces began their offensive against the Japanese at Buna and Gona, C–47s had been used to move casualties over the Owen Stanley Mountains to Port Moresby not only because no roads were suitable for moving casualties to the rear but also because the great distances and inherent danger precluded evacuation attempts by sea.[67] U.S. Marine transports began evacuating their wounded from Guadalcanal in August 1942, using Navy medical corpsmen, before the 801st MAETS began to operate there.[68]

The negative mindset toward the idea of moving patients by air held in all theaters by some senior ground-based surgeons would have predominated in the absence of an autonomous AAF Medical Service. Plans prepared by Col. Richard Elvins, Twelfth Air Force surgeon, for aeromedical evacuation in the medical sup-

port for Operation Torch had been coldly received by senior ground force surgeons. They told him that Twelfth Air Force would not be required to evacuate any patients by air because the method was too uncertain, unreliable, and hazardous for the sick and wounded.[69] As late as mid-1944, Grant's deputy, Brig. Gen. Charles Glenn, on an inspection visit to the Mediterranean, CBI, and southwest Pacific theaters, found good support for aeromedical evacuation by a number of theater surgeons, but not by the CBI theater surgeon. According to the commander of the 181st General Hospital in Melar, India, the theater surgeon was not in sympathy with aeromedical evacuation, and it was difficult to get orders authorizing air transportation. As a result, patients sent to him for aeromedical evacuation were sometimes held for long periods.[70] Grant found in late 1944 that surgeons in Gen. Douglas MacArthur's command did not believe aeromedical evacuation was in their patients' best interests. Grant reported to Arnold that a corps surgeon on Biak Island had refused to allow patients to be evacuated by air, even though it was available, on the basis that LSTs (landing ships, tank) would be available within a few days and the patients would be more comfortable. Grant was told that the patients were forced to remain on litters, waiting, for 2½ days. He was also informed that on the morning of November 19, 1944, thirty-six C–47s had departed Tacloban, Leyte, for the rear with available space for between 200 and 250 patients. While acknowledging there might have been circumstances of which he was unaware, he reported that several flight surgeons at Tacloban had definitely informed him that unless they personally sought out patients, they encountered difficulty in getting the patients evacuated by air.[71] A medical department with control of the AAF Medical Service and directed by either Magee or his successor, General Kirk, would almost certainly have relegated patient movement by air to a more marginal role.

Kirk was an extremely competent orthopedic surgeon who had come to his position from command of one of the Army's general hospitals. Notwithstanding Marshall's view of Grant as a possible successor to Magee, Kirk was not the chief of staff's choice. He represented a promotion track that tended to include senior medical department officers who, perhaps not unreasonably given the state of the Army in the interwar years, were more noted for their professional competence as physicians and hospital administrators than for being adept at planning and having skills to develop and administer a medical system in support of deployed U.S. troops in combat. General Marshall had sought an officer with more energy, imagination, and flexibility, and above all, greater field experience than Magee possessed.[72]

Marshall's choice had been Brig. Gen. Albert Kenner who in 1942 already had combat experience in World War II as General Eisenhower's chief surgeon of the Western Task Forces during the North African invasion. Patton had recommended Kenner for promotion to brigadier on the basis of his conduct during the landings and his success in saving all but two of some 400 desperately burned and mangled survivors from a torpedoed troop transport. Eisenhower concurred in his

recommendation. During World War I, Kenner had received the Distinguished Service Cross and Silver Star for gallantry in action, and he later received the Purple Heart. Of some eleven possible candidates, Kenner was the only one with any extensive combat experience.[73]

Nominated to the President by Secretary of War Stimson, Kenner had been initially accepted by Roosevelt, but before his appointment was announced, the President had a change of heart. The reason Roosevelt offered to Stimson was that Kenner lacked sufficient professional stature within the civilian medical community.[74] Kirk was the subsequent nominee, and although Marshall loyally accepted the rejection of his choice, he distrusted Kirk from that point and chose to deal with him only through the SOS/ASF commander or the deputy chief of staff.[75] Although aggressive and energetic, Kirk lacked combat experience and seems also to have lacked the administrative ability to direct the sprawling enterprise for which he was now responsible. His reputation in the Army rested upon a well-deserved reputation that he had built through his assignments to a succession of Army hospitals. During World War I he had been stationed at Camp Greenleaf, Georgia, providing medical services to recruits. His overseas assignments had been limited to several years at the Sternberg General Hospital in Manila.[76] As the Hawley-Kirk correspondence reveals, Kirk's attitude toward the AAF can best be characterized as bureaucratic, marked by a very aggressive defense of his turf.[77] It is perhaps instructive of his general attitude toward aeromedical evacuation that, when in 1945 he was to argue vehemently and, as it turned out, unnecessarily for a draft to secure 60,000 nurses, he told Hawley in a private letter that the nurses in the evacuation squadrons ought to be reassigned to Army general hospitals because they were not really needed for most aeromedical evacuation flights.[78]

The medical supply system worldwide was periodically to be of great concern to Grant. Hawley in 1943 could still write to the surgeon general, now Kirk, that "the inescapable fact is that our [medical] supply system—in the field as well as in the U.S.—is about the lousiest thing I have seen in all my service." The state of supply affected the MAETS assigned to troop carrier units in the theaters because they were dependent on theater stocks. In Europe, Hawley was able through heroic efforts to overcome the medical shortages and deal very successfully with the invasion of the continent and the subsequent Allied campaign in the west. In this, he was aided immeasurably by Voorhees who went to England and was instrumental in effecting a reorganization of the ETO SOS medical supply system for Hawley, who had been plagued by a lack of competent medical administrators and deficiencies in the surgeon general's supply system.[79]

The episode provides an interesting additional perspective on Kirk. Writing to Hawley while Voorhees was in England, Kirk said he was very fond of Voorhees who had done a "grand job here," and he would do the same thing for Hawley. However, he cautioned Hawley that Voorhees was extremely pessimistic—"everything is usually wrong and gone to hell"—but was a "fine fellow," so Hawley should not take that part of Voorhees too seriously. The point was

that the situation was in fact, quite desperate, as Hawley, who had repeatedly sought help from Kirk, was well aware. Actually, Hawley reveals a rather delightful sense of humor in his narrative accounts of a similar visit to the CBI theater where he was also to find severe supply problems later in 1944.[80]

In Washington, General Marshall's confidence in Arnold persisted throughout the war. He supported the growth of the AAF bomber force and the bombing campaigns against both Germany and Japan. The senior AAF leadership was imbued with a sense of mission to demonstrate the value of airpower as a war-winning tool and to gain the independence for the air force that airmen had been seeking since the 1920s.[81] They saw their highly trained aircrew personnel as a unique resource to achieve these ends, and both Arnold and Grant were convinced by actions of the surgeon general and the SOS, which controlled the general hospitals in the theater COMZ, that the surgeon general and the SOS simply did not understand the degree to which a qualitative difference existed between a well-trained infantryman and a graduate of the Flying Training Command's pilot or navigator training programs. This was not a difference in the value of the human being; it was a difference in terms of the infantryman's or airman's replaceability and the nature of the stress experienced by each. Aircrews were subjected to inherent and continuous stress whenever they were in the air, even when not in combat, and flight surgeons had to pay continuous attention to their mental and physical well-being if their combat effectiveness was to be maintained. The AAF complained frequently that it took a long time to retrieve an aircrew member once he had entered the theater hospital system controlled by General Somervell's SOS, and this delay adversely affected the aircrew member's skill level and attitude. Worse from the AAF's point of view, and revelatory of a fundamental lack of understanding about flying and the AAF in general, was the apparently not infrequent action of SOS Hospital Disposition Boards in returning to full duty AAF fliers with asthma, sinusitis, and asthenia when their conditions precluded their flying, or returning them to limited duty when there was no such thing as limited aircrew duty in combat.[82] Having to carry such a returned but effectively grounded flier to his unit meant that a replacement could not be requisitioned, compelling the remaining aircrew to fly more frequently, which in AAF bomber units compounded the already high risk.

A measure of the lack of understanding of even as astute and able a member of the Army Medical Department as General Hawley was his comment in a private letter to General Kirk in 1943 that "the effort of the Air Force to obtain control of hospitals in areas in which their troops are located arises out of purely personal ambitions."[83] Hawley based his assertion on the fact that when Grant's staff visited the ETO, his staff members had responded positively to Hawley's question of whether they were satisfied with the medical service given to Eighth Air Force. Hawley contrasted the attitudes of flight surgeons unfavorably with those of ground force surgeons who had voiced no similar desires. Hawley's question and the answers he received dealt only with the quality of the medicine being prac-

ticed, not the administrative framework within which it was practiced nor whether the equally or better qualified AAF medical personnel at Eighth Air Force bases could have provided definitive care more quickly had they been allowed to do so. As the report of the Kirk-Grant-Strecker visit to the ETO noted, almost one-third of SOS station and general hospitals in England were between 20 and 58 miles distant from airfields and AAF troop concentrations, implying a sometimes lengthy trip by ambulance over British roads. According to War Department Circular 165 issued at the behest of Surgeon General Kirk, elective surgery could be performed only at SOS general hospitals, regardless of the qualifications of the AAF surgeons at the base dispensaries.[84]

This was unacceptable from the AAF's point of view because the more highly trained and selectively chosen pilot or navigator was central to achieving the AAF mission. Both Arnold and Grant were impatient with obstacles when they perceived them to be the product of what they viewed as traditional thinking. As Grant testified before the Wadhams Committee in the autumn of 1942, "It is true that I do a lot of things sometimes that I may not have the authority for, but I've got a war to fight, and I'm trying to do things."[85] Grant thought the surgeon general and the medical department had neither grasped the nature of the task confronting Army medicine nor were they willing to exhibit the flexibility to find new ways to meet its challenges.

Grant's attitude is summed up by a diary comment during his visit to the Pacific in early 1943. He noted that he had heard nothing but complimentary remarks about the medical service and that their work at the front has been outstanding, but he was bothered by the complex command arrangements that created overlapping medical jurisdictions and unnecessary medical administrative red tape. Writing in his diary, he observed, "as I proceed further and further on this trip, I get more and more discouraged. We Americans have been thinking in terms of World War I, and the higher echelons are trying to solve the many new problems in those terms."[86]

Nandi on Fiji had a dispensary that he termed a disgrace, a problem he saw as the fault not just of the surgeon but also of command. Serious cases were sent to the evacuation hospital fourteen miles away over very bad roads, and no accommodations were available for minor cases, which wasted manpower. On New Caledonia he inspected an army camp at Plaine des Gaiacs which he called the worst he had seen in 27 years of service. Its so-called hospital had an open and filthy operating room lighted exclusively by a hanging 40-watt bulb, and the sick and wounded had to be sent to an evacuation hospital 35 miles distant over horrible roads.[87] One of the problems that the flight surgeons raised with Grant at several locations was that of aircrew sent to SOS hospitals. Cases of flight fatigue were returned to duty quickly, but they could not survive long. On the other hand, the physically sick and wounded were held for too long, and it was difficult to return them to duty. Some who entered the SOS chain were lost to the AAF.[88] A more general problem that obviously bothered Grant was lengthy ground trans-

portation of seriously wounded or sick patients over the terrible roads that were the norm on the island bases.[89]

Grant was correct in his comments about the initial foundering with regard to medical support in the Pacific and attempts to solve problems by applying approaches drawn from World War I. Time and the development of LOCs to the ZI would solve some but not all of the problems, in part because manpower and materiel for the ETO both had higher priority. As his diary makes clear, the organizational complexity of the Pacific area, the distance and absence of ground communications between stations, and the lack of command support tended to impact the local line and medical officers more than they did in other theaters. After visits to the major theaters to remedy supply and other problems over the course of the war, Colonel Voorhees was forced to conclude that the quality of the medical department in the Pacific compared to that in the ETO was considerably poorer.[90] Whatever were Grant's suggestions for solving some of the problems he encountered—and he made a number of them that seem to have been received seriously by theater authorities—his inspection trip convinced him that aeromedical evacuation was at least an important part of the solution.

Conclusion

The President's 1939 declaration of a limited national emergency marked the easing of the funds shortages that had inhibited the Army's growth and its modernization during the 1930s. For the Army's airmen, it meant expansion of Air Corps troops, fliers and support personnel, and the procurement in ever increasing numbers of modern aircraft, including transports, particularly those produced by the Douglas Aircraft Company, which made it possible to think realistically about the possibilities of mass aeromedical evacuation. The new air-minded Army chief of staff, General Marshall, materially assisted the Air Corps toward greater autonomy by creating the AAF in June 1941 and naming his deputy chief of staff for air, General Arnold, to head it. The move culminated in the designation of the AAF as one of the three major Army commands. The other two were the Army Ground Forces under Gen. Lesley J. McNair, and the SOS, later designated the ASF, under General Somervell. Paralleling these larger organizational changes were changes in the status and autonomy of the medical division of the Air Corps and of its chief, David Grant. From being a member of the Army Medical Department and a subordinate of the Army surgeon general, by October 1941 Grant, as the newly designated air surgeon, was responsible solely to Arnold, commander of the AAF, for all medical personnel supporting the AAF on its bases and installations. The Army surgeon general remained responsible for hospitalization and evacuation for the Army, but the March 1942 War Department reorganization put limits on his authority by placing him and the medical department as a technical service organizationally under the SOS commander. The subsequent assignment of aeromedical evacuation to the AAF allowed Grant to push devel-

opment of aeromedical evacuation units vigorously, in contrast to the rather dilatory approach to their creation that the surgeon general's office had taken during the emergency period between September 8, 1939, and 1941 when the United States entered the war.

Stimulated by revelations of the Luftwaffe's use of aeromedical evacuation in Spain and Poland and initiatives from Grant, who headed the then-medical division of the Office of the Chief of the Air Corps, the surgeon general's office had secured approval of a T/O for a Medical Air Ambulance Squadron, T/O 8–455, modeled on a proposal of Grant's for an air ambulance battalion. The proposed battalion would have required integrating medical personnel with dedicated twin-engine air transports to transfer patients to fixed hospital facilities in the rear areas, and small air ambulances for evacuating casualties from as far forward as battalion aid stations, depending on the attainment of air superiority. The Army activated a test unit, the 38th Medical Air Ambulance Squadron, at Fort Benning, Georgia, in early 1942.

The process of approving this T/O once again raised the issue of specialized and dedicated aircraft for aeromedical evacuation within the ranks of the Army's fliers. As a result, General Fechet's policy of 1931 for using converted transport aircraft was reaffirmed, and the air surgeon's concept of dedicated crash rescue–type aircraft for evacuating casualties from near the front lines was blocked by the Air Staff. Neither light aircraft nor pilots for them had been procured by the AAF, and it was pointed out that the presence of marked air ambulances was tactically unsound because it would allow an enemy to obtain the position of front-line troops. The principle of retrograde airlift to transport patients in unmarked transport aircraft used for logistic or tactical purposes was adopted and utilized throughout the war, although the informal dedication of such aircraft for aeromedical evacuation was limited by circumstance, tactical or medical.

The concept of medical personnel integrated with operational personnel in aircraft-equipped units was abandoned by Grant in favor of aeromedical evacuation units composed completely of medical personnel that, for the first time, included nurses. Approval of the new T/O for such a unit, T/O 8–447 for MAETS, and the foundation of the School of Air Evacuation at Bowman Field provided the organizational framework and preparation for the MAETS which were to be deployed to provide aeromedical evacuation services for the Army throughout the war.

The initial context within which aeromedical evacuation developed was one marked largely by disinterest toward the idea on the part of General Magee, who served as the Army surgeon general during the transition from an Air Corps medical division to a quasi-autonomous AAF Medical Service. Subsequent to the War Department reorganization of March 1942, aeromedical evacuation became but one element in the relationship between Magee and Grant that carried over to Grant's successor, Kirk, and that verged on hostility. The period was also punctuated by attempts by the surgeon general and his superior, General Somervell, to

regain control of the AAF Medical Service. Bureaucratic factors and Kirk's combative personality were undoubtedly important elements in this uneasy relationship, but it was rooted in a lack of understanding of aviation medicine that had existed between flight surgeons and the Army Medical Department from the start. On the AAF side, Grant and Arnold viewed the surgeon general and Somervell's SOS/ASF as continually demonstrating an incapability or an unwillingness to understand the special medical requirements of the AAF. The AAF focus was on maintaining the effectiveness of aircrews upon whom, in the final analysis, the success of the AAF mission depended. Based upon his experiences with the surgeon general's office in Washington and his observations in the field, Grant also mistrusted the ability of the Army's medical leadership to perform with the required efficiency and flexibility. His skepticism was in part dictated by the attitude of some ground force and SOS/ASF surgeons in the theaters.

In the theaters of operation, the context within which aeromedical evacuation was integrated into the theater surgeons' evacuation plans depended on tactical and logistic factors that varied widely and the emphasis that commanders placed upon its use. Some ground medical officers did not favor the idea of moving patients by air, viewing it as either impractical or dangerous. This was particularly true throughout the war in the Pacific theaters, in contrast to Europe where the initial skepticism of ground medical officers was largely overcome during the North African campaign by command interest and the all-too-obvious problems posed by geography and the inadequate transportation infrastructure.

Chapter 4

THE POSTWAR EVOLUTION OF AEROMEDICAL EVACUATION

The years following World War II were a period of evolution for aeromedical evacuation. In contrast to its rapid development and the applications adopted in the wide variety of combat conditions in which U.S. and Allied forces found themselves between 1941 and 1945—first in the Far East, and later throughout the South Pacific, the Mediterranean, and in Europe—the requirements for mass casualty evacuation that had stimulated its adoption disappeared. The requirement for aerial transportation of patients, both intratheater and intertheater to medical facilities in Hawaii and the ZI, remained, as did the local emergency airlift of victims of accidents and natural disasters. Consequently, the policies and procedures developed for World War II were refined and institutionalized to serve the requirements for airlifting relatively small numbers of patients in a sharply reduced armed force in a period of peace.

Aeromedical evacuation was a minor consideration for the service medical departments in the immediate aftermath of World War II. They faced much larger issues that included what the dropping of the atomic bomb on Japan meant regarding the nature of future war and how to organize the armed forces and their supporting medical services for the defense of the United States in light of the recent wartime experience. The prospect of atomic warfare injected an additional factor: the responsibility of the medical services toward the nation's civilian population in the event of hostile attack on its cities, including casualty evacuation.

The role the AAF B–29 bombers had played in delivering the atomic bombs, together with the decisive role that air power had played in the war against the European Axis powers, meant that the Army's airmen now had a strong claim for an independent service that they had sought for so long. It was not immediately clear whether any future independent air force would also have its own separate medical service, and thus complete the evolution of the near autonomous status

B–29 bombers, main bombing aircraft used against the Japanese homeland.

that General Grant had achieved for the AAF during the war. The increasingly equivocal role of the Soviet Union in the attempts of the wartime Big Three to resolve the issues left at war's end was a growing concern. Underlying all were memories of the prewar Great Depression that made Americans in the postwar period fearful that they might once again find themselves in economic difficulties, and the desire among some surviving New Deal legislators to expand medical care to the population at large.

By the beginning of the Korean War in June 1950, the organizational and functional framework for the modern aeromedical evacuation system had been firmly established. The major exception was the incipient doctrinal issue between the U.S. Army and, after September 1947, the newly independent U.S. Air Force (USAF) regarding the responsibility for moving casualties from the front lines during ground combat. This became an issue with the use of AAF liaison squadrons and Army air artillery observation aircraft for frontline evacuation during the previous war. It was kept alive by continued development of helicopter capabilities after war's end and by small groups of enthusiasts in the ground forces and the Army Medical Department who were interested in developing the capabilities of Army light aviation. The AAF had not wanted to commit itself formally to frontline casualty evacuation. In a postwar world of severely constrained military budgets and while striving to sell the maintenance of the largest possible strategic bomber force to Congress and the administration, the AAF was equally reluctant to divert resources to medical evacuation, though doctrinally it was also loath to countenance a divergence from the principle of centralized control of airpower.

Postwar Perceptions of Aeromedical Evacuation

During World War II, the Army and Marines Corps had increasingly resorted to removing casualties from the front lines by air. Faced with combat utterly unlike the trench warfare of World War I and fighting in far-flung theaters usually lacking modern road and rail systems, theater surgeons had found aeromedical evacuation to be a vital supplement to the surface chains of evacuation. In some theaters, such as the CBI, the evacuation of casualties by air had been the only available means to retrieve the wounded and sick from behind enemy lines or from dense jungle areas lacking ground communications.

With the full support of the AAF commanding general, General Arnold, and aided by the near autonomy it enjoyed after the War Department's reorganization of March 1942, the AAF Medical Service under General Grant had served effectively as the principal proponent of aeromedical evacuation. Its contribution to victory in Europe had been hailed by no less than General Eisenhower, and contemporary documents generated in the CBI and Pacific theaters demonstrate conclusively just how much medical officers and commanders valued it.[1]

In the immediate postwar years, some medical department members apparently still held reservations, although their wartime experience had largely answered the basic questions regarding which patients could be transported by air. The chief of the Department of Air Evacuation at SAM, Lt. Col. Kenneth Pletcher, asserted to the annual meeting of the Aero Medical Association in 1948 that aerial transportation of casualties was once again under attack from some quarters as being too unreliable and too dangerous.[2] To help silence such criticism, SAM conducted an inflight study of the effects of transporting patients with different clinical conditions.[3]

A contemporary sample of the views held by senior active duty and retired medical officers of the three services offered some support for Pletcher's comment, but they also included rather more nuanced attitudes toward aeromedical evacuation. These were in the form of responses to a questionnaire from the so-called Hawley Committee, chaired by then-retired Paul Hawley, the former ETO surgeon, and composed of the Army and Navy surgeons general and the air surgeon. Rear Adm. J. T. Boone of the Navy's Medical Corps served as its executive secretary. The committee had been charged by the new Secretary of Defense[4] with recommending improvements in military medicine, and it gathered information through hearings and other means. The questionnaire, sent to some eighty-two senior officers, including one nurse, asked for their views of how well the medical services had fulfilled their mission during the most recent war, and it requested suggestions on how improvements might be made. Questions on hospitalization and evacuation in the theaters and the CONUS were included. Respondents expressed a considerable amount of support (36 percent Army, 27 percent Air Force, and 19 percent Navy) for aeromedical evacuation.[5]

The head of the Army Pathology Institute, Brig. Gen. Raymond Dart, wrote that he had always strongly urged aeromedical evacuation to the fullest extent,

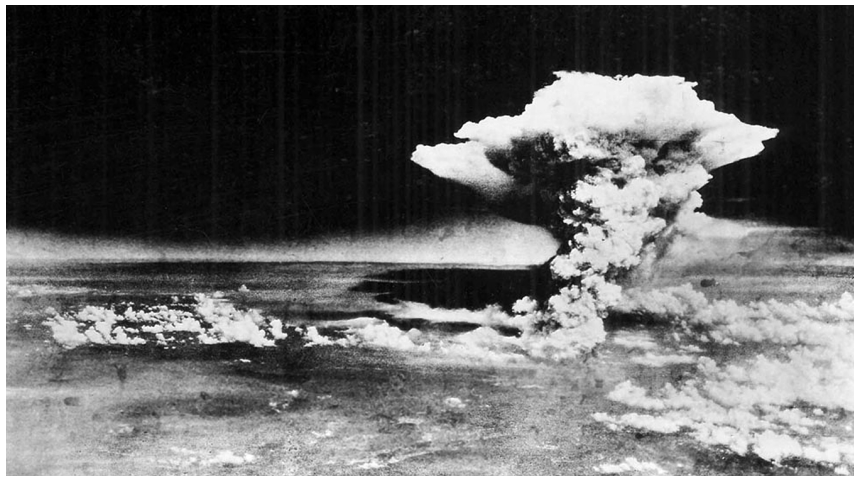
including the use of small ambulance planes in forward areas and large transport planes for long hauls between bases. In an echo of David Grant's proposal of 1941, Dart called for the surgeon general to control air ambulances and hospital ships. From the Naval War College, Capt. A. W. Eyer suggested more extensive evacuation from the COMZ to the ZI, noting that this inferred minimal hospitalizations in the COMZ and a rapid evacuation of casualties, preferably by air.

Retired Rear Adm. C. B. Camerer cited the use of aircraft as perhaps the greatest advance in casualty evacuation that saved lives and vastly increased morale. He recommended it be expanded and available in all combat areas. Col. O. F. McIlnay of the Air Training Command at Barksdale, Louisiana, echoed his Navy counterpart, Captain Eyer, calling for much greater use of aeromedical evacuation to permit concentration of definitive medical care in the COMZ and the ZI.[6]

Some respondents expressed reservations even while writing positively about aeromedical evacuation. General Kenner, Eisenhower's surgeon at Supreme Headquarters Allied Expeditionary Forces, echoed General Hawley's view of the uncertain availabilities of aeromedical evacuation, noting that valuable as it had been in the ETO, the availability of aircraft was dependent on tactical requirements. In the future, Kenner recommended that Army surgeons should control dedicated aircraft marked in accordance with the Geneva Convention for medical use only. Several respondents recommended an increased use of helicopters.

What was not said about aeromedical evacuation in some cases was more interesting. For example, the only nurse queried, Col. Mary G. Phillips, made absolutely no comment about flight nurses. Perhaps even more odd was the comment of Col. Robert P. Williams, Gen. Joseph Stilwell's surgeon in the CBI theater where aircraft had proved to be absolutely essential for evacuating casualties during the 1943–1944 campaigns in Burma. In Williams's response, he discussed evacuation but made no reference to casualty evacuation by air. His unwillingness to say anything seemingly confirmed, at least implicitly, the attitude attributed to him by the commander of a general hospital at Melar, India, who told the air surgeon's deputy, Charles Glenn, that Williams was "not in sympathy with Air Evacuation."[7]

Although these responses suggest a considerable amount of support for aeromedical evacuation by military surgeons of all services, its future development was clearly going to depend to a major degree on the final resolution of the struggle between the Army surgeon general and the air surgeon. Kirk, one of the few board-certified[8] medical men in the Army, focused on practicing medicine in general hospitals using the most advanced medical and surgical procedures, particularly in his own medical specialty, orthopedic surgery.[9] Grant, on the other hand, placed a greater priority on aviation medicine as a means of maintaining maximum effectiveness of the air forces conducting operations and of enhancing the practice of medicine in the field through the use of aircraft to increase the efficiency and above all speed in the chain of evacuation. As regards the practice of



Immediately after the atomic bomb drop on Hiroshima.

good medicine, it is fair to say that of the two, Grant's appreciation was better than Kirk's that aeromedical evacuation could ultimately obviate the need for some more radical medical procedures, such as amputations, because the speed of air evacuation conferred an advantage that slower surface methods could not match.

Securing a consensus about the value of aeromedical evacuation, although obviously important to its further development in the postwar world, was not the primary concern of General Arnold and the AAF leadership as the war moved toward its end. Their overriding priority was attaining the long-sought independence of the AAF from the Army, a goal complicated by discussions on unifying the U.S. armed forces pressed by the retiring and the incoming Army chiefs of staff, General Marshall[10] and General Eisenhower, as well as by President Harry S. Truman and influential members of Congress. The intense bureaucratic conflict that marked these discussions was set against more confusing issues about the nature of future war that was raised after the dropping of the atomic bomb. These called into question what role the U.S. military services should play in future national defense.[11]

The implications were profound for military medicine as a whole, with special relevance to aeromedical evacuation. If U.S. cities were to be subjected to atomic bombing as Hiroshima and Nagasaki had been, the imposition of martial law would probably be required and military medical departments would have to be called upon to fill the void left by the destruction of civilian medical facilities. In such circumstances, aeromedical evacuation would be the most likely means available to transport casualties, including radiation victims, to surviving medical facilities beyond the bombed area. If future combat resembled the ground operations reminiscent of the recently concluded war, large-scale casualty evacuation

would be called for.[12] Resource allocation, planning, and training decisions that might flow from answers to these and related questions could hardly be made until the Army airmen's fight for independence and the future of their quasi-autonomous medical service had been determined.

For General Grant, that future had begun to seem threatened in 1945 even before the dropping of the bombs. Surprisingly, what threatened the considerable freedom of action enjoyed by the air surgeon and the position of the medical service within the AAF were actions from within the AAF itself. In mid-January 1945, General Arnold suffered his fourth heart attack in two years, and to ease the burden on the notoriously hard-working and impatient Arnold, Army Chief of Staff General Marshall suggested that one of the two senior air commanders in Europe, Lt. Gen. Ira Eaker, be returned from the Mediterranean theater, where he had commanded the Mediterranean Allied Air Forces, to take over the daily running of the AAF as Arnold's deputy commander.[13] Eaker duly arrived in late March, and when the European war ended a month and a half later, Arnold selected Eisenhower's top airman, the senior U.S. air commander in the ETO, General Spaatz, to go to the Pacific to command the B–29 bombing effort against Japan. In an effort to avoid fragmenting the strategic offensive between rival commanders in the Pacific, Arnold had earlier prevailed upon the Joint Chiefs of Staff (JCS) to establish the Twentieth Air Force with himself as commander to control the B–29 units from Washington.[14] With Spaatz and Arnold both focused on the B–29 strategic bombing offensive against Japan, and with Arnold also in ill health, Eaker became the key figure in reorganizing the AAF in preparation for the fight for air force independence and for the major role airmen believed they had earned in the postwar armed forces. Among the efforts undertaken was a streamlining of the Air Staff to reduce its size and the number of general officer positions, in keeping with pressure from the War Department.[15]

More than just anticipation of postwar reductions was involved. As early as January 1945 General Arnold, while laying out a foundation for the AAF's transition from war to peace, specified that one of the governing principles for the future activities of the Air Staff and major commands be decentralization of operating functions to eliminate the system of rigid control that Headquarters AAF had developed during the wartime expansion.[16] In a visit to London in early March, Arnold briefed Eaker on what he wanted Eaker to do in Washington, but Eaker held no staff meetings until mid-July after his late-March return from Europe. Consequently, the nature of the reorganization that he would propose to Arnold had not been generally known in the AAF staff.[17]

To Grant's dismay, Eaker proposed placing the air surgeon's office under the personnel directorate and abolishing the commanding general's Special Staff, which included the air surgeon. Such a reorganization would place the air surgeon's office essentially in the same position it had occupied in the Office of the Chief of the Air Corps in early 1939. Grant was understandably upset with what he perceived as the threat to downgrade the role of the medical service in the AAF

and eliminate his direct access to the AAF commander. Justifiable as part of the Air Staff's reorganization as directed by Arnold, this organizational change merely heightened Grant's suspicions of Eaker that he had harbored since returning from his May inspection trip to the CBI theater. Grant believed there was a personal element in the proposed treatment of the AAF Medical Service, and it reflected the fact that Eaker would go to any lengths to get rid of him, even if the medical service was destroyed in the process.[18]

In late May, Grant had been surprised to observe Eaker escorting surgeon general Kirk and his wife at a ceremony where Grant had accepted a new aeromedical evacuation aircraft purchased by donations. Considering the hostility that Kirk had shown toward both the AAF Medical Service and Grant personally, Grant's suspicions were aroused because Eaker had not mentioned Kirk's attendance. Concerned about his future should he once again come under the authority of the surgeon general, Grant raised the issue in a frank conversation several days later with General Arnold, who told him that Eaker had recommended that Arnold relieve Grant and appoint Malcolm Grow in his stead. The AAF commander also told Grant that Eaker persisted to the point where Arnold had referred Eaker to Assistant Secretary of War Robert Lovett, who also refused, citing Grant's success in building the AAF Medical Service and his standing as a national figure. Arnold told Grant that, as long as he was AAF commander, he would protect him and keep him on his staff and would give him adequate warning of his retirement so that Grant could plan his own.[19]

The air surgeon was even more disturbed when the very next day he learned that Eaker had consulted surgeon general Kirk about a paper that Grant had sent forward for General Arnold's signature, and upon which Eaker had subsequently decided no action would be taken. The paper had requested authority for the AAF to discharge its own medical officers, an action that Congress had been pressing for but which Kirk had been resisting, to Grant's frustration.[20]

Arnold's uncompromising support of his air surgeon had provided the firm base from which Grant and his staff had pressed the cause of the special medical needs of aviators and aeromedical evacuation in both the CONUS and the worldwide theaters of operations. It enabled Grant to fend off efforts by the Army surgeon general, General Kirk and his superior, General Somervell, commander of the ASF, to regain control of the AAF Medical Service as well as direct access to the chief of staff. The latest effort had occurred as late as January 1945 without success, although Secretary of War Stimson did issue a directive in the wake of Kirk's failure that the surgeon general should have the formal right of direct communication with the secretary at all times. General Kirk was an old friend of Stimson's from the days when Stimson was U.S. Governor General in the Philippines, and subsequent events indicated that Stimson could and would exercise a veto on the Army's attempt to change the medical department if Kirk did not favor it.[21]

Unsuccessful as Kirk's bid had been, however, Arnold was preoccupied with the air war against Japan and with his health. He was intermittently hospitalized

Maj. Gen. Malcom C. Grow.

with heart disease and certain to be replaced soon by Spaatz, whom Eisenhower had indicated he wanted to succeed Arnold. In early July, before Eaker announced the proposed reorganization, Arnold amplified his earlier remarks, telling Grant that he knew Eaker and Kirk were friendly and that Eaker "did not believe in our Medical Service and wanted to turn it over to the Surgeon General." A month later, Eaker formally refused Grant's rebuttal of the proposed reorganization, so Grant took the only option available, from his perspective. When Spaatz confirmed in a September conversation that he wanted Grow to relieve Grant, Grant advised him that Grow should be ordered to headquarters immediately as his deputy and heir apparent because he, Grant, planned to retire in October.[22] By the end of the year, Grant and Arnold had both retired, and in January 1946 General Spaatz became the next (and last) commanding general of the AAF.

Other major actors who passed from the scene by the beginning of 1946 include General Marshall, who was replaced by General Eisenhower as army chief of staff, and Secretary of War Stimson, who was replaced by the Undersecretary of War, Robert Patterson. With Grant's departure, the foremost proponent of aeromedical evacuation left the scene at a time when the future of the independent air force and the future of its medical service were about to

become critical issues. It was left to General Grow, who became air surgeon on January 1, 1946, to sort out the future of a medical service for the envisioned USAF and what role aeromedical evacuation would have in its charter.

Grow's task was difficult and complex, overshadowed by the immediate concerns of General Spaatz and his staff for independence of the air force from the Army. An independent air force was favored by General Marshall, as it was by his successor, although the air-minded Eisenhower was equally convinced that the Army and an air force should be supported medically by a single medical department. To ensure Eisenhower's support for the airmen's primary goal of independence, Spaatz had agreed not to press for a separate air force medical service.[23] The fate of the AAF Medical Service had thus been joined to the fate of the airmen's quest for separation from the Army. Complicating this situation was a move to unify the armed forces which was supported by the War Department, including Headquarters AAF, and the new President, Harry Truman.

Unification and the Armed Forces Medical Services

Planning for a postwar structure for the U.S. armed forces began surprisingly early in World War II under the auspices of the far-sighted Army chief of staff, General Marshall. Marshall recalled all too vividly the rapid demobilization at the conclusion of World War I and Congress's refusal to support a large standing army. As World War II progressed and the success of the allied armies became more certain, the need to prepare for another postwar period acquired additional urgency. Legislation granting the President the powers that he had exercised in ordering the March 1942 reorganization of the War Department would expire six months after war's end. Without further legislation to provide a statutory basis, the War Department would revert to its prewar organization. The role of the AAF as one of the Army's three major commands would end, as would the institution of the JCS on which the AAF commanding general sat in a coordinate position with the Army chief of staff and the Navy's Chief of Naval Operations.

On the eve of U.S. entrance into World War II, Marshall brought Brig. Gen. John MacAuley Palmer, then seventy years old, out of retirement to be his personal advisor on organization and liaison with the National Guard, the modern equivalent of the colonial militia. Marshall and Palmer had both served in France under General Pershing, the AEF commander, and both believed that the Army in wartime should be a citizen army drawn from reserves. Palmer advocated universal military training as the basis for the citizen army.[24]

After the attack on Pearl Harbor, Palmer spent nearly all his time on postwar organization, and Marshall formed a postwar planning board in June 1942 to deal with the question of organization. In April 1943, Marshall directed ASF Commander General Somervell to begin studying demobilization planning, and in May the Special Planning Division in War Department's General Staff was created to review postwar organization.[25]

Although the JCS and other joint committees had proved adequate to the task of coordinating the efforts of the Army and Navy to achieve victory, Marshall and many in the Army believed these structures had been inefficient, cumbersome, and slow. They believed the war had demonstrated the necessity for unified command, which was best achieved by a single Department of Defense (DoD). Postwar austerity also would demand that functions be shared to achieve economies. These objectives could best be obtained through a single DoD, and in April 1944 Marshall's top postwar planner, Director of the Special Planning Division Brig. Gen. William F. Tompkins, so testified to the House Select Committee on Post-War Military Policy (the so-called Landrum Committee):

> We realize that in the post-war era this Nation will be struggling under the burden of a large public debt and that while the Nation will require adequate national security it will also demand that measures for this security be such as to provide for maximum efficiency and economy in the elimination of overlapping and duplication and competition between agencies.[26]

Marshall and the civilian leadership of the War Department favored creation of a unified structure for the U.S. armed forces having a single powerful civilian secretary and a single military chief of staff who would direct three separate functional military departments for ground, sea, and air. Reflecting on the interwar period, and certainly cognizant of the prevailing militia tradition in U.S. history, Marshall and Palmer favored universal military training for all young men to provide a trained reserve of manpower that could be mobilized rapidly in the event of another national emergency and avoid the problems faced in building the army for World War II. In the spring of 1943 General Arnold had established a postwar planning office in the Air Staff to help shape arguments for air force independence. He and his staff strongly supported Marshall's views. The War Department thus presented a unified position on the postwar organization of the U.S. armed forces, a view the Navy found wanting.

Suspicious that an independent air force would seek to acquire naval aviation, the Navy opposed its formation and sought to retain the wartime JCS structure that had served to coordinate rather than direct Navy planning and operations. Unification was ultimately to be realized, more on the Navy's rather than on the War Department's terms, with passage of the National Security Act of 1947.

The Eaker-proposed Air Staff reorganization, to which Grant had so vigorously objected, went into effect September 17, subordinating the Office of the Air Surgeon to the assistant chief of the Air Staff for Personnel. It became effective, but not without some apparent reservations on the part of General Arnold. According to Grant, Arnold voiced misgivings in mid-August about the reorganization, although he believed the process had gone too far for him to intervene.[27]

To at least help preclude the perception by AAF commanders that the organizational change affecting the medical department should be taken as diminish-

ing the importance of the AAF medical service, Arnold published a letter in late August to all AAF commanding generals and commanding officers. In it he stated, "there must be full and intelligent awareness of our responsibility for and the importance of our medical service and of its position and relationship in the organizational structure of each echelon." He listed a series of clearly fundamental principles essential to the function and operation of the medical service stressing the need for commanders to develop a close relationship with their surgeons and cautioning against lay administrative control that would prevent the surgeons from exercising their professional responsibilities to the sick and wounded.[28] Arnold announced his decision to retire in early November 1945, and his concerns about the Air Staff reorganization may have been a factor later that month in his directing Eaker to give Spaatz the job of determining the permanent status of the AAF. Probably more important was General Eisenhower's imminent succession of General Marshall as Army chief of staff, which occurred on November 20, because Eisenhower wanted Spaatz to succeed Arnold as AAF commander.[29]

Spaatz's role would be important to the new air surgeon, Malcolm Grow, and to the future of the medical service. In spite of his agreement with Eisenhower not to press for a separate medical service as part of air force independence, Spaatz, unlike Eaker, was clearly not content to return full responsibility for medical support of the AAF to the surgeon general. He persuaded the first postwar board charged with examining the War Department organization, the so-called Simpson Board,[30] to reaffirm the AAF commander's "command responsibility for all medical installations and units of the AAF and for all medical personnel assigned to the AAF."[31] Spaatz also helped convince the board to define the surgeon general's major task in his role as a technical officer of the War Department and chief medical officer (CMO) of the Army as setting Army policies for hospitalization, evacuation, and care of the sick and wounded, and also specifying that the surgeon general could issue directives to the medical officers in subordinate major commands of the War Department only through proper command channels, and not directly.[32]

Malcolm Grow, now Spaatz's air surgeon, agreed with David Grant on the need to preserve the wartime position of the AAF Medical Service in a peacetime air force. After Grant's departure, Grow's office developed a medical master plan for medical support of an independent air force. This was done in conjunction with a new phase of postwar planning by the Air Staff begun on October 15, 1945.[33] The Grow-supervised master plan incorporated as one of its major assumptions that an independent air force would provide its own complete medical service including regional hospitals, which in the CONUS were the equivalent of the wartime-developed AAF general hospitals controlled by the Army surgeon general. However, in September 1945 surgeon general Kirk had established a postwar planning board on the assumption that the AAF would continue as a component of the War Department and that the functions of hospitalization and evacuation for which the ASF had been responsible would devolve upon the sur-

geon general, whatever the fate of the ASF. The surgeon general would serve the War Department as a whole.[34]

Grow's approach was undercut by the Eaker-inspired Headquarters AAF reorganization of September 1945, and even more importantly by Spaatz's agreement with Eisenhower not to press for a separate air force medical service. The AAF Medical Service for which Grow found himself responsible in June 1946, following implementation of the Simpson Board's recommendations, was restricted largely to base dispensaries. The wartime regional hospitals in the United States (essentially AAF-controlled general hospitals) and the station hospitals serving major AAF bases were phased out gradually, and even SAM was reassigned to the Air University in April 1946. The surgeon general had control of all general hospitals and Army-wide responsibility for the technical administration of medical services, and Kirk, as the senior medical advisor once again to the Army chief of staff, was superior to the air surgeon in the Army medical hierarchy.[35] Kirk's situation, and perspective, was clearly reflected by Brig. Gen. Guy Denit, Kirk's immediate successor, when he stated in December 1946, "the surgeon general does not recognize the existence of an AAF medical department officer, nor of an Army Ground Forces Medical Department Officer…. The mission of the Medical Department is to serve the interests of the Army as a whole and not a particular command or branch."[36]

At least the aeromedical evacuation function within the War Department remained officially with the AAF. With Headquarters AAF adapted to peacetime, at least on an interim basis, by Eaker's September reorganization, the new AAF commander had directed changes to the AAF organizational structure in March 1946 to prepare for the changed circumstances and mission requirements of the postwar world. The reorganization provided the core for the command structure that would characterize the air force when it achieved its independence in 1947.[37]

An expanded ATC was directed to provide air transport for all War Department agencies except those served by troop carrier commands and some local services overseas, and for any government agency as required or directed. ATC was made responsible for air evacuating the sick and wounded from overseas theaters and between points within the United States. The transport command included a new Air-Sea Rescue Service, a designation implying possible crash rescue and frontline evacuation operations like those performed by AAF liaison squadrons in the war just past.[38]

In the immediate wake of the Japanese surrender, ATC's aeromedical evacuation flights had been chiefly filled with U.S. POWs freed from Japanese captivity. Subsequently, the command developed a schedule of aeromedical evacuation flights to the United States and Hawaii to move members of the occupation forces in the Far East and Europe needing definitive or specialized treatment that the Army general hospitals—in-theater and frequently sited in former enemy medical facilities—could not provide. Intratheater movement of patients continued to require theater airlift, generally by reconfigured transports of the theater troop car-

rier commands. Of more than 4 million passengers carried by ATC during the almost four years of war, its medical evacuation aircraft carried 339,000 patients: 103,000 from battle zones to base hospitals; 121,000 from base hospitals to the United States; and 115,000 from U.S. ports of debarkation to domestic hospitals. By comparison, from the end of the war until May 1948, ATC evacuated between 12,000 and 15,000 patients per year.[39] In the absence of combat casualties, the relatively small number of patients requiring this service between the end of World War II and the beginning of the Korean War would, in the interests of economy, lead to decommissioning the remaining hospital ships that had served in World War II.[40]

In all these cases, the absence of mass casualties from combat and sickness meant that fewer medical personnel were needed. Most of the Medical Air Evacuation Squadrons (MAESs) assigned to theater troop carrier units were decommissioned and their personnel assigned to the ATC's 830th MAES, which served as an umbrella organization for ATC from which flight nurses and medical technicians were assigned to aeromedical evacuation missions. Unfortunately, even the reduced requirement for such personnel was not easily met because so many doctors, nurses, and medical technicians had left the armed forces.[41] In mid-1946 to help fill the need, General Grow reopened the School of Air Evacuation, now at Randolph Field, Texas. Its operations had been frozen at the declaration of peace, but the shortage of medical personnel in the armed forces as a whole in the postwar years presented a bothersome problem that required constant corrective efforts. This shortage was also a major factor affecting the various proposals that impacted the future of the medical services during the struggles over unification.[42]

While the aeromedical evacuation system was adjusting with some difficulty to an essentially peacetime mode during 1946 and 1947, negotiations reached closure on the basic structure for unification of the armed forces. Based on the success of negotiations between Maj. Gen. Lauris Norstad, the War Department Director of Plans and Operations (and former AAF Director of Plans), and Vice Adm. Forrest Sherman, the Navy's deputy Chief of Naval Operations, the President announced on January 16, 1947, that Secretary of the Navy James Forrestal and Secretary of War Robert Patterson had agreed to support legislation for a Secretary of National Defense.[43]

The Secretary of National Defense would be responsible for coordinating three military departments—Army, Navy, and Air Force—each with a military head and under a civilian secretary. The three military heads would comprise a JCS, and the three departments would be administered as a single unit by the Secretary of Defense. Although the provisions did not call for a JCS chairman, they included a Chief of Staff to the President. In addition to the already established Central Intelligence Agency, the negotiators agreed to support legislation for a National Security Resources Board. The individual and collective functions of the armed forces—the so-called roles and missions of each component—were to be identified in a presidential executive order which had been drafted and pro-

vided to the participants, to be issued when the President approved the final legislation.[44] With the exception of the resources board, which presumably would (and did) address the mobilization and utilization of medical personnel and resources, the agreement was silent about the future organization and functions of the military medical services. Even before the legislation was introduced, these issues arose with a vengeance.

Anticipating the passage of unification legislation, Chief of Staff General Eisenhower appointed a special War Department board on January 20 headed by Brig. Gen. William Hall, the War Department deputy chief of staff for Personnel and Training, to identify and recommend solutions to major unification problems that the Norstad-Sherman agreement posed for the Army, pending unification legislative proposals.[45] Among the major issues was whether the Army and the new USAF would be supported by common service organizations, including medical services. The question for Air Surgeon Grow was whether the planned organic medical corps of an independent air force developed by his staff would be put into effect, or whether the Army surgeon general and the Army Medical Department would continue to provide the bulk of medical support, including hospitalization, as it had to the AAF under War Department Circular 138.[46]

At least for Eisenhower's tenure as chief of staff, the answer was a given. In his view, common technical support agencies would preclude the duplication evident during the war and would facilitate economies. Eisenhower was an enthusiastic supporter of air force independence, yet he felt so strongly about eliminating duplication that when he heard some AAF leaders express reservations about whether support by War Department agencies would be effective, he reminded Spaatz of their agreement about no separate services for an independent air force. Whatever was in Eisenhower's mind, his comments to Spaatz must have at least implicitly raised the possibility of losing the chief of staff's support for air force independence. Eisenhower told Spaatz pointedly that he would "oppose the whole plan with all the emphasis I can possibly develop" if the idea of separate services was developed in Congress or elsewhere.[47]

Eisenhower was particularly concerned about the idea of the independent air force having its own medical service, and he favored a consolidated medical organization. Worse from the air surgeon's point of view and contrary to thirty years of struggle by the Army's flight surgeons, Eisenhower also appeared to accept the surgeon general's tacit rejection of the validity of aviation medicine as a specialty that justified a separate medical service. In criticizing the air force medical plan, Eisenhower wrote Spaatz that it would be unwise to overemphasize the specialty of aviation medicine "to the point where the services would be duplicating overheads in every direction." The Hall Board, perhaps mindful of the chief of staff's views, stressed that an independent air force would not set up separate supporting services, like an Air Force Medical Corps.[48]

The issue—discussed by the surgeon general and the air surgeon before the Hall Board, which essentially espoused the Circular 138 arrangements—was

raised again early during testimony on the draft legislation on unification in March before a quite different audience: congressional committees considering the legislation. During these hearings, Congress was very concerned as a result of wartime shortages to organize the military medical services in ways that would make the most efficient use of doctors for civilian and military situations, particularly in light of the possibility of nuclear war. In a comment almost certain to raise the hackles of virtually all of the American Medical Association's members as a possible step toward socialized medicine, Chairman Chan Gurney of the Senate Committee on the Armed Services opined that there might be a need to militarize the civilian medical community in some areas to meet the catastrophe of a nuclear attack.[49] Similar concerns about the ultimate implications for civilian medicine of consolidating the federal medical services as a whole, and not just those of the Army and Air Force, were to underlay the deliberations of the so-called Hoover Commission. President Truman created this commission (formally, the Commission on Organization of the Executive Branch of the Government) to study ways of reorganizing the executive branch of government to make it more efficient. The wartime shortage of doctors concerned Congress, but residual interest remained on improving the medical care of the population at large, which some saw as an unrealized aspect of President Roosevelt's New Deal legislation.[50]

Two aspects of these deliberations are relevant: discussions on whether the armed forces medical services should be consolidated, and what prominence did the medical services give aeromedical evacuation. The consolidation model, favored by General Kirk, focused on hospitalization and tended to leave field medicine and evacuation as secondary activities. The prominence given aeromedical evacuation in discussions and committee reports reveals the attitude toward this technique compared to its actual use and development during the war.

The month before Kirk appeared before the committee, General Eisenhower repeatedly offered his conviction that the medical services could provide an excellent starting point for unifying the armed forces as a whole.[51] He believed strongly in a single medical service with three independent components for the unified armed force, and he believed the probable nature of future wars demanded that there be a strong defense secretary with directive authority, rather than merely a coordinator, and an equally strong director of unified medical services. Again using unified medical services as his model, he commented,

> For example, in looking at the picture of what war might be in the future, take a medical service. A medical service is no longer going to be concerned merely about evacuation of people out of St. Lo or out of Iwo Jima. I have no doubt that eventually the medical service of the whole United States in global war will be under one man. And that means the medical people are taking care of the wounded in Chicago and Portsmouth, just the same as at the front.[52]

General Kirk's testimony dealt directly with the medical services, and he initially merely stated the War Department position that, because nothing in the proposed legislation specifically dealt with the medical department, the existing situation would continue for two years while the Secretary of Defense decided what the final medical organization should be. When asked his personal opinion on the most effective future organization, Kirk described a highly centralized, single integrated medical service that would effectively be a fourth military department. It would be commanded by a powerful director general who would be a member of the Secretary of Defense's staff and would provide the secretary with advice on the health and medical care of all components of the armed forces. The director general's control would be broad. He would "prepare policies, plans, and directives governing the medical service; operate, command, and administer all medical department troops and installations not attached to the major forces."[53]

The director general and the Armed Forces Medical Service (AFMS) he commanded would be responsible for common hospital services including all fixed hospital installations: general, station, and convalescent in the CONUS, in overseas departments, and in the COMZ during war. The proposed AFMS would also operate a preventive medicine service, a common research and development (R&D) program, clinical research laboratories, the Army Medical Library, and the Army Institute of Pathology, and the AFMS would conduct common procurement, storage, and distribution of medical supplies. The director general would have complete responsibility for procuring, technically training, and assigning military and civilian employees. He would be responsible for preparing and defending budgetary estimates for the AFMS as well as for constructing and repairing all required medical installations. Last on Kirk's list of charges placed on his unified medical service was responsibility for coordinating and directing evacuation of the sick and wounded by air and sea.[54]

Deputy directors would direct operations of the new medical service in the CONUS and overseas at installations other than those attached to a major force. Each major force, that is, Army, Navy, or Air Force, would have a surgeon general appointed from the medical service and additional attached medical troops as determined necessary by the Secretary of Defense (on the basis of the director general's recommendations). The surgeon general of each force would be responsible for the specialized, technical, and tactical training of all attached medical personnel and for R&D pertaining to his special needs. All examples of these special needs pertained to field medicine:

> Surgeon General of the Army: Tactical training of battalions and regimental detachments, medical battalions, medical groups, dispensaries, field and evacuation hospitals.
>
> Surgeon General of the Navy: Specialized and tactical training of attached medical personnel for duty aboard ship, including hospital ships; naval air arm, and [related] research and devel-

> opment...; dispensary service evacuation of sick and wounded by ship.
>
> Surgeon General of the Air Force: Specialized and tactical training of attached medical personnel, such as flight surgeons and nurses, research and development as it applies to the health of flying personnel, air evacuation of the sick and wounded, and dispensary service.[55]

The rationale Kirk offered to support his proposals included identifying the primary missions of Army and Navy and the acute and serious scarcity of trained medical personnel during wartime and the wasteful parallel systems of hospitalization, evacuation, procurement, storage, and distribution of medical supplies. Kirk also asserted that "the medical service during the war, no matter how good, could have been better had there been a single integrated medical service"—a proposition that General Grant and his flight surgeons would no doubt have contested vigorously.[56]

It seems clear from the structure of the proposed organization that the AFMS core activities would focus on hospitals and clinical medicine and that field medicine—emergency surgery and interim medical procedures in support of patients as they moved along the chain of evacuation toward definitive care—would have less importance within the new organization. Medical personnel would be attached to a force and presumably rotate periodically back into primary hospital or hospital-related activities. This was not surprising given Kirk's background and the focus on Army hospitals among prominent members of the Army Medical Corps. Testifying before the Senate Appropriations Committee on military appropriations for FY 1946, Kirk apparently did not think it worth mentioning that aeromedical evacuation had played a major role in the more rapid evacuation of the wounded that he cited as one of the factors producing decreased mortality from certain kinds of wounds as compared with similar statistics from World War I. In fact, War Department Field Manual FM 8–35, published a few months before Kirk's testimony, specified, "evacuation of the sick and wounded by means of water transportation is mandatory if a military force is operating in a theater separated from the zone of the interior by a large body of water." The manual also specified, somewhat contradictorily, that "evacuation by air will be utilized whenever feasible."[57]

An anecdote related by a later Air Force surgeon general is suggestive of Kirk's relative priorities compared to Grant's, with whom he was in contention for control of the AAF Medical Service during the war. General Pletcher relates that he was present at a conversation between the surgeon general and air surgeon when Kirk told Grant "Look Dave, don't separate yourself from us [the U.S. Army Medical Department]. All you will do is get beat over the head by the line of the Air Force."[58]

Kirk's concept with its stress on clinical medicine was in keeping with the emphasis he had begun to place on additional graduate training and specialization,

including board certification for members of the medical department. While professionalizing the department was obviously a natural goal, given Kirk's background, it also had an expedient aspect: it was a way of meeting the expectations of the new breed of doctors and making the Army a more attractive option while simultaneously upgrading the department's professional skill levels. Kirk's successor Maj. Gen. Raymond Bliss continued this program, but at the end of 1949 a shortage of 1,200 medical officers remained.[59] Because of Kirk's inherent disinterest in field medicine, when coupled with the personnel and organizational uncertainties of the late 1940s, the constituency for aeromedical evacuation was not necessarily strong within the Army, except probably at SAM and in the offices of air surgeon and the command surgeon of the ATC.[60]

The final product of the hearings on unification legislation was the National Security Act of 1947 which became effective September 18, 1947.[61] The act, signed by President Truman on July 26, 1947, created a national military establishment comprising three military departments—Army, Navy, and Air Force—under a Secretary of Defense who had coordinating rather than directive authority, as the Navy had favored. The act left open for two years the final form of the medical department for the newly independent Air Force while the new Secretary of Defense decided what services being performed by the Army, including medical services, should be transferred to the Air Force.[62]

Kirk's ideal proposal was not adopted, but the surgeon general was left in charge of providing medical support for the new Air Force in consonance with the oral agreements between Generals Spaatz and Eisenhower that were codified and published on September 15, 1947.[63] The fundamental policy agreement stated that service support of the Air Force would continue "substantially as now constituted" and, specifically, "chaplains and medical personnel will remain with the Army." General hospitals for the Army and Air Force would be operated by the Army, although the Air Force could operate station hospitals and provide hospital service to members of either service depending on prior agreement. The surgeon general's traditional status and powers were reaffirmed as "Chief of the Medical Department of the Army and senior medical staff officer of the War Department."[64]

The period following creation of the national military establishment was marked by the deliberations of a wide number of boards and committees. Considered were various proposals for organizing the military medical services as a separate entity or placing it within the larger context of the federal medical services, which included the Veterans Bureau and the Public Health Service. The situation was so confusing to observers that a trade publication, *Washington Report on the Medical Sciences*, published a four-page directory in mid-September 1948 of "Washington committees, boards, etc., having responsibilities in the medical field which have sprung up in recent months."[65] Having the greatest influence on the future organization of military medicine were the Committee on Medical and Hospital Services of the Armed Forces, appointed by Secretary of Defense

Forrestal and generally known as the Hawley Board after its chairman, Paul Hawley, Eisenhower's former ETO surgeon, and the two task forces of the President's Commission on Organization of the Executive Branch of the Government (the Hoover Commission)—Ferdinand Eberstadt's Committee on National Defense, and the Medical Services chaired by General Kirk's wartime medical supply troubleshooter, Tracy Voorhees.[66]

The principal committees considered proposals like Kirk's for a single medical service coequal with the military departments, separate organic medical departments for all three services, and organic medical departments with a common general hospital system. Although aeromedical evacuation may have figured in the deliberations of these various boards and committees, it is significant that virtually no mention of the issue appeared in any of the final reports.[67]

The continuation of the situation whereby the Army Medical Department provided medical services to the Air Force as part of the agreements attendant to unification was profoundly disappointing to the air surgeon and his staff, but it was not to hold. After much discussion, the Secretary of Defense accepted the position of the Eberstadt Committee that each service needed to control its own medical service to conduct its mission most effectively. On July 1, 1949, the USAF Medical Service came into being with Malcolm Grow as its first surgeon general. The first essential function that the new medical service identified was "to operate air medical evacuation systems for both the Army and the Air Force."[68] Richard Meiling, David Grant's former air evacuation officer and executive officer, played an important role in achieving the transfer of functions from the Army to an independent Air Force Medical Service and in decisions that furthered the development and acceptance of aeromedical evacuation.[69]

Conclusion

Although the aeromedical evacuation system may have been peripheral to the concerns of the many committees, boards, and individual leaders dealing with issues of unification and control of the service medical departments, the system continued to evolve in the postwar period under the effects of external events and decisions arising from the drive to consolidate functions and enable the services to live within severely constrained postwar budgets. The AAF reorganization directed by Spaatz in March 1946 had charged ATC with aeromedical evacuation as part of its responsibility. ATC was to provide air transport services to the War Department and other agencies, but its limited aircraft resources precluded its giving a high priority to aircraft dedicated exclusively to air transport, even if its commander had wished to do so. Immediately after war's end, the AAF as a matter of policy began releasing transport aircraft to civilian airlines in an effort to strengthen the airline industry. The industry's economic health was essential to the nation's aircraft manufacturers and to the AAF, which ultimately depended on the manufacturers' production capabilities.[70]

Unification of the armed forces, begun in 1947 with the creation of the DoD, and events in Europe placed additional requirements for air transport upon the Air Force that necessarily affected aeromedical evacuation. As a natural step in consolidating functions as unification took hold, on June 1, 1948, the Military Air Transport Service (MATS) was created by integrating the Naval Air Transport Service with the Air Force's ATC.[71] The beginning of the Berlin airlift on June 24, 1948, in response to Soviet closure of the land routes into the former German capital created a demand for the four-engine C–54s. These were the standard aircraft for intertheater air transport of passengers, high-priority cargo, and patients, and the withdrawal of a significant number of them strained the capability of MATS to maintain the schedule of aeromedical evacuation flights that it and its predecessor organization, the ATC, had operated since the end of the war.

Domestic aeromedical evacuation, which had continued in the postwar period using C–54s and C–47s, now had to use greater numbers of the C–47s during the Berlin crisis. At the conclusion of the Berlin airlift, the Secretary of Defense issued a directive that aeromedical evacuation would be used for military patients whenever possible. This helped draw attention to some of the deficiencies of the unmodified transport that had been the standard vehicle for moving patients.[72] The result that the Air Force acknowledged for the first time since the days of the Cox-Klemin air ambulances in the 1920s was that a need existed for specialized aeromedical evacuation aircraft. A modification program was established for twenty-four C–47s to improve the cabin heating system, install easily cleanable floor coverings, and construct a heat-conserving bulkhead between the patient area and the cargo doors. Similarly, some thirty C–54M four-engine aircraft were modified to make them more comfortable and functional, dedicated to aeromedical evacuation missions. The added emphasis given to aeromedical evacuation helped create a stronger constituency for the mission within MATS. Supervision was vested in the command surgeon, Col. Wilford Hall, and an aeromedical evacuation division was established to coordinate the function.[73] A large number of transport aircraft developed during the war had been modified to carry patient litters, and gradually some began to enter the Air Force inventory in the postwar period.

Neglected in these developments was the use of aircraft for the evacuation of the wounded and sick from the front lines. This function had been a significant element of David Grant's thinking in 1940. Frontline evacuation had been exercised widely during the war on an emergency basis using light aircraft which had been allocated for other missions. General Arnold and his staff had resisted the idea of developing a formal capability for air ambulances because they considered it would divert resources from building a bomber-oriented combat force, but it did not prevent the Army air observation artillery units and AAF liaison squadrons from doing excellent ambulance work in all theaters, particularly in the Pacific.[74]

As a result of the success of the Army air observation artillery posts using light aircraft, General Eisenhower pressed the AAF to allow expansion of the

Army's use of light aircraft for other ground force missions under control by Army ground commanders. Reluctant to deviate from AAF doctrine over centralized control of airpower by AAF commanders, Arnold and the AAF gave in when Eisenhower, now understood to be Marshall's successor as Army chief of staff, predicated his support for an independent air force after the war on an expansion of organic Army aviation—aircraft under ground commanders' control. As Arnold's deputy AAF commander, Ira Eaker came to an agreement in late July 1945 with Commander of Army Ground Forces Gen. Jacob Devers in which the AAF officially countenanced a substantial increase in the number of liaison aircraft organic to various types of ground combat forces like tank battalions, cavalry divisions, infantry and mountain divisions, and to technical services like the engineers. Shortly thereafter, the distribution of liaison aircraft was extended to Army medical units.[75]

The AAF had not been enthusiastic about subsequent rumors that the Army was going to organize liaison squadrons for aeromedical evacuation, and Grant noted in his diary that the AAF now regretted letting the Army assume the air observation function.[76] The AAF did not itself pursue development of a specific frontline aeromedical evacuation capability in the postwar period in spite of ongoing research into helicopter development, in which the air surgeon had shown considerable interest. Helicopters had been used in the CBI theater for emergency aeromedical evacuation in 1944, and although development and procurement of light planes ceased after the AAF liaison squadrons were equipped in the middle of the war, the air surgeon had pressed helicopter development for possible air ambulance use.[77]

Helicopter development was still a subject of interest to the new Air Force. Its priority for helicopters to equip its new air-sea rescue units led to conflict with the Army over which service had responsibility for forward air evacuation. In the Army, interest in frontline aeromedical evacuation continued, although the Army was hampered by its controversy with the AAF and the loss of both pilots and liaison aircraft at war's end. By the end of 1949, the Army had conducted successful tests of the new Sikorsky YH–18 helicopter which was capable of transporting two internal litters and a medical attendant. No development followed, nor was a system or doctrine developed to govern its use.[78] The Korean War would sharpen the need to clarify the situation and would once again demonstrate the criticality of mass aeromedical evacuation, even in the atomic age.

Chapter 5

THE KOREAN WAR AND THE EMERGENCE OF THE MODERN AEROMEDICAL EVACUATION SYSTEM

The Korean War was a true watershed. It would demonstrate clearly that even in the shadow of atomic war, air evacuation of casualties still had relevance. On the Korean peninsula, the U.S. Army demonstrated the courage and effective command leadership that were key to overcoming the numerically superior forces who lacked adequate training. In the air over Korea, the USAF reaffirmed the decisive role of air superiority as the prerequisite for successful offensive and defensive ground operations and the aeromedical evacuation of casualties.

The conflict would also reveal limitations on the readiness of the U.S. forces and on the capability of aeromedical evacuation personnel and equipment to support them in combat. In both situations, a series of ad hoc measures succeeded in overcoming these limitations, and in the latter case it provided the experience on which the organization and procedures of the modern USAF aeromedical evacuation system were based.

The Korean War particularly served as the catalyst to refocus attention on the value of the air evacuation of frontline casualties. Aeromedical evacuation, especially during the conflict's critical moments, established the use of aircraft as essential for frontline casualty evacuation, and not just as a heroic means employed in emergencies as it had been viewed by some Army surgeons during World War II. Intra- and intertheater aeromedical evacuation demonstrated once again that air evacuation was a more medically desirable and less costly means for moving patients among medical facilities, and it served as a critical element in the logistic support of U.S. forces in combat. The war would also demonstrate that aeromedical evacuation could serve as an element in modifying the traditional chain of evacuation to make evacuation more rapid and efficient, medically and logistically.

The rugged topography of the Korean peninsula and severely limited capabilities of the its road and rail systems were what made casualty evacuation by air absolutely critical. This was particularly true during the period of relatively rapid movement up and down the peninsula between the initial North Korean attack and the emergence of the essential stalemate two years later. Japan served as an offshore COMZ, much as England had done during World War II, with U.S. Army hospitals located in a number of cities, but Japan possessed neither the same logistic stockpiles nor reservoirs of U.S. manpower for deployment that were available in England in 1944.

South Korea had only two widely separated seaports of any consequence, and its road and rail networks were relatively poor. The Far East was thousands of miles from the sources of U.S. manpower and supplies. Airlift came into its own by demonstrating its value for deploying and logistically supporting fighters in fast-moving conflicts in which there was neither time nor the means to amass the heavy ground- or sea-based logistic tails that had served U.S. forces so well in World War II. This recognition and the consequent growth of troop carrier and MATS airlift capabilities became linked to the development of aeromedical evacuation systems, and in 1948 the JCS directed that the Air Force establish such systems for the Army and for its own forces. The experience of the Korean War and the larger defense budgets stimulated by the war and the U.S. commitment to the North Atlantic Treaty Organization (NATO) would generate the development of these systems in earnest.

Aeromedical Evacuation on the Eve of War

Aeromedical evacuation by the USAF at the beginning of 1950 was still essentially oriented toward moving patients during peacetime. As experienced observer Richard Meiling, formerly from the air surgeon's wartime office and now chairman of the Armed Forces Medical Policy Council, noted, "as a peacetime operation, the air transportation of patients is steadily improving in efficiency. As a military operation under combat conditions, a lot of improvement is still required."[1] Troop carrier aircraft, supplemented on occasion by MATS aircraft, moved sick and injured occupation troops to theater medical facilities. Long-range MATS aircraft, still chiefly C–54s, transported patients who required treatment unavailable in theater medical facilities to the CONUS, and they helped the shorter range C–47s move patients from the ZI ports of entry to general hospitals or convalescent centers within the United States. The end of the Berlin blockade in 1949 had permitted reassigning C–54s to MATS and replacing some of the C–47s in the domestic aeromedical evacuation system with the larger C–54 aircraft. On the eve of the Korean War, MATS was providing aeromedical evacuation for approximately 350 patients monthly from Tokyo to the United States. Intratheater aeromedical evacuation in the Far East was provided by transport aircraft manned by personnel from the 801st MAES attached to the 374th Troop Carrier Wing at Tachikawa AB in the Tokyo area.[2]

Presumably stimulated in part by the Secretary of Defense's directive that military patients should be moved by air whenever possible, the USAF surgeon general, Maj. Gen. Harry Armstrong, in November 1949 had pressed successfully to have a number of C–54s modified to better equip them to provide aeromedical evacuations. Beginning in January 1951 the first of thirty modified C–54Es were delivered with a galley, nurses' storage cabinets, and a cabin ventilation system that operated while the aircraft was on the ground to keep patients comfortable while awaiting flight. Redesignated as MC–54Ms, the last aircraft was deliv-

C–54s were commonly used for aeromedical evacuation from Korea.

ered in January 1952. Later, ten C–97 pressurized transports were similarly reconfigured and delivered as MC–97s in February 1951.[3] The MC–97C variant could carry up to seventy-nine casualties with a crew of four medical attendants.

MATS exercised centralized control of aeromedical evacuation personnel through three aeromedical evacuation squadrons, each assigned to one of the three MATS divisions: Atlantic, Pacific, and Continental. This geographic distribution provided support to U.S. forces in the European and Far Eastern theaters, while also supplying patient airlift within the ZI through the Continental Division. In the Pacific, aeromedical evacuation flights were supported by the 1453d MAES headquartered in Hawaii, with a detachment at Tokyo's Haneda airport. Intra- and intertheater aeromedical evacuations were now generally routine. The largely ad hoc procedures for conducting aeromedical evacuation developed during World War II had been extended and adapted to the much smaller requirements generated by the postwar military force, much of which was engaged in occupation duties in Germany and Japan. Exchanges of equipment, including blankets and litters; communications among the dispatching and receiving medical facilities, inflight medical teams, and aircrew; and transmission of diagnostic and treatment information regarding patients, all were accepted procedures, although they were not accomplished without occasional glitches.

Research sponsored by the School of Air Evacuation now collocated with SAM at Randolph Field, Texas, did relate to wartime requirements, but it was not directed primarily toward aeromedical evacuation. Constrained for funds like the rest of the Air Force, SAM nevertheless developed an air-transportable hospital (ATH) that could be carried by a C–47. It was also involved in development of the XC–120.[4] This experimental aircraft was a variant of the C–119, the medium

Casualties being transferred from an H–19 to a C–54.

troop carrier aircraft that during the course of the Korean War became the Air Force's workhorse medium transport aircraft. The XC–120 fuselage was designed so that the lower half was actually a detachable pod able to be configured for 36 litter or 44 ambulatory patients. Although the C–120 never got beyond the experimental stage, its use as a small patient-holding facility was a possible application. The noise and vibration that made the Air Force medical service deem the C–119 undesirable for aeromedical evacuation may have influenced the decision not to build more than the prototype. As an air ambulance, it would have been comparable to but no better than the C–119, which could be configured for 35 litter and 67 ambulatory patients.[5]

Neither aeromedical evacuation nor field medicine in general was a primary issue engaging the Army surgeon general before June 1950. Staffing problems in the medical department that had plagued it since the exodus of wartime doctors was exacerbated by the separation of the Air Force Medical Service in 1949, when Army doctors were given the opportunity to opt for service in the Air Force.[6] The professionalization of the Army Medical Department pushed by General Kirk and his successor Gen. Raymond Bliss continued, reflecting the Army's persistent need to make the Medical Corps attractive to young doctors. One senior medical department officer, arguing against what he saw as inadequate attention being paid to training medical officers in things military, quoted an unnamed medical leader of the recent war as saying, "it was now considered almost indecent for a doctor to serve with troops!"[7]

Both the Army and new Air Force Medical Service were restricted by the tight defense budgets allocated to their parent services by Secretary of Defense Forrestal's successor, Louis Johnson.[8] The medical services were also having to

prioritize, to allocate scarcity as it were, among their various elements, while trying not to compromise unduly their primary mission of providing for the health of their parent forces.

An early casualty of the constrained budgets was the organic air ambulances assigned to the Army Medical Department. Authorized during General Eisenhower's tenure as army chief of staff, their priority had been greatly reduced after the severe drawdown of Army aviation with demobilization and postwar budget cuts. Contention also arose between the Army and the newly independent Air Force over who had responsibility for forward casualty evacuation.[9]

War and Aeromedical Evacuation on the Korean Peninsula

On June 25, 1950, the North Korean army in overwhelming force entered South Korea, crossing the 38th parallel which served as the political divide between the communist Democratic Peoples Republic of Korea and the U.S.-supported Republic of Korea (ROK). Infantry units spearheaded by Soviet-built T–34 tanks were opposed by South Korean forces, from which tanks, antitank weapons, and artillery heavier than 105-mm caliber had been deliberately withheld by the United States to preclude attacks on North Korea by the highly nationalistic and anticommunist South Korean president, Syngman Rhee. At the time of the North Korean attack, approximately half of the ROK army vehicles were out of commission, and it had only a six-day reserve of ammunition.[10] Initially, the South Korean forces inflicted heavy losses on the invaders, but its forces soon began to collapse. President Truman's decision to support South Korea against the aggression, first with air and sea forces and then with U.S. ground forces, meant that U.S. troops drawn from the four understrength divisions occupying Japan would have to be sent into combat quickly to try to stem the rapid North Korean advance.[11]

U.S. troops would enter combat with several severe handicaps. The occupation forces comprising the 24th, 25th, and 7th Infantry Divisions and the 1st Cavalry Division were manned largely by young draftees whose level of combat readiness was low due to lack of training. All but one of the collective twelve infantry regiments of these divisions had only two instead of the usual three infantry battalions, and the artillery battalions had only two of the normal three firing batteries. Overall, the divisions averaged approximately 70 percent of full war strength.[12]

Task Force Smith, the first U.S. unit hastily deployed by troop carrier C–54s from Japan to enter combat in Korea, was plagued by materiel shortages. It went into action on July 5 with only six antitank rounds for its six 105-mm howitzers because the Army had given priority to Europe for the small number of howitzer rounds it had procured. These would prove to be the only effective ground-based weapons against the North Korean T–34 tanks as Smith's force was effectively brushed aside by the tank-led North Korean infantry. Before retreating, Task Force Smith suffered more than 30 percent casualties.[13]

Air evacuation of U.S. personnel had begun even before the President's decision to intervene. C–54s and C–47s had been called upon to assist in evacuating Americans from the embassy and those serving with the Korean Military Assistance Group, as well as foreign nationals including members of the United Nations Commission on Korea, when the rapidity of the North Korean advance on Seoul created an emergency. The imminent fall of the South Korean capital made continuing the evacuation of U.S. dependents and others by sea from Inchon impractical. Air evacuees were flown from Kimpo and Suwon airfields near Seoul to Itazuke, Japan, across the Korean Strait from Pusan. During the course of providing air cover for these evacuations, fighters from Fifth Air Force had successfully destroyed a significant portion of the North Korean air force, and it soon established the air superiority over the peninsula that it was to maintain throughout the war.[14] This air superiority became a prerequisite for the aeromedical evacuation of casualties after U.S. ground troops entered the conflict.

The initial North Korean attack resulted in a fighting retreat by South Korean, U.S., and other forces fighting under a UN flag. They regrouped in an enclave in southeastern Korea where they remained until mid-September 1950. Following an amphibious landing by the new U.S. X Corps at Inchon on the western coast of South Korea on September 15, 1950, the now much-strengthened Eighth Army broke from the enclave, and the combined UN forces then essentially destroyed the North Korean army as a fighting force, forcing it from South Korea within two weeks. Using a UN resolution as justification, UN forces then invaded North Korea in early October with the Eighth Army moving forward in the western half of North Korea, and the X Corps entering the eastern half after making an amphibious landing at Wonsan on North Korea's east coast, some eighty miles north of the 38th parallel.

In spite of the arrival of heavy winter conditions, the two forces operating essentially independently of one another moved rapidly northward toward the Yalu River until late October, when massive Chinese intervention once again forced them to retreat. This much more difficult retreat ended in early January 1951 at lines stabilized approximately forty miles south of Seoul. From there, UN offensives by late June 1951 had gradually pushed the communist forces north above the 38th parallel, and both sides began to explore an armistice. Talks began in July 1951 and lasted for two years until an armistice was signed on June 23, 1953. Fighting continued during these talks, generating casualties and requirements for aeromedical evacuation, which, by the end of the war, was being accomplished smoothly and efficiently.

Many factors early on made aeromedical evacuation essential to the prosecution of the war. The combination of Korea's geography and climate, the communist tactics of creating roadblocks and infiltrating behind the UN forces along the valley ridges, the rapidity of advance of both communist and UN campaigns when on the offensive, and the effect of the air interdiction campaign by Fifth Air Force, Navy, and U.S. Marine air units and the Bomber Command of the Far East Air

Force (FEAF) in disrupting the Korean road and rail systems created situations in which casualty evacuation could be effected only by air. The needs in the field for ammunition, medical supplies, and food for U.S. and other UN forces could be fulfilled only by airlift or airdrop. In many cases, emergency aeromedical evacuation could be accomplished only by helicopter.

The first phase of the Korean conflict was marked by the success of the North Korean army in forcing ROK, U.S., and other UN forces by mid-July into the so-called Pusan Perimeter. This was a rectangular enclave in extreme southeastern Korea, roughly 100 miles long north to south, and about 50 miles east to west. The port of Pusan lay midway across the enclave's southern boundary, and the Naktong River anchored it on its western side. The area included two airfields, one outside Taegu, which was Headquarters Eighth Army, the other was east of Pusan.

Aeromedical evacuation was used basically only as an emergency means for moving casualties during the initial phase of the war. In early July, as the first U.S. ground units were going into action, General MacArthur's air commander, now Lt. Gen. George E. Stratemeyer, had informed MacArthur that FEAF was prepared to evacuate casualties by air from the peninsula using return flights of aircraft bringing in supplies and men to Korea from Japan. Several days before, the Korean Military Assistance Group had requested that three sick men be evacuated from Taejon in central Korea, and they were evacuated to Japan by a C–47 of the 374th Troop Carrier Wing.

During these initial weeks as the Eighth Army retreated south, twin-engine C–47s and C–46s were used to move the heavy volume of men and equipment into Korea because the airfields still available on the peninsula could not accommodate larger aircraft like the C–54s.[15] Personnel and materiel originating in the Tokyo area and destined for Korea were flown by C–54s of the 374th Troop Carrier Wing from Tachikawa AB to Ashiya on the southernmost Japanese island of Kyushu, just across the Korea Strait from Pusan, where they were reloaded aboard the smaller aircraft. This two-phase airlift pattern was soon applied to the movement of casualties.

Aeromedical evacuation from Korea began officially on July 7 using 801st MAES air evacuation teams relocated to Ashiya from Tachikawa AB. Teams attended patients on troop carrier aircraft returning to the air base at either Ashiya or nearby Itazuke from the combat airfields at Taegu, Pohang, Taejon, and Pusan. From these fields, evacuees were transported to the Army's 118th Station Hospital at Fukuoka. Itazuke's location at Fukuoka made it the predominant destination for casualties flown from Korea.[16]

Because the C–54s were generally returning to Tachikawa empty, this retrograde airlift very quickly began to be used to move patients attended by teams from the 801st from Fukuoka to specialized hospitals at Osaka and elsewhere in Japan. Because these intra-Japan patient airlifts were generally arranged by the dispatching hospital twenty-four hours in advance, the system resembled the

scheduled nature of domestic aeromedical evacuation. Patients being sent to the United States for further treatment were ultimately moved to the Haneda airport where the MATS terminal was located.[17]

The 374th C–47s could move patients from Pusan to a modern hospital in Japan in an hour. The alternative mode of casualty evacuation from Korea was by ship from Pusan, which took several days. From July 7 to September 15, when the Inchon amphibious landing occurred and the Eighth Army's breakout from the Pusan Perimeter began, the 374th Troop Carrier Wing evacuated 3,855 casualties from Korea. Another 9,160 were evacuated by surface vessels. Empty transport aircraft could have carried as many as 36,000 patients to Japan during the same period. One reason the Eighth Army had not used aeromedical evacuation more was its preference for retaining ground force casualties in Korea when possible. The Eighth Army surgeon estimated that nine of ten soldiers could be returned to duty without leaving Korea, but that patients transported to Japan would take at least thirty days to return to their units after hospitalization.[18]

The surgeon was also reacting to the imperfections of the ad hoc aeromedical evacuation system and expressing residual concerns with having to rely on retrograde airlift. During the summer battles, the Eighth Army had chosen to send its casualties from the Mobile Army Surgical Hospital (MASH) at Taegu City by train south to the evacuation hospital at Pusan. This was a conscious choice not to airlift them from Taegu AB, eight miles from the city, because of the shortage of motor ambulances and poor roads connecting them. Located some distance from the evacuation hospital in Pusan City, the air base at Pusan had no holding facilities, which made evacuation by air somewhat problematic from the point of view of patient welfare if evacuation was dependent on retrograde airlift.[19]

The surgeon's interest in using aeromedical evacuation for frontline casualties was considerably greater. The Air Force's 3d Air Rescue Squadron at Ashiya was equipped with L–5 liaison aircraft and H–5 helicopters, which its commander was willing to use for emergency casualty evacuation even though his official mission was to search for and rescue downed airmen. The L–5 had been used for frontline evacuation on an informal basis during World War II, particularly in the Philippine campaigns, and helicopters were used successfully for aeromedical evacuation during this period although their actual use was limited to a handful of cases due to their relative scarcity.[20]

Service interest in helicopters continued in the postwar era, but it was constrained by tight budgets and more basic struggles over roles and missions. Distinguishing the role of Army aviation from that of the now-independent Air Force was one of these struggles, and the JCS in May 1949 directed the Air Force to establish evacuation systems for the Army and for itself. In September 1949 it reaffirmed that "responsibility for the air evacuation of patients continues to be vested in the Department of the Air Force."[21] The Air Force had not addressed the issue of frontline evacuation before the Korean War, and it did not envision its air rescue squadrons in such a role.

The Sikorsky H–5 (foreground) was often used to carry casualties in Korea.

Helicopters were perfect for aeromedical evacuation in the rugged terrain and rice paddies where the fighting was occurring in Korea. H–5s could lift a patient and a technician plus two passengers in externally attached pods. The Army had no helicopters in the theater, although some Army medical officers (chief among them, Spurgeon Neel) had expressed enthusiasm about tests using a Sikorsky YH–18 helicopter for aeromedical evacuation conducted in November 1949 at Fort Bragg, North Carolina.[22]

The L–5s of the 3d Air Rescue proved to be ineffective due to the Korean topography. However, a detachment of H–5s sent to Taegu from Ashiya on July 22, 1950, soon demonstrated the worth of helicopters for evacuating casualties in emergency situations. The North Korean tactic of infiltrating around and enveloping UN forces as they traversed roads during the long summer retreat often temporarily isolated U.S. or ROK troops. The helicopter's ability to land and take off without requiring a landing strip made it uniquely valuable in situations when friendly troops were surrounded or otherwise inaccessible by ground transport. Mixing air rescue activities with responses to Army requests for emergency aeromedical evacuation, the half dozen H–5s had evacuated eighty-three solders by August 29, many of whom were suffering from wounds that would have killed them during the ten or more hours a motor ambulance would have required to deliver them to a field hospital, according to the Eighth Army surgeon.[23]

These early demonstrations of helicopter effectiveness by the Air Force elicited positive reactions from Army and Air Force leaders in the theater and brought to a head the issue of which service would have responsibility for frontline evacuations. In October, Army Surgeon General Bliss requested, with the strong support of theater commander General MacArthur and his surgeon, General Hume,

procurement of helicopter ambulance companies consisting of twenty-four helicopters each. Before the end of the month, helicopters were being purchased for immediate airlift to the Far East, and four detachments of four helicopters each were being activated for medical use.[24]

The reaction of General Stratemeyer, commander of MacArthur's FEAF, was equally positive. In mid-August, he requested that USAF headquarters in effect create a USAF helicopter aeromedical evacuation service. He asked for the organization and dispatch to Korea of an Air Force evacuation and utility squadron with twenty-five H–5 helicopters, a flight surgeon, and medical technicians.[25] Although USAF headquarters was negative to Stratemeyer's request, it did dispatch fourteen additional H–5s to be assigned to the 3d Air Rescue Squadron, observing that USAF planning for aeromedical evacuation had "not included the U.S. Army function of evacuation from frontline battle stations."[26]

Army helicopter aeromedical evacuation was officially established on January 1, 1951, when the 2d Helicopter Detachment became operational. In the pattern that would be followed, it was assigned to the 8055th MASH. More Army helicopter units followed, and aeromedical evacuation of casualties by Air Force, Army, and then Marine Corps helicopters became a regular element in the evacuation chain. Because of their small numbers, the helicopters were generally requested only for the most seriously wounded who needed the quickest medical attention possible to save their lives.[27]

With airlift having proven to be an essential element in both the logistics and medical support of the UN forces on the peninsula, the Far East Command (FEC) moved quickly to improve the efficiency of the first effective but undoubtedly wasteful use of the available transport aircraft. The Berlin airlift had demonstrated how centralized control of available airlift resources could best support a mission, and FEAF quickly sought to replicate the system for the Japan-Korea airlift. The former commander of the Berlin airlift, Air Force Maj. Gen. William Tunner, was brought to Japan and on August 26, 1950, given command of the new FEAF Combat Cargo Command (after January 25, 1951, it became the 315th Air Division [Combat Cargo]) specifically to handle paratroop operations during the planned Inchon invasion.[28] The processes and procedures he caused to be established not only benefited combat organizations in Korea that required rapid logistic support, they also provided a rational framework for aeromedical evacuation. Eighth Army surgeons could accept aeromedical evacuation as a routine rather than as an emergency operation, given the ability to coordinate airlift supplying forces in Korea with returning airlift to carry patients back to definitive care in Japan or the ZI.

Tunner established a mechanism for deciding the degree to which requests by each major user (Army, Navy, or Air Force) of airlift should be assessed in light of available airlift capability. At his suggestion, the FEC Air Priority Board representing the three services took responsibility for allocating among them portions of the airlift capability that Combat Cargo specified to the board each week, the deter-

mination being based on the tactical situation and the amount of airlift available. Liaison officers from the two principal users, Eighth Army and FEAF, comprised the Joint Airlift Control (JALCO) located at Combat Cargo headquarters at Ashiya. They received specific requests for air transportation from their services and decided what was to be moved and with what priority, keeping the consolidated requests within the total tonnage allocated to each service. The Transport Movement Control at Ashiya then scheduled aircraft to fill the requests, issued orders, monitored the missions, and diverted or canceled missions by radio, if necessary. The success of this system was aided considerably by the arrival of additional troop carrier aircraft including a wing of the new C–119 medium transports.[29]

By September 1950, after discussions with Eighth Army surgeons, Tunner had integrated aeromedical evacuation into the airlift system. The 801st MAES commander, Lt. Col. Allen D. Smith, also dual-hatted as Combat Cargo surgeon, became responsible for aeromedical evacuation. Each day at noon, Army medical evacuation officers in Korea and Japan communicated to Smith's office the requirements for patient movement the next day, and his office submitted a consolidated request to Transport Movement Control scheduling the requisite airlift. Aeromedical evacuation teams from the 801st were included as necessary. To the maximum degree possible, aeromedical evacuation requests were fulfilled on return flights of supply aircraft. The efficiencies made possible by the centralized control of airlift in the theater allowed special aeromedical flights to be scheduled to meet Eighth Army's requests at virtually all times. This structured approach and Combat Cargo's continuous field liaison during September and October 1950, combined with the remarkable swings in the tactical situation that increased the number of casualties, helped make aeromedical evacuation a standard method for transporting the sick and wounded, rather than serving in only an emergency mode. Evacuations by air from Korea jumped from 335 in August to 5,890 in September, while the number of sea evacuations dropped from 4,459 to 2,171.[30] Although not in accord with nascent Air Force doctrine, the Army ran the holding facilities at the evacuation points as Colonel Smith requested; he argued that the Army should take responsibility because the Air Force did not have sufficient personnel.[31]

The patterns of aeromedical evacuation established in the autumn months of 1950 generally persisted through subsequent phases of the war. By the end of 1951, virtually no patients were evacuated by sea from Korea.[32] Eighth Army surgeons recognized that casualty evacuation by air provided greater flexibility for medical regulators who determined where patients should be sent, and it made the chain of evacuation more responsive to changes in the tactical situation. To evacuate expected casualties during the Inchon landing and the Eighth Army breakout from the Pusan Perimeter, C–54s were dispatched to Kimpo AB close to Seoul as soon as the airfield was retaken. In the drive into North Korea, Combat Cargo established an intra-Korea airlift system to fly the sick and wounded from captured North Korean airfields to newly established field hospitals on the peninsula or to transport them to aerial ports of embarkation for flights to Japan.

In early October, Tunner had tried unsuccessfully to convince the Eighth Army surgeon that patients should be airlifted directly to hospitals in Japan rather than be moved point-to-point in Korea and then aeromedically evacuated to Japan. The surgeon still wanted to keep as many people in Korea as possible, so Tunner established a daily intra-Korea C–47 aeromedical flight from Suwon to Pusan, where patients were screened for disposition at the 8054th Evacuation Hospital. Retaining in Korea the wounded or sick who could return to the line within a reasonable period of time would loom all the more important by the spring of 1951 when the JCS made it plain to the new Eighth Army commander, Gen. Matthew Ridgway, that he could expect to receive no additional forces, only individual replacements for his losses.[33] Meanwhile, 801st evacuation teams of flight nurses and technicians were flying into Sinanju, some fifty-five miles south of the Yalu River, to provide inflight medical care during the trips southward to the 8055th MASH in the former North Korean capital of Pyongyang.[34] Until the fortunes of war changed and communist forces recaptured the northern airstrips, 801st personnel continued to assist in evacuating casualties.

In the winter retreat after the Chinese intervened in late November, airlift became the only means in many cases to evacuate casualties from advanced positions. Perhaps the most dramatic such episode occurred in December at the Changjin Reservoir, only seventy miles from the Yalu River. X Corps elements, including U.S. Marine and Army units, ROK troops, and British marines had reached the reservoir by difficult mountain roads but then found themselves surrounded by Chinese forces. The terrain was extremely rugged, and movement and fighting were hampered by frigid temperatures and heavy snow. The Chinese had put troops onto the snow-covered hills and mountains about the reservoir and erected twenty-four roadblocks on the only ground supply route, the winding and mountainous road leading to Hungnam and Hamhung on the east coast.[35]

The UN position quickly became untenable, with retreat to the sea the only real option. The evacuation by air of X Corps casualties from two enclaves at Hagaru-ri and Koto-ri near the reservoir permitted the remainder to fight their way back to the coast and be evacuated successfully by sea. C–47s from the 374th Wing's 21st Troop Carrier Squadron including a detachment from the Royal Hellenic Air Force conducted the evacuation, operating from tiny airstrips that were literally bulldozed out of the frozen ground. In five days they shuttled 4,689 sick and wounded men to the former North Korean airstrip at Yonpo. The most critical casualties were flown to safety in Japan in C–54s and Marine Corps R5Ds (the Navy designation for the C–54), while others were sent to Army and Marine Corps field hospitals in Hungnam or to the Navy hospital ship USS *Consolation* moored in Hungnam Harbor.[36] The aeromedical evacuees sent to Japan were attended by flight nurses from the 801st who had been held at Yonpo because of the danger inherent in the shuttle operation; 801st medical technicians accompanied the C–47 shuttle flights.[37]

Helicopters of all the services continued to demonstrate their value during the retreat; during the spring UN offensive that generally established what would

The H–19 was often used to ferry wounded soldiers.

become the truce line; and during the relatively static period that persisted until the fighting ceased in July 1953. Marine Corps helicopters assisted with the evacuation of casualties during the withdrawal from the Changjin Reservoir, and it was a Marine Corps initiative that resulted in the installation of platforms on hospital ships enabling them to serve as floating hospitals. After USAF headquarters refused General Stratemeyer's request to form an Air Force helicopter medical evacuation unit, 3d Air Rescue organized its helicopter detachment in Korea as Detachment F at Taegu in September 1950 and gave it a combined air rescue and aeromedical evacuation mission. The detachment followed the fighting north after the breakout from Pusan, moving from Pusan to Taegu, to Seoul, and to Pyongyang before returning south after the Chinese intervened.

To utilize the few helicopters available, one or more were attached to MASH units to pick up only the most seriously wounded, a procedure followed by Army helicopter units after they began operations at the beginning of 1951. Helicopters also proved invaluable for retrieving paratroop casualties from drop zones, as they did after drops at Sukchon and Sunchon in North Korea in late October 1950. In February 1951, at the high point of the Chinese communist winter offensive, 3d Air Rescue's H–5s evacuated fifty-two badly wounded soldiers from the surrounded village of Chipyong-ni, which was the hinge of the Eighth Army's defense line south of Seoul, after they had delivered badly needed medical supplies. Although Army helicopter operations came to dominate medical evacuations as the war progressed, in the spring of 1951 the H–5s and one new YH–19 helicopter of 3d Air

Rescue's Detachment F were still performing 85 percent of the frontline patient pickups. As of February 20, 1951, Air Rescue Service helicopters had evacuated 750 critically wounded soldiers, half of whom would have died had they been moved by ground transportation, according to the Eighth Army surgeon.[38]

The flexibility inherent in the aeromedical evacuation capability of the 315th Air Division also helped the theater medical establishment provide better definitive care for evacuees. This flexibility enabled the Japan Logistics Command (JLCOM) to allocate patients among an increasing number of Army hospitals being constructed or expanded in Japan. The JLCOM regulating officer could thus optimize the use of available space and medical personnel and respond effectively to surges in the flow of casualties arriving from the peninsula.[39] More important medically for the patients was the ease of transporting them speedily and safely without the negative impact of uncomfortable travel by train or ambulance. The flexibility gained within the regulating system facilitated the development of specializations within the JLCOM hospital system, with ultimate benefit to the patients. Specialists could be concentrated with equipment and drugs appropriate to their specialty, and patients could be brought to them.[40]

After late January 1951, casualties from Korea were categorized into three groups for treatment: those with head, chest, and eye injuries were flown directly to the Tokyo area for specialized surgery; those with frostbite and hepatitis were flown to Osaka, where specialized treatment centers had been established for these problems; all other types were distributed according to available bed space throughout Japan. This selection process merged with the so-called tri-entry system requested by JLCOM intended to simplify movement within Japan by flying directly to Tachikawa AB for the Tokyo area, to Itami AB for Osaka, or to Itazuke AB for Fukuoka. Patients were allocated to these destinations on a 40/40/20 basis. Both procedures meant that a patient could be regulated rapidly to the appropriate specialists for definitive treatment, or identified readily for aeromedical evacuation to the ZI on the basis of his or her projected recovery time, compared to the then-current evacuation policy which for FEC was generally 120 days. Except for emergency evacuations, the Army in Korea still insisted that patients go through all the steps of the traditional chain of evacuation.[41]

By the end of hostilities in 1953, 315th Air Division and the theater-based airlift organizations that preceded it had aeromedically evacuated 311,673 sick and wounded patients while MATS had moved 43,196 patients to the United States. This number was actually greater than the total number of casualties suffered during the conflict because it includes patients moved multiple times within Korea, between Korea and Japan, and within Japan. The benefits of aeromedical evacuation compared with the ground transportation of patients were manifest to all, reaffirming for the most part the advantages that casualty evacuation by air had provided in World War II. Not least was the positive effect on the morale of a wounded or sick soldier or marine who was quickly lifted from the combat environment to leave the stench and heat of battle behind.

Even for helicopter frontline evacuation, movement by air was generally more comfortable than transportation by motor ambulances over poor roads or by ships that generally were not air-conditioned.[42] Medically, patients benefited from less handling, the speed with which they reached definitive care, and the ability to receive medication, including blood plasma, in transit. Beyond the question of greater comfort was the avoidance of further injury incurred from being jolted on the rough roads of Korea. Logistically, aircraft provided a means for rapid medical resupply; it could also reduce the support needed by patients and the attending medical staff by keeping evacuation hospital populations low. The ability to evacuate patients readily by air to Japan in December, against the possibility that Chinese forces might overrun South Korea, also provided a strategic advantage.[43]

The death rate for casualties who reached hospitals in Korea (2.4 percent) was approximately half that suffered by the same category of wounded in World War II (4.5 percent). Actually, as Gen. Spurgeon Neel, the Army physician perhaps most responsible for pushing aeromedical evacuation within the Army Medical Department, argued convincingly long after the Korean War, Army medicine was a great deal better than even these figures suggest. The 2.4 percent death rate included patients who died shortly after reaching Army medical facilities but who during World War II would have been left to die on the battlefield because their wounds were so severe that they could not have been transported to a hospital in time to even attempt medical intervention. Such World War II fatalities would have been counted as killed in action.[44] As early as October 1951, in a speech to the Association of Military Surgeons, Army Surgeon General Maj. Gen. George Armstrong acknowledged that aeromedical evacuation had contributed greatly to the saving of lives.[45]

The Air Force Attempts to Institutionalize the Aeromedical Evacuation Lessons of Korea

The essentially ad hoc aeromedical evacuation system developed by the U.S. Army and General Tunner's 315th Air Division was given official sanction by issuance of a FEC directive on December 18, 1951.[46] At Headquarters USAF, the surgeon general's office sought to incorporate the lessons drawn from Korea into an aeromedical evacuation system that it acknowledged, with the exception of MATS operations, had been found lacking in many respects. The most urgent need it saw was developing a concept for forward aeromedical evacuation.[47]

The Air Force's new approach to theater aeromedical evacuation system was embodied in a 1951 manual that laid out a comprehensive organization for forward air evacuation, complete with tables of organization and equipment (T/O&Es) for each element. These were the Forward Medical Air Evacuation Flight (T/O&E 1–4101T EA), and three aeromedical evacuation holding groups, designated as Heavy, Medium, and Light (T/O&Es 1–, 2–, and 3–4401T), which were intended to receive and evacuate 400, 800, or 1,200 evacuees, respectively.

These were to be organized on a cellular basis for inclusion in troop carrier wings, as needed, and the manual detailed procedures for the operation of holding groups. These additional functions and units were therefore grafted into the theater aeromedical evacuation system inherited from World War II and built around troop carrier units. The new manual cited the need for a definite working priority for aeromedical evacuation, although it conceded such a priority "would ordinarily be secondary to forward moving logistic activities, but nonetheless be a definite operational commitment capable of upward priority designation for separate tactical situations." It also noted the need to clarify how aeromedical evacuation aircraft operating under instrument conditions should be treated. The manual included a tabulation of the aeromedical evacuation characteristics of troop carrier aircraft and listed the new assault transports the Air Force was procuring. These could operate on short, unpaved landing strips and could evacuate many more casualties than the fixed wing L–5 liaison aircraft that the 3d Air Rescue was then using in Korea.[48]

The Air Force's new interest in incorporating frontline casualty evacuation into its mission, which the AAF leadership had rejected in 1942, was already hostage to the ongoing battle between the Army and the Air Force over the kind and quality of the Tactical Air Command's (TAC's) support of the Army.[49] The Army's Medical Department wanted the forward aeromedical evacuation mission because of the demonstrated medical value of frontline evacuation by air, but the command leadership also wanted the mission to prevent the Air Force from co-opting the rotary wing aircraft they now began to perceive as having great potential for enhancing the combat arms.[50] It was perhaps indicative that, when toward the end of the war FEAF offered to take over the holding facilities the Army had been operating in Korea, the Army refused to change the status quo.[51]

The linked issues of who was to control frontline aeromedical evacuation and whether the Army would be given a free hand to develop rotary wing aircraft for tactical purposes were resolved in favor of the Army in a series of joint exercises and formal agreements at the service secretary level, even as the Korean conflict progressed. A DoD memorandum in May 1949 had given responsibility for aeromedical evacuation to the Air Force, which pursued developing its frontline aeromedical evacuation in joint exercises in late 1951 and in 1952. For the Southern Pine joint exercise held at Fort Bragg, North Carolina, in August 1951, the Air Force had sought to demonstrate the superiority of moving casualties exclusively by air to medical facilities in the rear rather than using a cumbersome ground chain of evacuation—much as General Tunner and his surgeon, Colonel Smith, had proposed at different times to the Eighth Army surgeon in Korea. The aerial system proved so successful that on the ninth day of the maneuver the infantry division suspended all ground evacuation activity except by the most forward echelon, the litter bearers.[52]

What was being demonstrated in the field was being undermined at the secretarial level. Frank Pace and Thomas Finletter, respectively the secretaries of the

Army and the Air Force, although formally recognizing that "the Air Force is assigned the primary function of supplying the necessary airlift to the Army," nonetheless signed an agreement on October 2, 1951, authorizing the Army to possess its own organic aviation to perform a number of functions, including the transportation of Army supplies, equipment, and small units within the combat zone. The combat zone was defined as the area to the rear of the front lines between 50 and 70 miles in depth. Moreover, the responsible Army commander was authorized to use his organic aircraft "as he sees necessary for the discharge of his mission."[53]

In Operation Snowfall conducted in January and February 1952 the Air Force found that the Army refused to allow casualties to bypass any links in the chain of evacuation. In Operation Longhorn the Air Force discovered not only that its evacuation activities were subject to greater restrictions but also that Gen. Mark Clark, the Army commander, demanded that Army helicopters be allowed to perform aeromedical evacuation anywhere in the maneuver area and that he be allowed to use them to resupply his tactical units. In the wake of Operation Longhorn, the director of the Joint Airborne Troop Board recommended that the Army unequivocally inform the Air Force that no requirement existed for Air Force helicopter support in the combat zone.[54]

Obviously concerned more about strategic and tactical forces by this time, the Air Force conceded the issue to the Army. Another Pace-Finletter agreement of November 4, 1952, specifically authorized the Army to use organic aircraft for aeromedical evacuation within the combat zone (now defined as "normally from 50 to 100 miles in depth") "to include battlefield pickup of casualties, their air transport to initial point of treatment and any subsequent move to hospital facilities within the combat zone." The Air Force was also authorized aeromedical evacuation from "the initial point of treatment or point of subsequent hospitalization within the combat zone" to points outside it as well as evacuation of casualties from the drop zone during airborne operations until ground linkup occurred.[55]

In spite of residual interest in pressing the Air Force case for frontline aeromedical evacuation,[56] the service by 1956 had conceded superiority in rotary wing transport to the Army within the combat zone and had accepted the literal interpretation of the Pace-Finletter agreement of November 1952. In January 1956, a joint Army, Air Force, and Navy manual, *Medical Service in Joint Overseas Operations,* laid out the basic relationships governing aeromedical evacuation in theaters of operation that remained in effect until the United States entered the Vietnam War.

The manual assumed that a theater medical officer and a joint staff, including a joint medical regulating office, would provide general medical policy to all the service theater components. Aeromedical evacuation responsibility was to be distributed among the services along the lines of the 1952 Pace-Finletter agreement. The Army and Navy would be responsible for picking up battlefield casualties in their respective combat zones (the Navy also had responsibility for Marine Corps

combat areas) and for transporting them to initial points of treatment or any subsequent medical facilities elsewhere in the combat area.

The Air Force was responsible for aeromedical evacuation from within the theater area to the CONUS or a designated temporary safe haven other than one provided by the Army or Navy within its combat zone. As specified by the Pace-Finletter agreement, the Air Force also had responsibility for all evacuation from initial points of treatment or points of subsequent hospitalization within the combat zone to points outside the combat zone. The Air Force was also made responsible for providing in-transit and staging facilities for evacuees and for attaching casualty aeromedical evacuation control officers to serve as liaisons with Army and Navy regulating agencies.

In the years remaining before the United States once again found itself at war in Asia, aeromedical evacuation tended to be determined more by developments in airlift, both tactical and strategic, than by other factors. TAC sought to develop the theater aeromedical systems within the parameters that the Pace-Finletter agreements had specified. TAC's troop carrier air force, the Eighteenth, developed a complete concept of a tactical aeromedical evacuation system (TAES) that USAF headquarters approved in March 1955 and which assumed utilizing assault, medium, and heavy troop carrier wings. Now free to develop helicopter aviation for tactical purposes, the Army also accepted the necessity for casualty evacuation by air.[57]

The Effect of Korea on Strategic Airlift and Aeromedical Evacuation

MATS was called upon to provide a much expanded intertheater airlift to support the Korean conflict logistically while also contending with unexpected surges in transpacific aeromedical evacuation. This activity affected MATS Continental Division's domestic aeromedical evacuation responsibilities. Contract carriers were used to augment the Pacific Division's airlift capability as were C–54s drawn from MATS Atlantic and Continental Divisions and from troop carrier units as well.

Aeromedical evacuation teams were provided from the 1453d MAES, which was headquartered in Hawaii and had a detachment at Tokyo's Haneda airport. A composite organization, the 1453d was staffed with Air Force nurses and medical technicians and Navy nurses and medical corpsmen. Just as aircraft resources were augmented from other sources, the 1453d received reinforcements from the Navy and MATS divisions and from elsewhere in the Air Force.

Evacuation teams and aeromedical evacuation flights were subjected to changing evacuation requirements for most of the first year of the Korean War because of the fluctuating casualty rates and changes in theater evacuation policy. Policy changes could create instant backlogs, as when the FEC on December 3 halved the theater evacuation policy from 120 days to 60. An instant backlog of

2,000 patients resulted. Variations could be large even when the evacuation policy remained basically constant. During October 1950, the Pacific Division evacuated 2,453 patients; in November the number was 1,907; but in December the evacuees numbered 6,214, which proved to be the peak month during the war. Evacuation requirements stabilized as the truce talks began and when greater experience and coordination between FEC and the Pacific Division permitted better planning. Ultimately, MATS evacuated 60,965 patients from the entire Pacific area from July 1950 through June 1953.[58]

Together with the workhorse C–54s, C–97s were used extensively for aeromedical evacuation. The C–97's cabin pressurization and greater speed provided a major advantage for seriously wounded patients. Contract carriers were used selectively for airlifting patients. In mid-December 1950, a pressurized Pan American Airways plane flew seventy-six chest-wound casualties from Tokyo to Honolulu.[59]

Prior to the Korean conflict, MATS had not had a single focal point for aeromedical evacuation, but this responsibility was soon vested in the command surgeon. This organizational change, plus the importance that aeromedical evacuation acquired by virtue of its life-saving potential, helped ensure that its importance as part of the MATS mission would retain visibility.

C–97s were also used for domestic aeromedical evacuation, and the surge in patients being moved among hospitals in the United States led to a reorganized and expanded domestic system. As used in Pacific Division transpacific evacuation flights, medically modified MC–54M aircraft were scheduled as much as possible. The Continental Division had been using dedicated air transport squadrons distributed geographically around the country, and the larger wartime movements caused it in June 1952 to create a new squadron, the 1731st Air Transport Squadron (Air Evacuation) and base it at Scott AFB, Illinois. Domestic patient movements during the Korean conflict totaled 215,402, and the peak month, as with the transpacific aeromedical evacuations, was December 1950 when 10,153 patients were transported. These levels of activity were such that the Air Force procured its first aeromedical evacuation aircraft specifically designed for and dedicated to this mission, the Convair C–131A Samaritan. Joining MATS initially in 1954, it could carry twenty-seven litter and seven ambulatory patients, or thirty-seven ambulatory patients. Pressurized and designed with onboard facilities for medical care, it was a major asset to the newly invigorated domestic system.[60]

Other byproducts of the Korean conflict that had an effect on aeromedical evacuation included the 1952 establishment of the CRAF to provide a reserve of long-range civil aircraft that could be activated incrementally and used to augment the military's airlift requirements in a crisis. The CRAF plan recommended that litter-carrier fasteners be installed on all four-engine transports manufactured in the future. This was a policy that the surgeon general had been seeking to implement. It represented a significant step toward the recognition of the value of the Air Force's aeromedical evacuation capability and served as an important basis

for its potential future expansion.[61] Less positive, however, were plans to reduce the Air Force's air transport capability in the wake of the Eisenhower administration's emphasis on strategic deterrent and its budget-balancing program. The transport service's size and visibility made MATS a target for civilian airline industry complaints that it provided unfair competition and should be reduced to support the mission of the Strategic Air Command.[62]

The business orientation of the Eisenhower administration also resulted in the imposition of a new accounting method, the Airlift Service Industrial Fund, for budgeting the costs of airlift services. The other military services would budget yearly for such services that would generate an accounting transfer of funds when delivered. Because aeromedical evacuation was an Air Force mission, the cost of this service was allocated to the Air Force.

By creating a single manager for airlift in December, President Eisenhower's Secretary of Defense consolidated control of all aircraft flying point-to-point scheduled service under MATS. Intended like the adoption of industrial funding to introduce greater efficiency and economy into the military air transportation system, Secretary Wilson's directive increased the number of transport aircraft potentially available for aeromedical evacuation. It also stressed the peacetime use of commercial airlift to enhance their wartime ability to support military forces, an emphasis that provided another channel for seeking enhanced aeromedical evacuation capability. The assignment of aeromedical evacuation missions to Air National Guard (ANG) units complemented these enhancement possibilities.

Conclusion

The Korean War served as a catalyst to clarify to the Army and Air Force the value of aeromedical evacuation. Assigned the responsibility for developing aeromedical evacuation systems for both services in the late 1940s, the Army had neglected the task of forward or battlefield evacuation. This was a mission that the AAF had rejected in 1942 when it was proposed by the wartime air surgeon, General Grant, but it was a mission the USAF Air Rescue helicopters would perform with great effectiveness in the early phases of the Korean War. This demonstration of successful aeromedical evacuation led the Army to embrace the helicopter enthusiastically, particularly when its other tactical applications became apparent. The initial Air Force rejection of dedicated helicopter rescue units soon changed to proposals for providing a complete range of aeromedical evacuation services from picking up battlefield casualties to delivering them at hospitals for definitive care. Thus was the issue of the control of battlefield casualty pickup injected into the ongoing Army–Air Force dispute over tactical air support of the ground forces.

The Korean War marked the Army's acceptance of aeromedical evacuation, and the resolution of the frontline evacuation dispute helped lay the basis for the distribution of responsibilities for aeromedical evacuation within a theater. The

role MATS played in emergency logistic support at the beginning of the conflict and its continuing value in that role, including the return of casualties to the CONUS, demonstrated the significance of air transportation for future conflicts. A number of ripple effects redounded positively upon the role of aeromedical evacuation among MATS's responsibilities. The basic structure of the modern aeromedical evacuation system that emerged in the wake of the Korean War and the advances that would occur during the next dozen years would generate the modernization of the transport fleet.

Chapter 6

THE MODERN AEROMEDICAL EVACUATION SYSTEM EMERGES FROM THE WAR IN VIETNAM

The aeromedical evacuation system for the U.S. armed forces that emerged from the Korean War experience was in great part due to the development of a new technology, the helicopter. The apparent resolution of conflict between Army and Air Force over its control and the Army's final acceptance of aeromedical evacuation for its medical, logistic, and tactical value were engrafted onto the World War II experience. The issue over the mission and control of rotary wing aircraft only became resolved in 1966 during the Vietnam conflict, and ambiguities regarding the Army's and Air Force's respective responsibilities for aeromedical evacuation as delineated in the *Medical Service in Joint Overseas Operations*, the joint manual issued in January 1956, would remain.[1] A new recognition of the critical role of airlift to operational planning and combat support had emerged from the Korean War and, with the new overseas commitment to NATO, the fact that airlift was a critical resource requiring centralized management and modernization became apparent.

An emerging issue was how large should an active aeromedical evacuation system be, or could it be maintained in peacetime, given the high cost of the medical personnel involved. Flight surgeons, flight nurses, and air evacuation technicians had been difficult to recruit in the required numbers in the post–World War II era. Although SAM had successfully expanded the training of aeromedical evacuation personnel for the Korean War, an exodus of personnel similar to what followed World War II occurred again. Medical professionals were simply not content to have their skills and special training either unused for long periods or put to use in dispensaries or hospitals in routine military medicine. Yet it was clear that another contingency similar to the one in Korea would require an expanded aeromedical evacuation capability, and MATS had a continuing requirement to

operate the domestic aeromedical evacuation system that had expanded and been rationalized during the war years. What size and capability might be required during time of war posed a difficult conundrum.

One solution to the problem of cost was to reduce the size of the active force devoted to aeromedical evacuation in peacetime but to preserve its ability to respond to crises by developing an aeromedical evacuation capability in the ANG and the Air Force Reserve (AFRES). To this end, the mix of forces in the AFRES and ANG was changed after the Korean War as the Air Force structure was reduced and redirected. When mobilized in late 1955 and 1956 the ANG began to activate aeromedical transport squadrons committed to MATS, and other measures were taken over the next few years to ensure such units were operationally ready. Arrangements were made to attach AFRES flight nurses to ANG units for training, and a special course for aeromedical evacuation technicians was established at SAM. Additional spaces were obtained for Guard personnel in specialized courses at SAM, the Armed Forces Special Weapons Medical Symposium, and Army medical centers.[2] In the 1950s the Continental Air Command eliminated six reserve fighter-bomber wings. Of the ten reserve troop carrier wings that remained, each was required to provide a tactical hospital. Continental Air Command also required them to create reserve aeromedical evacuation and casualty staging units. The hospitals were created in April 1957, and the aeromedical units were created in April and May 1959.[3]

USAF headquarters also took another approach to cutting costs. Under budgetary pressures, Air Force Chief of Staff Gen. Thomas D. White, apparently without consulting the Air Force surgeon general, went as far as seeking virtually to eliminate the active force commitment to domestic air evacuation. The USAF FY 1961 budget proposed cutting aircraft assigned to domestic air evacuation from thirty-one to fifteen by September 1960 and eliminating the mission completely by 1963. Presumably, pressure from the Army and from within the DoD caused White to quickly back away.[4]

Meanwhile, the Air Force continued its attempts to develop aeromedical evacuation doctrine for theater operations. With the cession of frontline evacuation to Army aviation after the Korean War, the initial organizational actions of the Air Force surgeon general to support frontline evacuation requirements were no longer fully applicable. The aeromedical evacuation system proposed by Surgeon General Harry Armstrong in 1951 essentially merely added a structure for frontline evacuation to the system previously developed ad hoc under the aegis of the 315th Air Division during the Korean War. Armstrong had proposed a hierarchy of new aeromedical units for receiving, processing, and holding casualties, with the assumption that Air Force helicopters and assault transports would be the primary vehicles used to perform frontline evacuation.

In the Eighteenth Air Force's "Concept of Aeromedical Evacuation in Overseas Combat Areas," approved by USAF headquarters in March 1955, the functions of forward medical air evacuation flights that Armstrong had proposed

were narrowed. Originally described as operating in conjunction with Air Force helicopter units and other units with assigned liaison or assault aircraft "to provide treatment and movement for aeromedical evacuees from a forward battle area," including flight escort, their venue was now the drop or landing zone in which Army troopers had been delivered by Air Force aircraft.[5] The reception function of these forward medical air evacuation flights was now allotted to casualty staging flights (CSFs), which were intended to be mobile and serve patients from any source delivered to them.

In addition to receiving and processing patients for aeromedical evacuation to the COMZ and possible further evacuation to the CONUS, directives required that CSFs also provide holding facilities for in-transit patients. Coordinating aeromedical evacuation requirements with theater airlift or MATS controllers would be the responsibility of aeromedical evacuation control centers (AECCs).[6]

In effect, the Air Force's concession of responsibility for frontline evacuation to the Army had formally created a three-tier aeromedical evacuation system: a frontline portion in which both the Army and Air Force had responsibilities, with the Army having primary responsibility for picking up casualties in the combat zone; a TAES operated by troop carrier or other theater airlift units to move patients from the combat areas to the medical facilities in rear areas (normally, the COMZ); and a strategic aeromedical evacuation system operated by MATS for intertheater patient movement to the United States and distribution among domestic medical facilities.

Rooted in the Korean War experience, the aeromedical evacuation system with which the U.S. armed forces would engage in hostilities in South Vietnam approximated the three types of aeromedical evacuation envisioned by Colonel Truby the chief of the Air Service medical division forty years earlier. Conditions of conflict in Vietnam—the exigencies of fighting a guerrilla insurgency with no clear front lines in a country with large stretches of sparsely populated jungle and a limited road and rail network—would tend to shape the system in ways not necessarily congruent with agreed-upon doctrine. Additionally, the helicopter's capability and the geography of Vietnam made it feasible to move casualties directly to field hospitals. A more subtle factor that would affect the Army's attitude toward the traditional chain of evacuation was the performance of Air Force helicopters during Southern Pine, the 1951 joint Army–Air Force exercise. One major result was the conclusion by the Army Medical Department that the Air Force's policy of bypassing some echelons on the traditional evacuation system, when possible, was desirable. This marked a shift from the Army's policy in Korea when the Eighth Army surgeon had vetoed Air Force suggestions to this effect.[7]

Aeromedical Evacuation Developments Between Korea and Vietnam

Perhaps the most notable event in the period between Korea and Vietnam was the procurement of the first USAF aircraft developed specifically for aeromedical

The Douglas C–118 Liftmaster outfitted for aeromedical evacuation duties.

evacuation, the C–131A Samaritan.[8] A pressurized aircraft, the Samaritan had two engines and cruised normally at 235 mph. Air-conditioned in flight, it was cooled by only a blower when on the ground, which proved inadequate for patient comfort. Passenger seats faced rearward and were capable of withstanding substantial gravity forces. The cabin was designed to medical specifications and permitted the installation of a variety of special medical equipment such as iron lungs, orthopedic beds, artificial kidneys, or incubators for transporting patients. The aircraft could carry thirty-seven ambulatory patients or twenty-seven litter and four ambulatory patients and a medical crew of three. In accordance with the Geneva Convention, the Samaritan had a large red cross on its vertical stabilizer, the first such USAF aircraft to do so.[9]

Stimulated by the flow of Korean War casualties to the United States, the Air Force had authorized Samaritan procurement in late 1951 to replace the aging VC–47s in the domestic aeromedical evacuation system. By early 1955, MATS squadrons assigned to the domestic system were fully equipped with twenty-six C–131As and six MC–54Ms, but a combination of factors began to affect the system adversely. The lack of pressurization of the now-aging C–54s limited their utility for flying patients over the Rocky Mountains, although having four engines made them the most desirable aircraft for mountain flying. Additionally, the availability of C–54s began to decline because they required extensive maintenance to keep them operational while the C–131As were receiving programmed major maintenance, and two were transferred to Europe. The assignment of the pressurized, four-engine C–118 Liftmasters to the system helped cover these losses, and the procurement of nine C–131Es enabled MATS to retire the MC–54Ms, which were gone from the domestic system by 1958.[10]

The Convair C–131 Samaritan.

This now-modern fleet of pressurized, propeller-driven aircraft supported a trunk-and-feeder system connecting the major aerial ports of entry on the East and West Coasts through a series of intermediate stops and an occasional flag stop. Trunk flights were flown by dedicated aircraft on a scheduled basis between Air Force bases located near major hospitals; feeder flights to these bases were made from scattered airfields to bring in patients who needed more definitive care.

Centralized control of the five squadrons of the MATS Continental Division assigned to the domestic system was exercised by the 1st Aeromedical Transport Group headquartered at Brooks AFB, San Antonio, Texas. In 1953, the Continental Division had created its predecessor, the 1706th Air Transport Group (Air Evacuation), to decentralize authority and improve supervision. This action was also intended to facilitate the group's conversion to the C–131A. Patient movement control centers at squadron locations coordinated patient movement on the scheduled trunk-line flights, and the 1st Aeromedical Transport Group controlled domestic system operations through an aircraft flight-following and movement control center at Brooks. Trunk-line itineraries varied over the late 1950s as MATS modernized its domestic aeromedical evacuation aircraft fleet. Travis AFB, California, and McGuire AFB, New Jersey, were the western and eastern terminuses; intermediate stops included Brooks AFB; Brookley AFB, Mobile, Alabama; Andrews AFB, Maryland; Scott AFB, Illinois; and Lowry AFB, Denver, Colorado. Charleston, South Carolina, served as a flag trunk stop.[11]

The 1st Aeromedical Transport Group issued new schedules and developed new route structures that reduced by 37 percent the time spent in flight. These also ensured that, during 80 percent of each day, an aeromedical evacuation aircraft was flying within the area served by the using hospital and a flight could easily be

diverted to a nearby base to meet an emergency evacuation of a patient. Patient handling for those moving through the system was improved and brought under direct MATS control in 1957 by creating CSFs at McGuire, Travis, and Scott AFBs. The CSFs undertook tasks previously performed by local hospitals that tended to strain their capability to meet their base responsibilities. For example, 6,300 patients were processed by the Aeromedical Evacuation Section of the Scott AFB hospital during 1954, which led ultimately to unrealized plans to curtail dependents' medical care.[12] To preclude such situations, the 1st CSF was activated at Scott on January 18, 1958, and the 2d CSF, which would be the focal point for most of the returning casualties during the Vietnam War, was activated at Travis AFB on the same date. The mission of the MATS CSFs was to receive and process patients for transport, provide nursing service for patients in transit, transport them to and from the aircraft, and load and unload them.[13]

The stimulus provided by the Korean War for modernizing the domestic aeromedical evacuation system focused attention on what the USAF and MATS should plan for regarding airlift and aeromedical evacuation requirements. No Air Force or DoD directive mentioned a wartime mission for MATS, but creation of the Single Manager Operating Agency for Airlift (an enlarged MATS) remedied this deficiency. DoD Directive 5160.2 designated the Secretary of the Air Force as the agency's single manager and the MATS commander as the agency's executive director. It also directed the Secretary of Defense to "organize, equip and attach air transport units necessary to meet military requirements as determined by the Joint Chiefs of Staff."[14] The directive applied to all aircraft operating point-to-point on a scheduled basis or "aircraft whose operations are susceptible to such scheduling." In accordance with its terms, all but twenty of the Navy's four-engine Fleet Logistic Air Wing's transports and all of TAC's heavy, troop carrier aircraft (the C–124 Globemaster II) were transferred to MATS.[15] The loss of a major portion of TAC's troop carrier fleet made maintaining a separate troop carrier organization unjustifiable, and Headquarters Eighteenth Air Force was disestablished. The concepts it developed for theater aeromedical evacuation systems were embodied in Headquarters USAF, TAC, and theater manuals and regulations and generally paralleled those specified by MATS.

TAC's mission was now to train tactical units for assignment to overseas commands or joint task forces (JTFs) constituted to provide quick response with a balanced and tailored U.S. force for worldwide contingencies. An example of this would be the post-1961 United States Strike Command. Limited war such as the Korean conflict just past, a general war like World War II fought with conventional weapons, or a nuclear war with the Soviet Union—all posed potentially different requirements for aeromedical evacuation, making it difficult to develop programs to procure and train personnel for such a system. The structure of the aeromedical evacuation system and procedures for operating it were, however, available in the appropriate theater regulations and manuals. For the Pacific, these were issued by the Hawaiian headquarters of Pacific Air Forces (PACAF), which

on July 1, 1957, had replaced FEAF after the U.S. armed forces in the Pacific moved from Japan to Hawaii at the end of the fighting in Korea. Pacific Command (PACOM) replaced FEAF's parent, FEC, at the same time.[16]

While the domestic aeromedical evacuation system was being modernized, and the theater systems and MATS were adjusting to the new peacetime requirements for moving U.S. patients worldwide, the system was exercised in several contingencies that did not involve U.S. combat casualties. One of the first exercises was the aeromedical evacuation of wounded and sick French legionnaires from Indochina in June 1954. This occurred in the wake of the French surrender to communist Vietminh forces at Dien Bien Phu in May 1954 and the French agreement to relinquish control of its former colonies. Four-engine C–124 troop carrier aircraft of the 315th Air Division airlifted the French troops from the Tan Son Nhut airfield at Saigon to Tachikawa AB in Japan in Operation Wounded Warrior. From Japan, MATS flew the troops on C–97s across the Pacific to the United States and thence by C–118s to France and Algeria.[17]

Other contingencies during the interval between Korea and Vietnam in which MATS aeromedical evacuation capabilities were available to support U.S. or friendly forces included the 1956 airlift in support the rebels during the Hungarian Revolution; the 1958 Operation Blue Bat, the joint deployment of an Army task force to Lebanon from Germany; and the 1960 airlift, Operation New Tape, to the former Belgian Congo in support of the United Nations. In contrast to Wounded Warrior, these three operations were not aeromedical evacuation missions. Foreshadowing a new Cold War interest in the Middle East, Operation Blue Bat was conducted at the request of the Lebanese president who was concerned about preventing the possible overthrow of his government after the successful 1954 coup in Iraq against the British-supported Hashemite king.[18] Neither Blue Bat nor New Tape received the benefit of JCS medical planning, according to the senior Air Force medical officer in Europe who was responsible for the medical support of these operations. This, he asserted, was typical of the lack of attention paid to medical issues by the JCS during this period.[19]

Changes in the Status of Airlift and MATS Capability

The creation of a single manager for airlift in 1956 had been occasioned by the Eisenhower administration's interest in greater efficiency through centralized control of what would soon be called strategic airlift. After 1956, reality showed that control of airlift in the armed forces was not as centralized as the DoD's directive suggested, but it represented a definite, albeit imperfect, step toward that end.[20] The focus on airlift represented by the creation of a single manager also reflected continuing congressional interest. Stimulated in large part by commercial air carriers, which aroused their congressional delegations with the charge that MATS transport of passengers and cargo represented unfair government competition, several congressional committees and subcommittees conducted a series

of hearings in which a number of issues were aired and recommendations made regarding future airlift policy.[21]

Aeromedical evacuation seems to have hardly been discussed in any of these hearings. In perhaps the most important one, a special subcommittee of the House Armed Services Committee on military airlift and chaired by the powerful South Carolinian, Mendel Rivers, aeromedical evacuation was mentioned only in passing. In a background briefing to the members of the subcommittee, Col. Walter Cook, the MATS deputy assistant chief of staff, when describing aeromedical evacuation, revealed Air Force plans to phase out the domestic system along with other support operations "in order to maintain combat strength at the required level."[22]

The chairman's comments during the hearings clearly indicate he was not sympathetic to the Air Force's priorities. He expressed concern at what he perceived as the secondary status accorded MATS by the Air Force leadership and the responsibility of the Air Force to support the Army as prescribed by previous agreements and directives. Rivers was obviously sympathetic to the need for more airlift capability; he was quoted in the *Army Navy Air Force Journal*'s coverage of his subcommittee hearings as having said that the airlift shortages revealed in the hearings were frightening. In an exchange with Air Force Chief of Staff General White, Rivers goaded him a bit with the idea that MATS be made a specified command as one way "to put the responsibility on somebody and stop some of this lip service [to Air Force support of MATS]."[23]

The most positive development from these hearings was Congress's acceptance that turbojet aircraft were needed to modernize MATS. MATS argued that an uncompromised military cargo transport powered by jet engines and designed specifically for the purpose had to be developed, and that, because the need was so urgent, an off-the-shelf aircraft was mandatory until the required aircraft was available.[24] Both would be fitted to carry litter and ambulatory patients for MATS's strategic aeromedical evacuation mission.

Similar attention was paid during these hearings to improving tactical airlift. A start was made by DoD, but any substantial action would be deferred until a new administration with a different vision of how best to preserve U.S. national security took charge. This congressional attention to the future of airlift transcended the change from the Eisenhower to the Kennedy administration. More to the point, the change of administration brought a change in the strategic concept around which the U.S. armed forces were organized. The Eisenhower administration emphasized the U.S. nuclear strike force embodied chiefly in the Air Force's Strategic Air Command (SAC), whereas Kennedy's emphasized a range of conventional and nuclear forces with which to respond to a given situation at an appropriate level of intensity. The concept of flexible response was consonant with the Army's outlook that limited wars, like the Korean conflict, were probable and required a conventional response, rather than what they asserted was the potentially suicidal and increasingly incredible threat to meet aggression with a nuclear attack on the aggressor.

Flexible response required adequate conventional forces and the airlift to move them quickly to where they were needed, in contrast to reserving airlift strictly to support SAC in its conduct of a nuclear exchange. That meant modernizing MATS with jet transports; reevaluating the capabilities of the CRAF, and examining how it should be utilized in future contingencies; and in accordance with Air Force policy already being implemented, moving surplus transport aircraft into the ANG and the AFRES to increase their airlift capability.[25] Concerns about domestic air evacuation disappeared; instead, expansion and modernization of both tactical and strategic airlift were to be undertaken. By implication, both tactical and strategic aeromedical evacuation were to have heightened roles. In his first inaugural address, President Kennedy stated plainly that he had directed prompt attention to increase airlift capacity because

> obtaining additional air transport mobility—and obtaining it now—will better assure the ability of our conventional forces to respond, with discrimination and speed, to any problem at any spot on the globe at any moment's notice.[26]

Immediately after President Kennedy's address, attention to increase airlift occurred: the initial buy of fifty long-range C–130E Hercules in the previous Eisenhower defense budget, one of the tangible results of the recommendations of the Rivers subcommittee, was increased to ninety-nine; and seventeen KC–135 Stratotanker jet tanker aircraft on the production lines were ordered reconfigured as transports. An additional thirteen C–135 Stratolifters were also ordered. These new jet transports were to become available at the rate of two per month beginning in June 1961. With an audit trail extending back into the previous administration, the uncompromised jet cargo aircraft went into development in 1961 with the selection of the Lockheed C–141 Starlifter.[27]

On the eve of the U.S. intervention in Vietnam, the USAF had received its first jet transport, the C–135, for intertheater evacuation. Within a few years it would receive C–141s. Additionally, it had a growing theater force of assault transports and doctrine drawn from the Korean War to support tactical aeromedical evacuation. Complementing the Air Force's aeromedical evacuation capabilities were Army medevac[28] helicopters and smaller fixed-wing aircraft that could, as was demonstrated in World War II and the Korean conflict, evacuate small numbers of casualties in emergencies.[29] However, the line separating Air Force tactical aeromedical evacuation from Army frontline evacuation remained somewhat ambiguous.

Factors Affecting Aeromedical Evacuation in Vietnam: Roles and Missions

A memorandum of November 26, 1957, from the desk of Secretary of Defense Wilson gave the Army the right to operate aircraft for several traditional

Army functions within an enlarged combat zone that was 100 miles forward and to the rear of the line of contact between U.S. and enemy forces. These functions included command, liaison, communications, observation, reconnaissance, and fire adjustment, but Wilson also affirmed the more contentious roles for Army aviation secured during the 1950s that the Air Force believed encroached on its troop carrier mission: aeromedical evacuation and the airlift of Army personnel and material. Wilson specified Air Force responsibilities to be strategic and tactical airlift (the airlift of Army personnel and materiel into and out of the Army combat zone, including support of airborne operations) and

> aeromedical evacuation from Air Force operating locations within the combat zone through Air Force casualty staging units to hospital facilities outside the combat zone, and aeromedical evacuation from an airhead or an airborne objective area where airborne operation includes air landed logistic support by Air Force.[30]

The Air Force was also responsible for tactical reconnaissance, interdiction of the battlefield, and close combat air support.

That the Army was not content with this division of labor and responsibilities quickly became obvious as it continued to press for expanding the role of Army aviation in ground combat. When the Kennedy administration came to power in 1961, the Army's leadership found the environment conducive to advance its concepts. The outcome was the June 1965 decision by Secretary of Defense Robert McNamara to authorize the first air mobile division built around the intensive application of helicopters to ground combat. The Air Force considered that the Army's deployment of armed helicopters, battlefield surveillance capabilities, and very-heavy-lift helicopters constituted a clear violation of the roles and missions that had been assigned it as well as a costly duplication of its capabilities. The official Air Force concept for employing tactical airlift included air logistic support for combat forces through establishing and maintaining "an air line of communications" for personnel, supplies, and equipment to Army supply points and to combat units, "regardless of their size or location." Air Force tactical airlift was also to move units within the combat zone, conduct aeromedical evacuation operations, provide emergency supply and resupply, and transport the special forces.[31] By contrast, Army Chief of Staff Gen. Harold K. Johnson in testimony before a special subcommittee on military airlift of the House Armed Services in October 1965 cited "the retail line of communications *operated by the Army* [emphasis added]"; Army dependence on the Air Force to support Army requirements "as far as they can operate their aircraft efficiently...consistent with our tactical mission"; and Army fixed-wing twin-engine transports, the C–7 Caribou and C–8 Buffalo, as the logistic link between "the long-range bulk carriers [Air Force C–130s], and Army helicopters in the forward areas."[32] Air Force concerns about Army encroachment on Air Force missions would follow this first airmobile division—

the 1st Cavalry Division (Airmobile)—into Vietnam, where it deployed soon after its activation in 1965. When the division arrived in-country, it brought with it its own, organic helicopter medevac capability.[33]

The Context of Aeromedical Evacuation in Vietnam, 1961–1968

U.S. involvement in Vietnam progressed through several phases. In the first, the United States supported the French attempt to suppress the Vietminh insurgency in the early 1950s through a military advisory assistance group (MAAG). The MAAG administered military assistance programs that supplied aircraft, munitions, and other direct services, including logistic and maintenance support supplied by the USAF for aircraft sent to Indochina. In the second phase, the United States provided support to the noncommunist South Vietnamese government that emerged after the partition of Vietnam in 1954. The vehicle was a similar assistance program administered by a MAAG and included U.S. Army, Air Force, and, after May 1961, special forces advisors. In November 1962 the U.S. Military Assistance Command, Vietnam (MACV), a subordinate unified command under the commander in chief, Pacific Command (CINCPAC), was established to manage the deployment of U.S. advisors and materiel. When the United States decided in 1965 to intervene with U.S. ground troops, MACV directed U.S. combat operations and the buildup of U.S. forces. This approach lasted through 1968 when President Lyndon Johnson made the decision to reduce the U.S. role and turn over the war to the South Vietnamese, the so-called Vietnamization program. MACV then oversaw the drawdown of U.S. forces from 1969 through their complete withdrawal in the early 1970s until MACV's deactivation in March 1973.[36]

This gradual path that led to the introduction of U.S. forces into combat in Vietnam conditioned the development of the aeromedical evacuation system. Initially there was a lack of appreciation for the number of troops that would eventually be deployed (they numbered some half a million at the height of hostilities in 1968). This created an ad hoc approach to the development of a system for casualty evacuation, which was further encouraged by ambiguities in the theater command structure for airlift and associated aeromedical evacuation responsibilities.[37]

The Origins of the Aeromedical Evacuation System, 1961–1965

After the Kennedy administration's decision to increase aid to the Diem government in 1961, a buildup of medical facilities began to accommodate the 8,000 U.S. military personnel planned to be dispatched as advisors to bolster the South Vietnamese government forces. The first helicopter units that deployed to Vietnam were not dedicated medevac units; those began arriving in December 1961 with H–21 light helicopters. In late April 1962, the first dedicated medevac

unit, the 57th Medical Detachment (Helicopter Ambulance), arrived. It was equipped with UH–1As, the first Hueys to be deployed to Vietnam.[38]

Following the practice begun during the Korean War, the 57th was assigned to the Army Medical Department. It was stationed initially at Nha Trang, a coastal town 265 miles northeast of Saigon with the 100-bed 8th Field Hospital and four attached medical detachments sent with the 8th to provide specialty care. All these units had been alerted for dispatch in the preceding February to ensure that the incoming U.S. advisors would have a full range of medical services available. Their assignment to Nha Trang prevented further overloading an already overcrowded Saigon, which appears to have been the principal reason for the decision to send the detachment north. The Vietnamese air force was responsible for meeting the evacuation needs of the Vietnamese army, but it had no dedicated medevac units. It used H–34s for evacuations, but the helicopters performed erratically, if at all.[39]

Reminiscent of earlier controversies, the issue of command and control of aeromedical evacuation aircraft arose several months after the 57th's arrival and was precipitated by the relative inaction of the unit. Located several hundred miles from the delta and other areas where most of the fighting was occurring, the 57th's helicopters had a limited radius of action of some 90 miles. By June, they had evacuated only twelve U.S. and fourteen Vietnamese army[40] personnel, and the 57th's commander assigned two Hueys to Qui Nhon, 100 miles farther north on the coast in an attempt to extend medevac coverage. He also sought with only partial success to have JP–4 fuel for the helicopters stored inland in several critical locations, and he tried several times without success to get permission to move the 57th to Saigon or the delta where it would be closer to the fighting. Although he was later a strong supporter of the 57th's aeromedical evacuation mission, in September Gen. Joseph Stilwell, commander of the Army Support Group, Vietnam, considered transferring the 57th from control of the Army Medical Department to the Army Transportation Corps, which controlled all U.S. Army helicopters in Vietnam at that time. According to the historian of the medical department in Vietnam, Stilwell observed the 57th's relative lack of activity and thought its restriction to medevac was a waste of resources and that its medevac helicopters should be used for other logistic missions.[41] Stilwell dropped his idea only after representations by the 57th commander and the Support Command surgeon, who also commanded the 8th Field Hospital.[42]

Stilwell was not alone in focusing initially on how to meet operational requirements in light of the nature of Vietnamese geography, the guerrillas' tactics, and the increased but still limited resources available. As the historians of helicopter aeromedical evacuation in Vietnam note, all commanders of Army aviation units in South Vietnam met as early as July 1962 to discuss the possibility of employing Army aviation extensively to support South Vietnamese counterinsurgency efforts. They were briefed that greater U.S. military involvement would require that Army aviation assume tasks ordinarily assigned to armor, ground transport, and infantry.[43]

All Army aviation units were suffering from inadequate logistic support, and not until November 1962 did the still unique medevac Hueys have an established logistic channel to provide spare parts. Helicopter resources were scarce, and some Army aviators argued against having dedicated helicopters for aeromedical evacuation. They even suggested that the red crosses displayed on them be removed and that the helicopters be assigned general support tasks when they were not engaged in medevac missions. In the same vein, the Army Support Command suggested that the identifying red crosses be displayed on removable panels. The senior MAAG advisor in Qui Nhon went so far as to try several times to commandeer a standby medevac helicopter.[44] Not until early 1963, after the Vietnamese army mounted a heliborne assault in the delta that resulted in heavy casualties, including three dead U.S. advisors, did moving the helicopter ambulances closer to the fighting receive serious consideration. The 57th was ordered to Tan Son Nhut airfield at Saigon on January 16. Reflecting both the more serious consideration being given to aeromedical evacuation by MACV and the continuing influx of U.S. equipment, in March General Stilwell gave the 57th the first new-model Hueys, UH–1Bs, to arrive in Vietnam.[45] Over the next two years, the 57th placed detachments at Pleiku in the central highlands and Qui Nhon, again to provide medevac support within the II Corps zone, whereas the remaining aircraft of the 57th at Saigon provided similar support to the III and IV Corps zones. In the northernmost I Corps zone, where U.S. Marines fulfilled the advisory role, Marine Corps H–34 helicopters provided both aeromedical evacuation and combat support. By June 1963, some type of capability for forward area helicopter aeromedical evacuation was available to all of South Vietnam, although the dedicated coverage provided was thin.

The initial Air Force role in aeromedical evacuation began with the dispatch of twin-engine C–123 Provider assault transports to Vietnam in January 1962 to give tactical and logistic support to Vietnamese and U.S. forces in the field.[46] In many respects, C–123s were ideal for this role because they had been designed to operate from short, rough, or unprepared landing strips in support of airborne operations. The Air Force also envisioned C–123s as evacuating casualties on retrograde missions from forward areas, particularly from airborne assault areas in emergencies. Capable of carrying either litter or ambulatory patients, the C–123, like its Korean counterpart, the C–119, was not an ideal vehicle for moving the sick or wounded. The noise level in the cargo compartment, which had no soundproofing, was very high, and because the aircraft was not pressurized, it could not be air-conditioned for in-flight passenger or patient comfort. Vibration from the engines and a tendency to yaw rhythmically during straight and level flight added to the discomfort of those riding in the cabin.[47]

Whatever its deficiencies as a vehicle for aeromedical evacuation, the aircraft was well-suited to support forces in outlying areas, especially the special forces camps in Vietnam's remote interior. Like the C–119 during the Korean War, C–123s were used to evacuate casualties and patients when a more suitable aircraft

UH–1 Huey evacuating casualties in Vietnam.

was unavailable. During the next several years, C–123s brought in the sick and wounded from outlying locations to Tan Son Nhut, and a single C–123 was kept on a twenty-four-hour alert at the airfield for a possible emergency aeromedical evacuation request. An AECC was also established at Tan Son Nhut and manned by two medical technicians who received evacuation requests and coordinated patient movement between Tan Son Nhut and the 8th Field Hospital at Nha Trang, which until April 1965 was the only U.S. Army field hospital in Vietnam.[48]

In October 1963, the Navy opened a 100-bed station hospital in downtown Saigon to provide, for the first time, full inpatient and outpatient capability to support U.S. forces serving with South Vietnam's III and IV Corps. Casualties from these areas were initially transported by 57th helicopters to Tan Son Nhut and then moved to the hospital by ground ambulance. Because the distance and the traffic en route presented problems, an abandoned soccer field fifteen minutes away from the hospital was converted into a helicopter landing pad, materially shortening the time between the pickup of a casualty in the field and the initiation of treatment at the hospital.[49]

The Air Force TAES continued to develop from these beginnings. C–123s began scheduled evacuation flights weekly between Tan Son Nhut and Nha Trang, taking patients to the 8th Field Hospital and bringing back patients and personnel returning to duty to Saigon. Personnel from the AECC frequently served as inflight medical crew during these flights. Major hospital cases were evacuated by air from Vietnam to Clark AB in the Philippines because it had better medical facilities; others were evacuated in accordance with the fifteen-day evacuation policy adopted for Vietnam. Airlift squadrons equipped with four-engine turboprop C–130s based at Tachikawa AB, Japan, and Naha AB, Okinawa, moved

patients regularly on backhaul missions from Tan Son Nhut to Clark. There, they received further treatment at the hospital or were stabilized for MATS evacuation to the United States. The theater evacuation policy was sixty days.

In May 1962, C–130s were put on a specific weekly aeromedical evacuation schedule timed to meet the returning C–123s from Nha Trang, and connecting Clark AB, Tan Son Nhut airfield, and Don Muang airport in Bangkok, where another AECC was established. At least initially, the C–130s were A models which, like their smaller transport brother, the C–123, had little or no soundproofing. Noise levels in the cabin might be uncomfortable for patients, but the aircraft was fast and very stable in flight and the cabin was pressurized, which reduced patient stress from flying at the high altitudes where the turboprops were most efficient, and it provided climate control in the passenger compartment.[50] Medical crew members from the 9th Aeromedical Evacuation Squadron (AMES) at Tachikawa AB accompanied these C–130 flights, and in 1963 detachments of the 9th AMES were established at the three terminal points. The system was unstressed enough at this point in the deepening U.S. involvement to handle an occasional emergency evacuation flight for a single patient on a diverted aircraft with an informally augmented medical flight crew.[51]

Roughly 200 patients each month were moved to or from Southeast Asia during 1963–1964, and of these, fewer than 40 percent were battle casualties. The system was clearly adequate to fulfill the then-current evacuation requirements. Aeromedical evacuation in Vietnam up to 1964 had little resemblance to the evacuation systems the Air Force had built for the joint exercises conducted with the Army after the Korean War[52]; this would remain largely true through the years of direct intervention and troop buildup and withdrawal.

The same could easily be said for much of this period with regard to the airlift system in Vietnam upon which aeromedical evacuation largely depended. Unlike the Korean conflict when the 315th Air Division had functioned as the FEC's single manager for airlift and been the major player in helping fashion and then direct the theater aeromedical evacuation system, the command structure for airlift and aeromedical evacuation in 1965 was more complex. The 315th Air Division, still located at Tachikawa AB in Japan, now reported directly to PACAF headquartered at Hickam AFB, Hawaii, which was the Air Force component of the newly established (1957) unified theater command headquartered on Oahu. Intratheater airlift was the 315th's responsibility, and its 9th AMES, also headquartered at Tachikawa, provided the medical flight crews for required aeromedical evacuation. However, MACV, the Army-dominated subordinate unified command headquartered in Saigon in 1965, had, from its inception in March 1962, a doctrinal bias toward decentralized control of a supporting airlift system.[53] This had the same roots as the Army's aggressive promotion of Army aviation, that is, if under Army command and control, it would be more responsive to the requirements of ground combat.[54] This contrasted sharply with the Air Force's belief in the efficiency of centralized control of theater airlift, which the Korean conflict

had demonstrated to its satisfaction and which were embodied in its command directives. Such centralized control also provided the most effective means to coordinate aeromedical evacuation requests.[55]

The result of these differences produced a hybrid, the Southeast Asia Airlift System for Vietnam. Established in late 1962, it was controlled by the newly created 315th Troop Carrier Group (Assault) at Tan Son Nhut AB. Although the 315th Group was formally assigned to the 315th Air Division in Japan, operational command of the unit was vested in the MACV commander who exercised command though his Air Force component, and airlift capability was allocated by a board established within MACV J–4 (Logistics). The degree of airlift centralization was not complete because the Army's C–7 aircraft were largely excluded from the system; they provided direct support to Army senior advisors in the field and to MACV itself, much to the Air Force's dismay. By 1963, a section of the 315th's Operation Section had emerged as the airlift control center (ALCC) to provide scheduling, flight following, and operational planning in response to airlift allocations from MACV.[56]

As U.S. involvement deepened in Vietnam, the Army imprint on MACV was perhaps best exemplified when the Army brigadier general heading MACV J–1 (Personnel) proposed in 1964 that MACV be made an Army specified command rather than continue as a subordinate joint command of PACOM. Denied this, MACV was still reorganized by Secretary of Defense McNamara along lines suggested by the Army: Army Gen. William C. Westmoreland was placed in the new position of deputy commander, MACV; the Air Force Deputy J–3 was replaced by an Army officer because, according to the J–3, Maj. Gen. Richard Stilwell (son of General Joseph Stilwell), he was unable to "look at J–3 matters except through USAF-tinted glasses" and he knew nothing of ground operations; and the MACV chief of staff position was filled by General Stilwell when the incumbent Marine Corps brigadier vacated it, although Adm. Harry D. Felt, the CINCPAC, had favored making the MACV chief of staff a senior Air Force officer to obtain an Air Force perspective within the mainstream MACV operation.[57] The Air Force also lost the J–2 position to a Marine Corps brigadier general, and, when the MAAG was closed out in May 1964, foreshadowing the change of mission that MACV would undertake within a year, MACV requested 310 additional staff positions, 283 for the Army; 24 for the Navy/Marine Corps; and 3 for the Air Force.[58]

The Airlift System and Aeromedical Evacuation During the Combat Years

A tactical airlift system that approximated Air Force doctrine and the centralization embodied in the 315th Air Division during the Korean War was finally achieved in 1966 and was essentially maintained during the following years of U.S. combat growth and operations. The Southeast Asia Airlift System directed by the 315th Air Commando Wing[59] was replaced by the Common Service Airlift

System in October 1966 with the creation of the 834th Air Division. The new air division absorbed the ALCC and assumed command of the 315th Wing and the 8th Aerial Port Group, which provided the specialized cargo reception and handling capability to the airlift system. The 834th also was given operational control over C–130s based outside Vietnam when detachments of these aircraft were temporarily assigned on a rotating basis to several bases in South Vietnam.[60]

The numbers of C–130s and base areas from which they operated had increased substantially by 1966. By the fall and winter of 1965–1966, twelve C–130 squadrons were based in the western Pacific to provide logistic support to operations in Vietnam. Besides the Japan and Okinawa C–130A squadrons, E and B models were now based at Clark, Mactan in the Philippines, and Ching Chuan Kang on Taiwan. C–130s were used until 1967 for scheduled evacuation flights from Vietnam to Clark AB, when they were replaced by PACOM C–118s brought from Japan and dedicated to aeromedical evacuation, a task that was extended to include moving patients within the combat zone and Thailand.[61] On January 1, 1967, the 834th took command of the 483d Wing, an organization formed to integrate into the Air Force the Army fixed-wing C–7s that were transferred pursuant to the July 1966 agreement between the Army and Air Force chiefs of staff.[62]

Management of the new centralized system also improved. Earlier in March 1966 a new MACV joint movements transportation board with representatives from MACV's staff agencies and the component commands had begun to meet and make monthly allocations of the combined sea and air transportation capability that was projected to be available to the command as a whole. A MACV traffic management agency also became fully operational in March to provide day-to-day management of cargo and personnel movements. These new transportation and traffic management entities undertook the managerial role that the MACV logistics section had previously attempted.[63] The new system represented a considerable step toward centralized control of the airlift supporting MACV and the U.S. combat effort in Vietnam. The greater control over the available airlift resources also made it possible to realize greater efficiency in coordinating and scheduling the work of the AECC with the ALCC at Tan Son Nhut. Reflective of the still somewhat confusing organizational relationships, the AECC was operated by the 903d AMES, a former detachment of the 315th Air Division's 9th AMES at Tachikawa that had been established in July 1966. The 9th had itself been elevated organizationally to an aeromedical evacuation group, and both the new group and its subordinate organizations—the 903d AMES, the 901st AMES at Clark, and the 902d at Tachikawa—remained under the 315th Air Division.[64]

The Mature Aeromedical Evacuation System, 1966–1968

The evolving relationship between MACV and the Air Force in operational matters affected airlift and the TAES dependent upon it. The in-country and the supporting PACOM airlift and aeromedical evacuation systems that had emerged

by 1966 both worked, and with some subsequent fine-tuning, worked well, but occasional glitches did occur.[65] Both systems succeeded due to the capability of the responsible service members to provide ad hoc solutions to problems, sometimes contrary to doctrine, as had been discovered in the United States' previous two wars. Still, the institutional conflicts and different perspectives of the Army and the Air Force conditioned the actual systems that emerged and helped shape future organizations with the same missions.

In an inspection of the aeromedical evacuation system supporting MACV in early 1966, the USAF Inspector General (IG) reported that it was excellent from the medical standpoint, and it continued so during the rest of the conflict.[66] The number of hospitals grew rapidly after U.S. combat forces entered the country in 1965. At its peak, the Army had deployed seven surgical hospitals; eleven evacuation hospitals, including the 312th Evacuation Hospital, an Army Reserve unit; four field hospitals; and one convalescent center to South Vietnam. In all they providing 5,283 beds. The Air Force and Navy operated hospitals at Cam Ranh Bay and Danang, respectively, and Korean and Australian hospitals were also in-country.[67] All major medical installations except the 3d Field Hospital at Saigon were located at airfields from which C–130s could operate.

In addition to Air Force airlift, both dedicated and opportune that provided aeromedical evacuation capability to support this hospital structure, twelve medevac helicopter units were in-country by the end of 1968, as were air ambulance units integral to Army operational combat formations.[68] The former MACV command surgeon, General Neel, much later described the aeromedical evacuation system in-country broadly as a grid with Army helicopters moving casualties across the narrow waist of the country from combat areas eastward to U.S. and allied hospitals located along the coast, and Air Force aircraft operating north and south between Saigon and Danang, transferring patients among in-country hospitals and evacuating those from South Vietnam whose recovery time would exceed the MACV evacuation policy, now at thirty days because of the increased number of hospital beds. He also noted the flexibility that each service exhibited, with the Air Force removing casualties from frontline areas when Army casualties overloaded the Army medevac helicopters, and the Army sometimes moving patients by helicopter from hospital to hospital.[69]

A notable example was the battle of Dak To, which began on November 1, 1967, when the large number of casualties sustained by the 173d Airborne Brigade during a several-week-long battle threatened at times to overwhelm both the brigade's clearing and collecting unit and the medevac helicopters' capability to move casualties to the 71st Evacuation Hospital at Pleiku. Because so many casualties began to back up while awaiting surgery and intensive care at the 71st, Air Force C–130 missions backhauled the less seriously wounded to two evacuation hospitals at Qui Nhon. Later in the month, the 903d AMES deployed a mobile CSF to provide much-needed support to the evacuation operation, which was still hectic. An Air Force observer of the evacuation process wrote shortly afterward

that the Air Force CSF was doing an outstanding job of receiving litter patients and caring for them in ten to fifteen minutes after their removal from the medevac helicopters and providing emergency life-saving care.

> The C and C [clearing and collecting] physician and technicians are only able to spend the time required with each patient to assure a clear airway and to stop bleeding. All other life-saving procedures are accomplished by the CSF, i.e., start fluids, IV [intravenous injections] and whole blood, resuscitate and aspirate, rebandage and administer drugs. Many patients required the full time attention of one nurse and two medical technicians.[70]

The observer further noted that a 55th Medical Group regulator was on duty in the Air Force CSF and that frequent C–130 support missions into Dak To provided the means to support the aeromedical evacuation requirements.[71]

General Neel's description was undoubtedly overbroad, but it contained a large amount of truth. The system that was in place in mid-1966 reflected changes and compromises to doctrine that the realities of the situation in South Vietnam necessitated. The Army's concept of hospital support for a field army had assumed that surgical and evacuation hospitals would move with combat units and provide necessary medical services as the tactical units to which they were linked advanced or retreated. Field hospitals, although mobile, were not linked to tactical units but were designed to serve an area.

With no discernible front lines and a generally unsafe road system, the three types of hospitals, originally conceived of as relatively austere mobile medical facilities, gradually became fixed installations containing increasingly sophisticated medical equipment. Rather than following combat units and receiving casualties through a conventional Letterman-style evacuation chain, the hospitals received patients virtually always by airlift, either by medevac helicopter or fixed-wing transports, generally C–130s, C–123s, and the scheduled C–118s, or less frequently by Air Force or Army Caribous (respectively C–7s and CV–2s). Patients were regulated generally in the air through the forward area regulating system, which used high-frequency (HF) single sideband radios to connect the appropriate Army medical regulating officer to the evacuation aircraft. The medical regulating officer was in contact with the helicopter unit and various medical facilities to which the patient might be sent, depending on the urgency for treatment, the type of wound, and the availability of the appropriate skills at a given hospital.[72] As General Neel points out, the helicopter became a valuable tool for managing patient flow because of its ability while in transit to ignore terrain features, its speed, and the availability of communications to direct it in ways that were responsive to a changing combat and medical situation.[73] The conventional Army evacuation chain became largely irrelevant because of the short distances to be traversed from combat areas to medical facilities farther up the chain and the speed with which medevac helicopters or other air-

craft could move patients. Army division aid stations were routinely overflown to clearing and collecting units or directly to hospitals, which it was MACV policy to locate at a relatively central position, defined as a thirty-minute helicopter flight from the expected point of injury, whenever possible.[74]

Wherever located, all medical facilities were vulnerable to enemy attack, and all of South Vietnam was designated a combat zone.[75] Consequently, no COMZ existed in South Vietnam, and no in-country general hospitals could deliver long-term definitive care to the more seriously wounded. The feasibility of evacuating casualties directly from Vietnam to the United States had been demonstrated in 1961 by one of Military Airlift Command's (MAC's) new C–135 jet transports, but that was at a time when relatively few Americans were in South Vietnam and none were deployed in combat roles. In 1965, as the patient flow from Vietnam began to increase as a result of U.S. combat operations, MAC's acquisition of the C–141A provided a possible means to increase this flow of casualties directly to the ZI. This potential raised serious military and medical issues.

From the Americans' early advisory years, patients evacuated from Vietnam were flown by theater airlift aircraft to Clark AB where they were either further distributed to hospitals within PACOM or prepared for evacuation by MAC to the United States. With growing numbers of U.S. casualties in the 1965–1966 period, matching the sick and wounded with the most appropriate medical facilities through effective medical regulation assumed a critical role. The forward area regulating system controlled patient movements in-country, and regulation out-of-country was initially the responsibility of the Far East Joint Regulating Office at Camp Zama, Japan. In November 1967, this role was effectively decentralized to a MACV branch in Saigon where requests received from regulating officers throughout South Vietnam were consolidated and coordinated with casualty staging facilities and offshore hospitals.[76]

As U.S. casualties and evacuees arriving at Clark increased substantially during 1965 and 1966, General Westmoreland, the MACV commander, experienced the classic concern of seeing his sick and wounded evacuated to places far from their units. As the MACV surgeon at that time pointed out some years later, if all casualties who could not return to duty within MACV's 15- to 30-day evacuation policy had been returned to the United States, U.S. combat strength in South Vietnam would have experienced a serious decline. (MACV occasionally changed the basic 15-day policy to 30 days depending on bed availability and casualty flow.) MACV's solution was to have the equivalent of approximately 3½ general hospitals established in Japan to receive and provide care to patients who could be expected to return to duty within the 60-day evacuation policy in effect in the rest of the theater.[77]

The Effect of the Vietnam War on Aeromedical Doctrine

If the Army Medical Department had had to adjust its doctrine regarding hospital support of a field army and the chain of evacuation, the Air Force had been

forced to accept de facto changes in its tactical aeromedical evacuation doctrine. Evaluating the period 1965–1968 when the evacuation system supporting U.S. combat forces in South Vietnam developed, TAC expressed considerable concern that the tactical aeromedical evacuation doctrine it had formed based on the Korean experience and subsequent joint exercises was not being followed. PACAF Manual 55–13 assumed in accordance with the *Medical Service in Joint Operations,* the 1956 joint manual that laid out the three services' agreement of understanding about how theater aeromedical evacuation systems would operate in the future, that the theater air commander of the joint command would have responsibility for aeromedical evacuation. Additionally, a theater medical officer and a joint staff, including a joint regulating officer, would issue general medical policy to the several theater components.[78]

In the event, the MACV theater air commander—the Seventh Air Force commander, after February 1966—was never given this responsibility by the PACAF commander. Nor was this practical because the 315th Air Division functioned as the theater airlift organization, and it controlled a large portion of the available airlift capability usable for aeromedical evacuation based outside South Vietnam.[79] Until late 1967, the 315th Air Division also controlled the 9th Aeromedical Evacuation Group (AMEG) that had detachments and squadrons, including the 903d at Tan Son Nhut, stationed at eighteen different locations in the PACOM. Fifteen of these organizations were in Southeast Asia, and the logic of the situation generated a move of Headquarters 9th Group to Clark in the Philippines and an organizational change to place it directly under PACAF, with the PACAF surgeon having technical supervision for aeromedical evacuation in early 1968.[80]

The TAC report was essentially quite negative about what it saw as the Army's default assumption of a role in tactical aeromedical evacuation that doctrine had prescribed was the Air Force's. The report pointed out that doctrine had postulated the deployment of mobile CSFs to provide area control for the Air Force–directed TAES, but none had been deployed until 1967, "too late to prevent incursion by Army helicopter capability into the tactical aeromedevac role, thus degrading the validity of future tactical aeromedevac doctrine." The report also noted ruefully, "the credibility of tactical aeromedevac doctrine and concept was degraded by the absence of Air Force [mobile] CSFs in forward areas and successful casualty staging by standard medical facilities at rear Vietnam bases."[81] It saw the importance of tactical aeromedical evacuation diminished by several principal factors, the first being that

> Army helicopters are natural and available vehicles to perform the Army role of battlefield casualty pickup. Army force concepts envision adverse weather aeromed helicopters assigned to medical commanders. Furthermore, Army cargo helicopters have, like tactical airlift aircraft, a casualty back-haul capability. A *threat* to tactical AME [aeromedical evacuation] is posed

> by these features combined with the Army's growing fleets, their improving range capability, and the localized nature of RVN [Republic of Vietnam] and expected future conflicts [emphasis added].[82]

These criticisms must be read in the context of a stylized format for Corona Harvest reports that asked authors evaluating what happened against existing Air Force doctrine to provide bases for their recommendations of changes to doctrine. Little question exists that the choice of words and critical tone of the TAC report's comments reflect continuing friction between the Army and Air Force over Army aviation.

MAC and the Evolution of Intertheater Aeromedical Evacuation

Interestingly, the TAC report also reflected a certain degree of frustration with what it saw as MAC's encroachment on the tactical aeromedical mission. Technology, in the form of the long-range and fast jet transport, the C–141, helped revive an old issue regarding the value of evacuating casualties by air. Using the new C–141s able to carry eighty litter patients, MAC inaugurated four weekly aeromedical evacuation flights in July 1966 direct from Saigon to selected hospitals in the ZI. MAC documents and some Air Force surgeons argued that the use of the new high-speed jets to evacuate patients directly to U.S. hospitals would permit fewer forward medical facilities and savings in personnel and equipment while concentrating scarce medical specialists, allowing their skills to be more efficiently used.[83]

This was an argument analogous to the one made by flight surgeons in the late 1920s and early 1930s that aircraft ambulances would permit concentrating medical resources in general hospitals in the COMZ by eliminating links and the concomitant requirement for medical personnel in the chain of evacuation. The difference in Vietnam was that technology had now advanced to the point when the rapid transfer of patients to definitive care to the distant CONUS hospitals was a practical possibility, assuming that patients could survive their transit without a serious degradation in their medical conditions. Purportedly, Air Force Manual 2–1, *Strategic Airlift*, asserted that evacuating patients from "conflict area staging points...including...battlefield pickup and evacuation from initial point of treatment to medical facilities within the combat zone" was a strategic airlift mission.[84]

Whatever MAC's view of how aeromedical evacuation of casualties from Vietnam should be regulated, it was basically dictated by the volume of patients requiring evacuation offshore, which spiked at times of major battle[85]; the nature of a patient's wounds; and concerns for sustaining a patient's condition, once the C–141 entered the MAC inventory. Early negative experience with some of the patients MAC evacuated directly to the United States caused the MACV surgeon

in early 1967 to direct that the determination of whether or not a patient should be evacuated to the CONUS would be made neither in Army hospitals in Vietnam nor the Air Force CSFs serving them; the decision would be made by theater hospital staff members, and then only after a patient's condition had been sufficiently stabilized, a status that may not have been as clear-cut to a doctor as a layman might think.

Extensive monitoring and reporting of patients' conditions as they transited PACOM bases, particularly through Clark, validated the soundness of the MACV directive, but they highlighted once again a fundamental and persistent difference between some senior medical officers in the Army and the Air Force about how best to use aeromedical evacuation. The Army Medical Department basically saw aeromedical evacuation as the best method for moving patients after they had been stabilized from an evacuation or surgical hospital in the combat area to definitive care, either in the rear area or, when necessary, to the CONUS. Rapid movement from the battle zone improved troop morale, and if patients capable of rejoining their units within the evacuation policy were retained in medical facilities near the front, the size of the Army combat force would not be progressively diminished. Some in the Air Force, while believing that significant morale and humanitarian benefits could be realized through aeromedical evacuation, also believed that expanding evacuation to the United States for virtually all classes of patients offered the significant additional benefit of sharply reducing the forward medical support structure needed in-theater. The wounded would be given the minimum emergency treatment necessary for their survival while being moved by air, and airlift would also provide the means to return them to duty once they were healed.[86]

The latter view was implicit in the Seventh Air Force surgeon's response to the draft MACV directive, a response that took issue with its premise and also seemed to reflect irritation at the overtly Army cast to the ostensibly joint subordinate unified command. Regarding the MACV surgeon's justification for changing the policy of the Army surgeon general, Seventh Air Force Surgeon Col. Earl Brannon pointedly noted, "medical policy in the PACOM, including hospitalization and evacuation procedures is not dictated by the [army] Surgeon General, but is established by CINCPAC with appropriate JCS guidance and with due consideration of component surgeon at CINCPAC and MACV level."[87] Apropos the new policy, Brannon wrote that it appeared "these 'changes of policy' are merely gimmicks to increase the bed occupancy in the overabundant offshore hospital beds," and he had seen no evidence to substantiate the MACV surgeon's claim that patients did not withstand the short flights to Clark and Japan well, let alone the much longer direct flight to the CONUS.[88]

Samples of the record of additional or reparative treatment by aeromedical evacuees at Clark and elsewhere indicate that Brannon was simply wrong. Some patients' degraded conditions upon arrival at intermediate stops did require their removal and further treatment at offshore medical facilities before they could be

sent on. Their numbers were generally small, and they varied depending on the intensity of conflict and the resultant level of casualties in a given period. According to the deputy hospital commander at Clark, approximately 4 percent of more than 50,000 evacuees to Clark between the beginning of the war and the end of 1968 were removed for additional medical care, although some medical histories suggest a higher figure. Whatever the average, what is true is that patients who were removed were indicative of the difficulties that could occur with early evacuation by air of severely wounded individuals. In virtually all cases, problems discovered during the examination of evacuees by Clark medical personnel (which were routinely conducted when an aeromedical evacuation aircraft arrived) were not flight-generated, and patients had not been removed frivolously, as some in-country medical authorities seemed at times to imply.[89]

Comments about the Vietnam War always need to be qualified because its nature changed over time, but a recent analysis of the reasons offered in response to a query by Brannon's successor in late 1967 for why twenty such evacuees at Clark were removed offers support to these propositions. The analysis validated the medical necessity of the actions and identified patients in this restricted group who had received inadequate treatment of their wounds, and others whose baseline condition required further stabilization before they were evacuated. To the degree that errors of judgment did occur, they were joint; some occurred at Army hospitals, and some occurred at Air Force casualty staging facilities where patients were received before they departed Vietnam aboard evacuation aircraft.[90]

Of course, some conditions necessitating patient removal and further treatment were the result of the natural evolution of a case as well as deterioration of a patient's condition from dehydration, sequela from soiled dressings, and so forth. The effect on patients of early aeromedical evacuation became the subject of continuing intensive study by PACAF and MAC surgeons because conditions in South Vietnam continued to necessitate transferring the seriously wounded and sick out of Vietnam. The introduction of the new C–141 jet transports provided the means to move patients rapidly among different offshore hospitals and directly to hospitals in the CONUS.[91]

By the end of 1965, the C–141 had replaced the C–135B, which remained the primary aircraft utilized for aeromedical evacuation in PACOM during the remaining years of the war. In 1967, MAC C–141s also picked up an intratheater task, replacing the PACAF-dedicated C–118s that had provided aeromedical evacuation to Clark. Consonant with the development of what was essentially a two-phase evacuation system—Vietnam to offshore hospitals, and offshore hospitals to the CONUS—by September 1968 MAC C–141s were conducting virtually all intratheater evacuation missions from Vietnam, which now included Guam and locations in Thailand and Okinawa. Direct C–141 flights from Tan Son Nhut and Cam Ranh Bay were established to Yokota AB in the Tokyo region. USAF airlift operations had moved to Yokota because the runways at Tachikawa were too short to accommodate jet aircraft. C–141 evacuation routes

from Yokota to the United States traversed both the Central and North Pacific Ocean to Travis AFB, California. The mid-Pacific route included Guam and Hickam AFB in Hawaii.[92]

For more equitable patient distribution across the country and to ease the burden on Travis AFB, which was the primary West Coast aerial port of entry for patients, C–141s also carried patients over modified polar routes to Scott AFB in the Midwest and to Andrews AFB in Maryland, just outside Washington, D.C., with refueling stops at Elmendorf AFB in Alaska. MAC had its own aeromedical evacuation organization in PACOM, the 10th AMEG, which was headquartered at Hickam. The 10th deployed two AMESs, the 56th at Yokota, with an AECC, and the 57th at Clark. The 10th Group and its squadrons had detachments with AECCs at three points in Vietnam: Danang, Cam Ranh Bay, and Tan Son Nhut. By 1969 patients were being segregated by destination on C–141s and were being flown directly to western destinations other than Travis. MAC's aeromedical staging facilities were at Travis and Scott. All other major patient transfer points featured aeromedical staging facilities, but like the in-country CSFs (other than the mobile CSFs that fell under PACAF's 903d AMES), all staging facilities were units under the major command that operated the particular base medical facility.[93] The system functioned well enough to indicate that coordination among all these entities was effective, but the degree of parallelism between PACOM and MAC aeromedical evacuation organizations nevertheless suggested that greater efficiencies could be achieved through organizational changes to bring tactical and strategic aeromedical evacuation under a single controlling entity. Aeromedical evacuation conferences attended by representatives from the major commands made recommendations supportive of such a move. Merging the MAC and PACAF AECCs at Clark, Tan Son Nhut, Cam Ranh Bay, and Danang was initially delayed, but it was eventually implemented as a step in that direction.

Vietnam and the Acquisition of the C–9 Nightingale

By the early 1960s, C–131s had been in the MAC inventory for almost ten years. Although representing a major step in modernizing the domestic aeromedical evacuation system as it regained vigor during the Korean War, their deficiencies became more evident as attention focused on distributing casualties, especially when the C–131's performance was compared with the C–141's. The number of patients delivered at Travis taxed the capability of the C–131s and the older C–118s to distribute casualties to domestic medical facilities. The older aircraft had also required frequent maintenance-related RONs (remain over night), with attendant patient delays and discomfort and higher operational costs. Studies in the early 1960s indicated that a larger capacity jet aircraft specially configured for aeromedical evacuation could be capable enough to operate on domestic routes with many fewer RONs, shorter patient transportation times, and lower costs.[94]


CHINA
NORTH VIETNAM
HANOI
BURMA
LAOS
Gulf of Tonkin
VIENTIANE
Udorn
Nakhon Phanom
Phu Bai
Da Nang
THAILAND
Ubon
Chu Lai
Takhli
Korat
SOUTH
Phu Cat
Pleiku
Don Muang
BANGKOK
Qui Nhon
CAMBODIA
Tuy Hoa
U-Tapao
VIETNAM
Nha Trang
Cam Ranh Bay
PHNOM PENH
Phan Rang
Tan Son Nhut
Bien Hoa
Gulf of Thailand
SAIGON
Binh Thuy
South China Sea
Southeast Asia
National Capital
Principal U.S. Air Base

After a yearly series of intensive studies, the McDonnell Douglas DC–9, an off-the-shelf jet aircraft used widely by commercial airlines, was procured and delivered configured for medical operations. First introduced in October 1968, by 1969 it had completely replaced the C–131 and C–118 propeller aircraft in the domestic system. Several years later it was deployed overseas. The C–9 configured to Air Force specifications cruised at 460 mph and had a maximum capacity of 36 litter patients or a mixed load of 18 litter and 20 ambulatory patients. Given its speed and capability, it could operate from a central location and fly domestic routes without having to RON. The fleet of fourteen C–9s was placed under the 375th Aeromedical Airlift Wing at Scott. Deployed to the Pacific and European theaters in the early 1970s, it provided a dedicated and efficient aeromedical evacuation aircraft that complemented the C–141 in a theater role. It provided the means for MAC to argue that the Vietnam experience indicated a worldwide centralized aeromedical evacuation system under MAC was the most efficient approach to future requirements in peace and war. How the AFRES, ANG, and the CRAF might fit into such a system, if adopted, were acknowledged as issues, but the result would remain to be seen.

Although justifiable on medical and efficiency grounds, C–9 procurement was probably assisted by Army attempts in late 1963 to establish requirements for medium-range transports for aeromedical airlift, which caused the Air Force to be concerned that the Army's aggressive aviation program would have as its next objective taking over the domestic aeromedical evacuation system run by MAC.[95] The Air Force might have been confirmed in its suspicions, rightly or wrongly, if it had been aware that the chief nurse of the Army was proposing that eight Army Nurse Corps officers be selected to train as flight nurses. Her justification was in part that "Medical Support Plans for the future envision [the] use of large Army cargo aircraft, both fixed wing and rotary wing types for the movement of groups of patients, e.g., twenty-four litter and thirty-three ambulatory patients."[96]

Conclusion

The adjustments of doctrine and practice that the war had imposed on the Air Force's tactical and strategic aeromedical evacuation systems were profound. Although a resurgent aeromedical evacuation system with more or less distinct intratheater and intertheater (tactical and strategic, in the new parlance) features had emerged in the Korean War, it was basically a more sophisticated version of the World War II system that had operated at its maximum innovation and greatest efficiency in late 1944 and 1945. Prewar concern about which patients could be moved by air were largely dismissed on the basis of wartime experience, which generally held that if a patient could be moved at all, he or she could be moved by air. With the advent of large jet aircraft and under pressure to evacuate the sick and wounded rapidly, the issue became more complex. Just what was sufficient stabilization for a patient who was suffering from a variety of ills and who might

be exposed to lengthy times in the air was not necessarily clear. Air Force surgeons were well aware of the ambiguities medical personnel faced. A contract study done for SAM explained:

> The single word used to describe the patient's condition in relationship to his ability to withstand evacuation is "stabilization." Originating physicians and physicians in general use this term widely. However, when asked to define it in meaningful terms...it becomes evident that there is no real agreed upon definition. It is most often utilized as a subjective term to describe a patient's condition modified by the urgency of the requirements to evacuate him.[97]

The positive aspect of any decision to evacuate a patient aeromedically was that the patient would be transported to medical facilities incomparably better equipped than those he might have found himself in in earlier wars.

The concept of using retrograde and essentially opportune airlift capability to evacuate the wounded had been eroded by the absolute requirement that patients had to be removed from the country, so more and more aeromedical evacuation flights became scheduled flights, and more dedicated aircraft were adapted for this mission. With Army helicopters having successfully co-opted the frontline aeromedical evacuation role, the Air Force was increasingly forced to think in terms of evacuation systems using high-performance jet transports that could assume interchangeable roles.

Whatever discomfort any of the U.S. military services experienced when they discovered that specific situations in wartime require adjustments to prewar doctrine, the system of aeromedical evacuation in Vietnam was a howling success. The challenges and possibilities posed by new aircraft and requirements for evacuation also generated the development of new medical equipment. Typical of items that could be installed on a cargo pallet and loaded on a cargo aircraft in minutes was the Special Airborne Medical Care Unit, a module to increase the capability of routine inflight medical care and allow for inflight emergency treatment of patients.[98]

Thousands of casualties were evacuated from the front lines principally by Army helicopters, and PACAF and MAC evacuated thousands to offshore or CONUS hospitals. The domestic system then distributed patients to hospitals providing whatever specialty care was needed. Selection criteria also considered a desire to place patients as close to home as possible. The ANG showed its capability by assuming near-offshore work, freeing the regular domestic system so it could transport Vietnam casualties. The modern aeromedical evacuation system was beginning to emerge.

Chapter 7

MODERNIZATION, CENTRALIZATION, AND NEW AEROMEDICAL EVACUATION PARADIGMS

The last phase of U.S. involvement in Vietnam, the drawdown of U.S. forces and the Vietnamization of the war, was precipitated by the Tet Offensive that began on January 30, 1968. The aeromedical evacuation system that evolved during this final phase was a continuation of the system that had developed during the first few years of U.S. involvement. Personnel turnover sometimes affected how efficiently the system worked, but the evacuation routes, procedures, and general nature of the system remained essentially unchanged.[1] In 1968, the peak year, MAC moved 60,770 battle casualties within the theater and from the Pacific to the CONUS, but it moved only 8,183 in 1971, although the number of nonbattle casualties flown to the United States was almost the same in 1971 as it had been in 1968.[2] The size of the U.S. force had shrunk substantially in this period, but the nonbattle casualty numbers remained high because narcotics addicts were transported in patient status from June 1971, but not without some friction between the Army and Air Force.[3]

As U.S. involvement in the war drew to a close, two noteworthy aeromedical evacuation missions occurred: Operation Babylift, a humanitarian evacuation of Vietnamese orphans, and Operation Homecoming, the return of POWs in accordance with the Paris agreement. Each was noteworthy, but Operation Babylift became the prototype for MAC's new aeromedical evacuation capabilities in humanitarian missions in support of U.S. foreign policy.

Col. Regina Aune, heroine of Operation Babylift.

Operation Babylift

Although Operation Babylift used aeromedical personnel and facilities and was accomplished in aircraft configured for aeromedical missions, it was more properly a noncombatant evacuation. It was initiated in response to the obviously deteriorating military situation in South Vietnam in March 1975, when it became apparent that Saigon and the South Vietnamese regime would be defeated by the end of April. On the first day of April, the South Vietnamese ambassador to the United States appealed for help in evacuating and resettling the large number of Vietnamese refugees who would soon be fleeing the approaching communists. As an immediate necessity, he cited the need to fly approximately 2,000 orphans to safety in the United States or other friendly countries. Six private humanitarian agencies that operated orphanages in South Vietnam had already determined they needed to get their charges to safer locations. Two days later, the newly installed U.S. President, Gerald R. Ford, released $2 million from a special foreign-aid children's fund for this purpose and directed that "C–5 and other aircraft especially equipped to care for these orphans during the flight" be sent to Saigon. The President said he expected such flights to begin within thirty-six to forty-eight hours.[4]

Orphaned children being loaded in Operation Babylift.

In spite of the lack of an explicit tasking from the President, Joint Staff Deputy Director of Logistics Lt. Gen. Maurice F. Casey authorized MAC to conduct the first two flights employing a C–5 Galaxy and a C–141 then en route to Saigon. Because noncombatant evacuation was a State Department responsibility, Casey secured a State Department agreement that MAC would conduct the orphans' evacuation.[5] In turn, MAC directed the 9th AMEG at Clark AB to provide aeromedical evacuation personnel for the flights, but not to designate the flights as aeromedical evacuation missions or to mark the aircraft with red crosses.[6]

The actual airlift of children and escorts was complicated by several factors including a limitation on the number of U.S. personnel in South Vietnam imposed by the ceasefire agreement. This initially precluded deploying a MAC airlift control element to Saigon, which normally would have regulated aircraft flow, onloading, and dispatch, and provided a central point of control and coordination. Lines of military authority overlapped in the theater, and close coordination between DoD and the State Department was lacking. Adding to the confusion was the uncoordinated entry into the evacuation process of privately chartered aircraft contracted for on behalf of the humanitarian organizations operating the orphanages.

The general uncertainty surrounding the situation in Vietnam was also compounded unexpectedly by the personal intervention in the evacuation by the flamboyant president of World Airways, Ed Daly. World Airways had a number of contracts for airlift with MAC, but Daly conducted what in effect was his own unsanctioned private evacuation operation parallel to MAC's, in disregard of Federal Aviation Administration (FAA) regulations, the U.S. ambassador's authority, and the Status of Forces Agreement with Japan.[7] Reportedly, when an

angry Daly asked the ambassador what he would do if, as the ambassador had suggested might happen, Daly was shot down for taking off from Tan Son Nhut without clearance, the ambassador answered simply, "Applaud."[8]

The planned MAC use of retrograde airlift was to have begun with the C–5A identified by General Casey in his directive to MAC Commander Gen. Paul K. Carleton The intent was that subsequent missions would be flown by C–141s. The selection of the C–5 was an accident of fate. Its cargo of 105-mm howitzers was being delivered to Saigon as part of the Ford administration's desperate attempt to shore up the foundering Thieu regime, and the C–5 carrying the howitzers was the first aircraft in position to embark the orphans after the President issued his directive.[9]

Unlike the C–141, C–5 aircraft, which had entered the MAC inventory in 1970, were not intended for use in aeromedical evacuation and had no stanchions for litter installation. C–5s were designed to carry outsized cargo such as combat vehicles, not passengers. However, each aircraft had seventy-five airline-type seats in banks of three in a troop compartment at the rear of the fuselage, high above the cargo floor and accessible only by a ladder. Theoretically, ambulatory patients might be carried in this compartment, although climbing the ladder could present a problem. When Lt. Col. Regina Aune, the medical crew director (MCD) for the C–5 flight, who had been on alert at Clark for any C–141 urgent aeromedical evacuation, arrived at Tan Son Nhut, she described the situation as chaos.[10] Neither she nor any of the other medical personnel had ever evacuated patients on a C–5, but now they were to participate in airlifting 228 Vietnamese orphans to Clark, where they would be medically screened and subsequently moved to the United States for adoption. (Eyewitnesses reported that many of the children actually had parents who had put them aboard aircraft to get them to safety while they themselves remained behind.) After processing, the children were to be accompanied by civilian escorts who were representatives of the Agency for International Development (AID). Because too few passenger seats were available for everyone, the flight crew was authorized to load evacuees on the cargo floor. Children and escorts were placed on blankets on the floor and held in place by heavy nylon straps normally used to secure cargo. The troop compartment was filled, two children to a seat, with members of the flight crew and medical personnel passing each child up the ladder. A double medical team of four flight nurses and six medical technicians was placed onboard to tend to the children in flight. The aircraft took off with 314 persons onboard, including Dr. Meritt Stark, a civilian doctor from the AID, and one of his daughters who was serving as an escort.[11]

The takeoff was routine, but as the aircraft reached an altitude of 23,000 feet, a pressure door failed, causing an extremely rapid loss of cabin pressurization. The explosive decompression was so violent that parts of the door assembly blew off and severed the cables controlling the aircraft's pitch trim tabs, elevator, and rudder. The pilots were left with little control over the aircraft. Despite their desperate efforts, it crashed in a rice paddy near Tan Son Nhut, killing 138, including 78 orphans, a flight nurse, two medical technicians, and several other members of

the flight crew and passengers, including Dr. Stark's daughter. Members of the flight and medical crews acted heroically, including Lt. Col. Aune who, despite a broken leg, helped evacuate the children until she collapsed. 1st Lt. Harriet Goffinett, another flight nurse, suffered a broken collarbone that rendered one arm immobile, but she still carried children on her opposite hip.[12]

Despite the loss of the C–5, Operation Babylift continued. Subsequent evacuation missions to the United States were made using a combination of MAC C–141s and MAC-contracted civilian aircraft, including World Airways DC–8s and 747s and Pan American Airways 747s. Unlike the instruction given to the 9th AMEG, each of the C–141 missions was formally designated an aeromedical evacuation mission and carried a standard medical crew. Ultimately, by May 9, the official end of the operation, 2,894 orphans reached the United States, of whom 1,090 were carried by privately contracted airlines.[13]

Beyond the obviously humanitarian aspects of Operation Babylift, the fact remains that the relationship between MAC and the commercial airlines was problematic and could affect the CRAF and its possible role in aeromedical evacuation. The difficulty was not attributable just to the somewhat bizarre conduct of Ed Daly; commercial airlines complained to the State Department that in following President Ford's directive, MAC was conducting an airlift that should be a commercial operation.[14] Another development with implications for future aeromedical evacuation operations was that the necessarily rapid tempo—four to five missions a day—of orphan evacuations from Saigon was such that the number of available medical crew members was quickly depleted, and they had to be augmented with a continuing flow of flight nurses and medical technicians from aeromedical evacuation organizations throughout the United States. It was necessary to reduce the standard medical flight crew to one flight nurse and two medical technicians for the flights from Clark to the United States, but a flight surgeon was added to the crew for each flight.[15] Finally, the lack of an AECC in Saigon coupled with the absence of a single authority for airlift control meant that a substantial number of C–141 missions intended to evacuate orphans from Tan Son Nhut on retrograde flights departed with relatively few. Civilian 747s chartered by the humanitarian organizations that ran the Saigon orphanages arrived with no coordination, and because they could and did transport very large numbers of orphans, many fewer orphans were available for the C–141s because AID personnel could process only 400 a day. The result was a waste of in-flight medical capability that the MAC C–141s provided, with a potentially negative effect on the health of the orphans flown from Clark to the United States on privately chartered airliners due to their lack of trained flight medical crews.[16]

Operation Homecoming

Conducted between February 12 and April 4, 1973, Operation Homecoming marked the formal severance of the United States from direct involvement in the

Exultant ex-POWs ready for take-off as free men again.

fate of the South Vietnamese state. Withdrawal of remaining U.S. forces would depend on the release of former U.S. and allied POWs from communist control, and this release was to be accomplished within sixty days of the signing of the Paris agreements. During the negotiations, plans had been made for this event, whenever it might occur.[17]

The 9th AMEG at Clark had been tasked to conduct the repatriation and return of the POWs as urgent aeromedical evacuation missions immediately upon the prisoners' release to U.S. control.[18] Fortuitously, the sixteen flight surgeons available proved to be exactly the number needed to cover the missions of the first and second phases. Pursuant to a DoD directive, the POWs were declared patients as soon as they returned to U.S. control. Unlike in the subsequent Babylift missions, the 9th was directed to designate the flights specifically as aeromedical evacuations and to conduct them on aircraft marked with red crosses to ensure that they accorded with the provisions of the ceasefire agreements.[19]

It was known that conditions for the POWs had improved over the years preceding the Paris negotiations, but earlier, much harsher treatment and difficult conditions of life in North Vietnam prison camps in general meant that many prisoners would be suffering various types of mental and physical disabilities.[20] The limited medical intelligence available in planning for the Homecoming missions led to the decision that two flight surgeons should be present on each mission, and in some cases the standard in-flight medical crew was further augmented during the actual operation by additional nurses and medical technicians. The number of physicians needed to accompany the Homecoming flights was not readily available because there was no pool of unassigned military doctors. Those in-theater had other existing medical responsibilities, so the solution was to recruit sixteen

Freed POWs line up to board their return aircraft at Clark Air Base.

Air Force, Army, and Navy second- and third-year residents in aerospace medicine to support these flights. The MAC patient movement priority system was as follows: *urgent* indicated that immediate movement was required; *priority* meant movement was required within twenty-four hours; and *routine,* movement was required within seventy-two hours.[21] Senior medical oversight was provided by the Thirteenth Air Force surgeon, Col. Richard Malone, who flew to Gia Lam with the advanced party (ADVON) to assist in conducting an initial medical screening of the POWs, and Col. Leonard Johnson, commander of the 9th AMES, who coordinated the overall operation. Both men were board-certified Air Force medical officers.[22]

Returning POWs were processed in three phases. The first 596 released were collected at several points in Vietnam and flown on MAC C–141s and C–9s to Clark AB where they were thoroughly examined by doctors. Then, generally within seventy-two hours, MAC C–141s flew groups of 576 U.S. military personnel plus thirteen U.S. civilians and one Canadian civilian to one of five major aerial ports in the United States. In the third phase, the evacuees were flown to one of thirty-one destination hospitals within the United States on the 375th's C–9s. C–141s picked up the majority of the released POWs at Gia Lam Airport in Hanoi, and the C–9s picked up ex-POWs of the Vietcong at Tan Son Nhut. Although the North Vietnamese transported the POWs they held to Gia Lam, in two cases forty-one POWs held by the Vietcong were flown to Saigon by Huey UH–1D helicopters to be evacuated to Clark by C–9As. British helicopters flew two POWs held by China to Kai Tak Airport for their flight from Hong Kong to Clark.[23] A C–130 carried the ADVON to Hanoi prior to the first mission, and each ex-POW was assigned an escort for the flight back to Clark.[24]

Although time did not permit medical members of the ADVON to conduct extensive triage on the prisoners once they were released in Hanoi, medical intelligence had indicated specific medical problems that might be expected among the evacuees. Appropriate medical equipment for these problems was provided onboard or was stocked at Gia Lam. For example, intelligence had identified approximately eight patients suspected to have cardiac disease, one of whom might have suffered a heart attack in 1969. To anticipate a possible life-threatening situation during his evacuation, a flight surgeon/cardiologist and a senior medical technician with complete cardiac care equipment—an electrocardiograph; a battery-operated defibrillator, cardiac monitor, and external pacemaker; and appropriate cardiac drugs, including nitroglycerin to relieve angina, atropine to increase heart rate, and quinidine gluconate to control arrhythmia—were placed at the Gia Lam Airport by the ADVON C–130 awaiting this individual's arrival because the timing of his release was unknown.[25] On the evacuation flights from Hanoi, flight surgeons interviewed each patient and began documenting specific mental and physical conditions requiring further attention. They also provided treatments of various sorts, most of which were palliative, such as administering diazepam as a sleeping aid and tranquilizer, analgesics for the pain of abscessed teeth and fractures, and antipyretics to reduce fever. They treated several cases of acute medical problems while in flight. All medical data were transmitted to Clark by radio so that appropriate treatment facilities might be prepared before the men's arrival. Each returning POW was provided with a seat and a litter to use as he wished.[26]

Operation Homecoming was a notable success. Perhaps because of the exhilaration engendered by their release, during the evacuation flights to the United States, the released POWs generally paid little attention to medical conditions that later required extensive treatment and rehabilitation. For example, in their collective report of the evacuation flights, the accompanying flight surgeons reported that they noted numerous cases of poorly healed fractures and damaged joints among the returnees. Others had medical problems generated by wounds. One had suffered a head injury that induced epilepsy-type seizures; another had injuries to his spinal cord from a land mine that almost totally paralyzed his lower extremities; a third had a massively swollen leg resulting from an AK–47 wound through his knee. Among the returnees was one case of malaria and at least one case of potentially severe psychoneurosis, and many manifested anxiety and hyperactivity. In this regard, the presence of flight surgeons on the evacuation aircraft proved extremely helpful because most of the returning POWs were downed pilots or aircrew who felt comfortable with aeromedically trained physicians, and the returnees sought them out to discuss their concerns and anxieties openly and frankly. Virtually all ex-POWs had intestinal parasites which caused them great concern.[27]

Operation Homecoming was an extremely heartwarming and satisfying way for the United States to end its otherwise disheartening involvement in the Vietnamese conflict. Two of the accompanying flight surgeons reported that

working with the ex-POWs was a most moving and meaningful experience, saying they would never forget the men's faces and joy as they entered the aircraft.[28]

The operation presented immediate and potential lessons for future aeromedical evacuation operations. From an operational and medical standpoint, it had been conducted with effectiveness by PACAF and MAC. The theater and MAC aeromedical evacuation systems had performed extremely well, and the returnees' extensive observations throughout the evacuation process provided a considerable body of new data on the physical and psychological effects of being a POW. With regard to recommendations to be drawn from a considered evaluation of the operation, participating Army, Navy, and Air Force flight surgeons collectively recommended that future joint operations transporting patients always include participants from all the services. They also recommended a clarification of lines of responsibility that would clearly establish a Flight Surgeon Aeromedical Evacuation Coordinator (the role played during Operation Homecoming by the 9th AMEG commander) as the controlling authority over all participants in the aeromedical evacuation process. Perhaps the flight surgeons' most portentous recommendation was that

> future aeromedical evacuation missions of this magnitude involving patients with unknown medical states and conditions must include Flight Surgeons as part of the aeromedical evacuation crews [who] must be given ultimate authority in decision making of clinical matters pertaining to the patients on such special missions.[29]

Justified by the circumstances of Operation Homecoming, the recommendation had obvious applicability to other special aeromedical evacuation missions beyond the controlled but constrained circumstances of the POW airlift. Tactical situations could preclude establishing evacuation facilities to produce stable patients, or, as during the Tet Offensive, available facilities might be overwhelmed by casualties requiring immediate evacuation.

The Tet experience is instructive in this regard, as one flight nurse recalled many years later. Capt. Olivia Theriot was medical director of a crew staying overnight near Tan Son Nhut before flying a scheduled aeromedical evacuation mission to Clark the next day. During the night, up to three Vietcong battalions attacked the airport while other Vietcong forces were attacking the city proper. She and her crew were called out around 4:00 A.M. to evacuate the first casualties from the fighting, and they began an aeromedical evacuation shuttle on C–130s that lasted for three of the five or six days while serious fighting in Saigon continued. Casualties were evacuated on two roundtrip flights between Tan Son Nhut and Clark; she and her colleagues then picked up the casualties who had been treated at Clark and aeromedically evacuated them to Tachikawa. The patients were either hospitalized at Tachikawa or further evacuated on MAC aeromedical evacuation missions to the United States on C–141s. From Japan, medical teams

C–9 Nightingale aircraft.

were flown directly back to Tan Son Nhut to evacuate another load of casualties to Clark for evaluation and treatment, and the cycle was repeated. Colonel Theriot recalled that when she finally returned to her room in the bachelor officers' quarters at Clark, one of the maids became very emotional, crying and embracing her because in her absence it had been rumored that she had been captured in Saigon by the Vietcong.[30]

Only basic triage could be accorded the evacuees at Tan Son Nhut to ascertain whether they were sufficiently stabilized to survive the approximately three-hour flight to Clark. Too few doctors were available to augment the basic medical crew of flight nurses and medical technicians and address whatever acute medical emergencies might arise under the circumstances. Had flight surgeons been added to the basic medical flight crew, they would have been extremely valuable, but as was undoubtedly true during Tet (and Operation Homecoming would demonstrate further), flight surgeons and possibly even basic aeromedical evacuation flight crews could be hard to find.

Creation of the Worldwide Aeromedical Evacuation System

C–9As were deployed to the Far East and Europe in 1972 under theater control to replace the C–118s that had been performing intratheater aeromedical evacuation. Although the Air Force had procured these single-purpose aircraft reluctantly in the late 1960s, their capability provided additional support for airlift consolidation, a major MAC objective.[31]

MAC's acquisition of the C–141A and its smooth integration into the MAC airlift structure was key to the command's effective support of U.S. forces in

Southeast Asia. The aircraft's systems for command, control, and communications, its traffic management and cargo and passenger handling characteristics, and its maintenance and logistic support features proved invaluable. The versatility of the C–141A ranged from conducting strategic airlift of passengers and cargo to and from the United States to intratheater airlift missions, including (at PACAF's request) aeromedical evacuation. This created some coordination problems between similar support structures for the strategic and tactical airlift systems that, in the case of AECCs at Cam Ranh Bay, had resulted in consolidation of the systems. MAC thus began to press for consolidation of tactical and theater airlift forces under its control. In its Corona Harvest reports on Southeast Asia (and presumably elsewhere), MAC argued that "airlift is a continuum"; pointed to "extensive parallelism" in basic functions of strategic and tactical operations that "detracted from efficiency and tended to complicate" the totality of the airlift mission; and recommended consolidating tactical and strategic airlift assets under its control to eliminate duplication and generate savings in both manpower and equipment.[32]

The capabilities of the C–9A complemented those of the C–141A in performance and in the aeromedical evacuation role. Although the performance of the four-engine C–141A was superior to that of the C–9A, both were high-speed, long-range jet aircraft. The C–9A was dedicated to aeromedical evacuation, but the C–141A could be quickly converted to carry litter and ambulatory patients. Its medical capabilities were similar to a C–9A's in that its palletized medical equipment and portable facilities could be put onboard in minutes using the C–141's integral cargo loading system. Moreover, the two aircraft had been interfacing effectively in the aeromedical evacuation role at aerial ports of entry in the CONUS since the late 1960s when the C–9A had taken over the domestic aeromedical evacuation role. C–9As conducting aeromedical evacuation missions in the European and Pacific theaters suggested the obvious parallel that MAC operate the theater interfaces with strategic aeromedical evacuation, using the CONUS interfaces as a model.

The MAC consolidation proposal was furthered by difficulties realized during the U.S. aerial resupply of Israel after it had suffered simultaneous attack by Syria and Egypt in late 1973. The offense was a surprise violation of the UN-supervised ceasefire that had been in effect since 1967 when Israel had defeated an Arab coalition. The Yom Kippur War, which opened with an attack on October 6, 1973, required that MAC conduct airlift operations over an average one-way distance of 6,450 miles. Because Germany, Spain, Greece, and Turkey refused to allow aircraft clearances, the aerial resupply operation, code-named Nicklegrass, would have been very difficult, if possible at all, had Lajes AB in the Portuguese-owned Azores Islands not been made available. This sobering realization led to the development of aerial refueling capabilities in both the C–141A and the C–5. The operation also revealed a break in the asserted continuum of airlift because it showed that no procedures existed for TAC's C–130s to augment the MAC sys-

tem in an emergency. Ad hoc procedures overcame this difficulty, but it brought to light the difficulties of directing airlift through several commands. Against this backdrop and the Southeast Asian experiences with duplicative airlift systems, Secretary of Defense James Schlesinger, issued a directive on July 29, 1974, for the Air Force to consolidate all military airlift forces under a single manager by the end of FY 1977. A month later he identified the single manager as MAC.[33] Subsequent directives from Headquarters Air Force specified further that MAC assume responsibility for all aeromedical evacuation functions worldwide. It delegated responsibility for managing the new system to the parent organization of the domestic C–9As, the 375th Aeromedical Airlift Wing, effective April 1, 1975. The 375th thus took control of the 1st AMEG at Pope AFB, North Carolina, which specifically focused on wartime and contingency requirements, and the 2d and 9th AMEGs at Rhein-Main AB in Germany and Clark AB in the Philippines, respectively, which had responsibility for theater aeromedical evacuation in the U.S. European Command (USEUCOM) and in PACOM.[34]

Among other benefits, this consolidation of aeromedical evacuation systems provided greater flexibility in managing aeromedical personnel who could be dual-qualified to achieve crew interchangeability on all aircraft able to be utilized for aeromedical evacuation—C–9As, C–141As, or C–130s. This was already true in MAC, as exemplified by Colonel Aune, the heroine of Operation Babylift. Assigned to MAC's 10th AMES at Travis, she was qualified in all three aircraft when she was called out as the C–141A nurse at Clark to board the ill-fated C–5.[35] A complete standardization of aeromedical evacuation policies, procedures, and training could also be achieved, and staging locations and requirements could be selected more efficiently to reduce medical crew fatigue. Medical crew rest appears to have been a problem during aeromedical evacuation operations from Vietnam. Initially and during heavy evacuation periods, like Tet and the 1969 offensive, medical crews were in short supply, and they were forced to fly very heavy schedules and return quickly for additional evacuation duties.[36]

Aeromedical Evacuation in Europe: The NATO Commitment

Whereas the major events that conditioned the development of the modern Air Force aeromedical evacuation system—the Korean and Vietnam conflicts—paradoxically occurred in the Far East, the major national security problem facing the United States after 1947 was the Soviet Union. It not only threatened U.S. interests in Europe and elsewhere, but after the Soviets detonated their first atomic bomb, it threatened the territory and population of the United States itself. The Cold War with the Soviet Union crystallized after the failure of the 1947 conferences to produce a peace treaty among the allied nations that had won World War II. In 1949, after a communist coup in Czechoslovakia the preceding year had destroyed any semblance of democratic government in that central European country, the United States and twelve other nations signed the North Atlantic

Treaty, thus creating NATO to provide collective defense against possible Soviet aggression. The United States also made the unprecedented commitment to station its troops in Europe on a permanent basis, and it agreed to make them responsive to the operational command of a Supreme Allied Commander rather than a national commander when certain conditions had been met.

A major element in shaping the evolution of the aeromedical evacuation system in the European theater was therefore quite different from what had influenced the 1957 creation of PACOM. U.S. occupation troops were present in Germany from 1945 on, and in increasing numbers after 1949 as the United States deployed troops to support its new treaty commitment. Medical support of U.S. forces in Europe was readily available from U.S. military medical personnel, some practicing in former German military facilities, and military medicine was increasingly supplemented by the civilian medical community as the practice of medicine revived in Europe. As one retired Air Force flight surgeon put it when responding to a query about why there had been little aeromedical evacuation of personnel from the fighter base to which he had been assigned in the Netherlands, "There were hospitals every ten miles it seemed!"[37]

For this reason, aeromedical evacuation was much more focused on intratheater evacuation, moving patients from remote sites in Europe to the major facilities in Germany for treatment, than it was on intertheater, strategic aeromedical evacuation to the United States.[38] This pattern was intensified when Greece and Turkey joined NATO in the early 1950s and the United States established bases in these countries and others, such as Ethiopia, that had lesser-developed medical infrastructures. Even before the DoD directed the use of airlift for patient evacuation in 1949, the overseas theaters had asked the AAF ATC to continue aeromedical evacuation to speed patients back to the United States and provide transport for patients unable to travel by surface means. Army hospital ships were still available, but they no longer operated under the Geneva Convention. They had faster turnaround times now because only a vacant berth was necessary; having a full patient load was no longer required.

In 1947, ATC's commitment was to move 240 patients a month from the Pacific theater to the United States but only 80 patients a month from the European theater. This imbalance persisted throughout the postwar years, and the addition of Vietnam casualties only exacerbated rather than fundamentally changed it. Only in 1947 did what had been an irregular, on-call aeromedical evacuation system supported by a reduced-strength 806th MAES go on a scheduled basis.[39]

With the formation of NATO, the prospect of casualties requiring evacuation and treatment (a prospect always present once the Cold War began) became a formalized concern. Two medical planning conferences were held under the auspices of NATO's senior military headquarters, the Supreme Headquarters Allied Powers Europe (SHAPE), in Paris in October 1952 and in June 1953. The U.S. delegation included the Assistant for Health and Medical to the Secretary of Defense (this position was later upgraded to the current post of Assistant Secretary of Defense

for Health Affairs—ASD/HA), Dr. Melvin Casberg, the three military surgeons general, and other senior officials and staff. Medical issues of common concern discussed at the first meeting included basic principles of medical care, evacuation, and early treatment of battle casualties, topics based on the presentations by U.S. representatives. Medical problems of atomic/biological/chemical warfare were also discussed on the basis of presentations by representatives from the United Kingdom. At the second conference, delegates sought to come to grips with how to deal with medical issues within the complex structure of the NATO military organization that was emerging, and they discussed SHAPE's organizational, logistic, and medical planning. Delegates placed special emphasis on standardization projects and medical problems of atomic/biological/chemical warfare defense. Deemed a success by Dr. Casberg, meetings were not scheduled to occur on a preplanned basis; future meetings were left to SHAPE to call from time to time at its discretion.[40]

From the paucity of later results, it appears that, for several decades after these initial meetings, medical issues were left largely to discussion by national representatives on the myriad working groups and subcommittees that the burgeoning NATO and SHAPE organizations were creating.[41] NATO standardization agreements that were produced addressed only broad conceptual issues such as when to use antibiotics. Each nation's military medical department was left to practice medicine as it thought best for supporting its troops.[42] Evacuation too would be a national responsibility.

The prospect of full-scale conventional conflict with the Warsaw Pact and heavy casualties with equally heavy aeromedical evacuation requirements tended to lose relevance for NATO medical planning in the late 1950s. When new U.S. hospitals were built in Europe during this period, their purpose was not to care for casualties expected from a Warsaw Pact–NATO conflict, but to care for personnel in SAC wings who were deployed to the United Kingdom to deter such an event.[43]

In 1957, under U.S. urging, NATO adopted nuclear deterrence as its strategic concept and embraced a nuclear tripwire strategy. The approach was embodied in MC 14/2, a policy declaration by the NATO Military Committee. The concept to employ nuclear weapons agreed upon by the NATO members' alliance had been largely provided by the United States against the Warsaw Pact and Soviet Union, should they attack any NATO member. It paralleled the Eisenhower strategy of massive retaliation and was adopted after it became clear that the NATO members had neither the resources nor the will to raise conventional forces sufficient to match the Warsaw Pact's assumed manpower advantage. The adoption of a flexible response strategy in 1967 altered the context for medical planning. Flexible response rejected an immediate nuclear response to an attack in favor of a prior robust conventional defense it was hoped would preclude the need to employ nuclear weapons. The objective now became the need to think more seriously about creating a medical support structure in Europe adequate to address the levels of casualties that a NATO–Warsaw Pact conflict would generate. Aeromedical

evacuation within the theater and from Europe to the United States would be important elements in such a structure, given the theater geography.

The creation of such a medical support structure would initially be slow because of the high cost of our ten-year involvement in Vietnam and the desire to reduce defense spending at that conflict's end. Later, higher priority was accorded to strengthening our conventional combat power dedicated to the defense of NATO. Territorially, NATO was relatively shallow between the inner German border and the English Channel, and strengthening NATO's capability to fight conventionally was intended to reduce the possibility that it would have to employ nuclear weapons to defeat a Warsaw Pact attack. To counter the Warsaw Pact's perceived superiority on the ground, the United States placed a great deal of emphasis on rapidly reinforcing NATO with U.S. troops and their supporting medical units from the United States. This would require large amounts of strategic airlift immediately following an attack. To ensure that reinforcements arrived ready to fight, their equipment, including medical stocks, was positioned in European depots so the forces could be combat ready as quickly as possible upon arrival. Defense spending began to increase during the last year of the President Jimmy Carter's administration, and during Ronald Reagan's presidency it expanded substantially with a number of initiatives intended to provide greater medical readiness in Europe. Aeromedical evacuation played large in these initiatives.

Two events provided great impetus to these medical readiness initiatives: the bombing of the U.S. Marine barracks in Beirut, Lebanon, on October 23, 1983, that killed almost 250 marines, and the subsequent testimony before a congressional committee by the then-acting ASD/HA, Dr. John F. Beary. Beary testified that only one of five wounded in a NATO–Warsaw Pact war could be treated, given the inadequacies of U.S. military medicine in Europe, which provoked a strong congressional reaction.[44] His testimony reflected a certain amount of frustration with the apparent reluctance of the military services to fund medical readiness at a higher level, especially since defense budgets had increased in the early 1980s under the new Reagan administration.[45] Beary's replacement, Dr. William "Bud" Mayer, a former Army psychiatrist, focused almost exclusively on medical readiness, an emphasis that tended to reflect the administration's focus on strengthening the entire U.S. military. Mayer was apparently not very interested in other issues such as dependent medical care and the costs of the peacetime military medical establishment, an issue that once again had given rise to a proposal to integrate the service medical establishments into a common military medical command, as Norman Kirk had favored in 1945.[46]

Mayer pushed even harder to increase the number of hospital beds that would be available for casualties in a NATO–Warsaw Pact conflict or as a result of hostilities elsewhere where U.S. forces might become engaged. For this purpose, some asserted with considerable reason that Mayer tended to exaggerate the deficiencies in the treatment capabilities of U.S. forces in Europe and the role of ASD/HA in initiating the remedial programs through which most were being

addressed.[47] Mayer's comments further highlighted long-standing problems and may have helped garner congressional support for larger appropriations for medical readiness.[48] His activities were obviously also intended to create pressure on the service chiefs to fund more medical readiness measures in their respective shares of the defense budget.[49]

Mayer's ability to pressure the U.S. armed forces to increase medical readiness in support of their combat elements was rooted in the problems that arose after the terrorist bombing of the U.S. Marine Corps barracks in Beirut. Criticism was leveled at the treatment of survivors, including an accusation that service rivalry had affected which hospitals the Air Force had sent the evacuated casualties to. An investigating commission headed by Adm. Robert Long concluded the on-scene medical care after the bombing was heroic and stated it found no evidence that any of the wounded had died or received improper medical treatment "as a result of evacuation or casualty distribution procedures."[50]

The Beirut incident provided Mayer the opportunity to have Secretary of Defense Caspar Weinberger task the ASD/HA (which was Mayer) to conduct an independent review of medical readiness planning in USEUCOM. Weinberger directed the secretaries of the Army, Navy, and Air Force and the DoD IG to provide support personnel to the review group when ASD/HA requested it and to pay for their travel. Secretary Weinberger also directed the Chairman of the JCS (CJCS) to arrange for USEUCOM cooperation and support of the review group when it visited the European command.[51] In a subsequent charge to the review group, Mayer specified that as a minimum their investigation should cover "medical command and control, medical evacuation, the adequacy of friendly nations for hospitalization and evacuation support in the event of mass casualties, and planning for medical responses to terrorist attacks." He enjoined the review group members that they were in effect serving as extensions of the ASD/HA staff and were representing the Secretary of Defense rather than their parent service or command. He asked for their report by April 13, 1984.[52]

The resulting Zimble Report, as it came to be known after its putative author, Adm. James A. Zimble, was extremely critical of USEUCOM's medical readiness, particularly with regard to terrorism, which it referred to as nonmobilization contingency planning. The USEUCOM staff believed the report to be an unfair assessment because its conclusions were predetermined.[53] In one sense, the observation was correct because Admiral Zimble's foreword specifically stated that the report essentially restated previously identified, persistent problems.[54]

The JCS directed the services to provide support for their own personnel, inasmuch as there was no European command surgeon. The senior surgeon of each component command—United States Air Force in Europe (USAFE), U.S. Army Europe (USAREUR), and U.S. Navy Europe (USNAVEUR)—was designated USEUCOM surgeon in addition to his component command position. He performed his theater-level duties on a part-time basis. The USEUCOM surgeon had little or no formal operational control or line authority over the components'

medical elements, and as the review group pointedly noted, his office was seriously understaffed, having only three officers and one clerk-typist.[55]

The Zimble Report organized its findings under ten headings based on Dr. Mayer's charge. The major thrust of the recommendations was that integrated medical readiness planning which included involvement of NATO host nations needed to be performed under the control of theater-level medical authorities. Moreover, a full-time USEUCOM surgeon should have the authority to coordinate execution of the readiness plans in the event of war. The components' parent services were also to commit the necessary resources in their budgets to remedy the well-known principal readiness shortfalls. Aeromedical evacuation was discussed in the Casualty Medical Evacuation section, and occasional references to it appear under other headings as well.[56]

The Zimble Report's discussion of aeromedical evacuation was cast principally in terms of the strain that shortfalls in theater medical capabilities would impose on the ability of strategic airlift to meet the prescribed fifteen-day evacuation policy. The review group and the Office of the ASD/HA (OASD/HA) were focused on procuring the necessary medical capabilities that in their view were key to the adequate treatment of U.S. casualties. They did not, however, envision enhancing aeromedical evacuation capabilities as the solution for the fundamental deficiencies in the theater's medical readiness. From the perspective of the OASD/HA, although the available aeromedical evacuation capabilities had some problems, the number of C–141s was basically sufficient to provide strategic aeromedical evacuation, and enough C–130s and theater-based C–9As were present to meet tactical aeromedical evacuation requirements.[57] The review group's view clearly shared this perspective, concluding from their investigations that

> it is clear that under the most optimistic assumptions we could not provide life-saving treatment and stabilization for evacuation to the majority of our casualties in a major conventional war in USEUCOM. This problem cannot be alleviated by shortening the evacuation policy, a step which affects only the movement of stabilized patients. Only the procurement of adequate surgical capabilities can ensure that our casualties would receive adequate treatment.[58]

The report noted that none of the services had programmed for sufficient in-theater medical resources to support a fifteen-day evacuation policy during the initial period of conflict. During this period of peak demand, third-echelon, or reparative, medical care would be critically short for the first thirty to sixty days of a European war, and a shortage of beds would dictate that only casualties not stable enough to move be kept in-theater. The sizable number of injured who might otherwise have returned to duty after short convalescences would have to be evacuated to the United States to free beds for additional casualties. The review group postulated that this would severely tax if not completely overwhelm MAC,

whose aeromedical evacuation workload had increased by 29 percent worldwide since 1978, and by 58 percent in USEUCOM since 1981, all the while it was facing shortages in airframes, crews, and medical equipment.[59]

Considering the shortage of in-theater medical capability to permit USEUCOM to meet the prescribed fifteen-day evacuation policy, the review group recommended that MAC continue to use ad hoc solutions and develop initiatives for evacuating large numbers (3,000 per day) of relatively unstable casualties to the United States under a five- to seven-day evacuation schedule. In an echo of the Vietnam conflict, the group recommended that MAC inject its strategic airlift aircraft, the C–141A, into the TAES by moving small numbers of casualties who could be emplaned quickly on retrograde missions from offload points in the combat zone to the theater COMZ.[60]

Other recommendations regarding aeromedical evacuation had more extensive implications for doctrinal changes as well as for NATO policy regarding national support of a member-nation's forces. The review group recommended that planes for each strategic aeromedical evacuation mission to the United States include a physician, not necessarily a flight surgeon, as an attendant; that MAC's current efforts to automate the huge amounts of patient data be speeded up and given a high priority; that USEUCOM establish a high priority for negotiating additional host-nation support for medical evacuation in the combat zone, both on hospital trains and aboard civil aviation; and that a study be initiated to identify and define the requirements of a follow-on dedicated aeromedical evacuation aircraft to replace the C–9A.[61]

In spite of the fact that USEUCOM and Dr. Mayer's office appeared to be striving to achieve the same goal of higher medical readiness in the theater, especially after the issuance of the Zimble Report and the appointment of a new activist deputy commander in chief of U.S. forces in Europe (DCINCEUR), Gen. Richard Lawson, considerable tension existed between the theater and Mayer's office.[62] It owed primarily to the fact that the theater had made greater strides in remedying its medical readiness deficiencies than Dr. Mayer was apparently willing to acknowledge publicly.

The growth of the Warsaw Pact air threat in the early 1970s stimulated Air Force Surgeon General Lt. Gen. Paul Myers to convene a high-level panel to consider how to improve medical readiness for a conventional war.[63] The panel's recommendations resulted in, among other things, a vigorous initiative led by Myers to develop additional treatment facilities for Air Force casualties to support a European theater evacuation policy of fifteen days. General Myers created a program for developing so-called contingency hospitals to provide additional beds and ancillary services and equipment needed to care for the projected levels of casualties. Suitably large unused buildings—hangars, abandoned hospitals, old factories, and so on—were obtained in member nations of the alliance, including Denmark, Germany, Great Britain, Luxembourg, and Turkey; similar arrangements were made quietly with Kenya, Israel, and France.[64] These facilities were rehabilitated, stocked with medical equipment and supplies, and held in standby

status pending activation. When activated, medical personnel from the major Air Force hospitals in the United States would be flown to Europe to make them operational while reservists assumed the domestic duties of deployed personnel. Key to the system, once enough hospital beds were obtained, would be evacuation capability within the European theater.

The contingency hospitals were generally large. Those at Little Rissington and Upwood in the United Kingdom each had 1,500 beds; Nocton Hall, also in the United Kingdom, and Donaueschingen in Germany each had 750. In 1993, when all the projected host-nation agreements had been concluded and the contingency hospitals were completed, the USAFE contingency hospital system was scheduled to provide 14,500 beds.[65] The service hierarchy was generally supportive of this and other initiatives and provided a tenfold increase in funding for the contingency hospital program in its first year.[66]

The question of hospital beds for the casualties of all U.S. armed forces from any conflict in Europe was obviously a broader issue. The commander in chief of U.S. forces in Europe (CINCEUR), Gen. Bernard Rogers, USA, who also served as NATO Supreme Allied Commander, Europe (SACEUR), had to be concerned with the medical readiness planning of all of his component service commands because a NATO–Warsaw Pact conflict was expected to produce very high casualties. A congressionally mandated conversion of support to combat forces in the late 1970s had a negative effect on medical readiness, whereas a decade later the JCS issued a directive to increase by tenfold the previous estimate of the number of casualties in a European war.[67]

Urged on by the OASD/HA and following the lead of the Air Force, which had developed ATHs as part of the deployable medical system (DEPMEDS) program, the Army developed Warm Base systems and the Navy developed a counterpart fleet hospital system. The increased bed capacities represented by contingency and deployable hospitals were further supplemented by agreements with allied nations (the host-nation support agreements), including Great Britain, Germany, Portugal, and Spain, to provided beds in their own hospitals for U.S. casualties. Germany also agreed to provide hospital trains and buses.[68]

The viability of all these plans obviously depended on the availability of timely aeromedical evacuation. The geographic extent of the allied European Command, stretching as it did from North Cape, Norway, to the southern shores of Turkey; the offshore location of many of the fixed and contingent COMZ medical facilities; the uncertainties regarding NATO's ability to retain air superiority, still the sine qua non for aeromedical evacuation; and the certainty that the level of violence would be extremely intense, should the Warsaw Pact attack, made aeromedical evacuation the preferred evacuation method, both medically and strategically.[69] Mayer appeared not to understand that retrograde airlift on C–130s or C–141As would not necessarily be sufficient to support the theater's tactical or strategic aeromedical evacuation requirements, and the NATO members' small airlift forces made any major assistance in this area problematic at best.

Beginning in the early 1980s, studies of medical mobilization at the National Defense University conducted by knowledgeable officers in residence at its various schools had raised serious questions whether MAC aircraft could successfully meet the strategic aeromedical evacuation requirements arising from a European war. One such study published in April 1982 by the Industrial College of the Armed Forces (ICAF) was prepared by a group of student officers who were experienced in military readiness issues. Using computer-based simulations and assumptions based on planning factors drawn from known deployment plans and projected casualties, they concluded that the theater would actually operate with a zero-day evacuation policy for the first three to four weeks of the war when the most intense fighting and highest casualty rates would occur. Because medical facilities in Europe were so limited, only the most severely wounded could be held in the available beds until they stabilized sufficiently for evacuation to the United States. The less severely wounded, who ordinarily would have been returnable to duty within the evacuation policy, would have to be evacuated by air from the theater to free beds for more of the severely wounded. The estimated 3,000 to 5,000 casualties evacuated daily in each of the first thirty days would include up to 70,000 ambulatory wounded who might otherwise have been returned to duty, and pressure on the relatively limited amount of strategic airlift would overwhelm the aeromedical evacuation system.[70]

The situation would not necessarily improve in the near term because the deployment of units and logistic support to reinforce NATO in accordance with the JCS Operation Plan (OPLAN) 4102 would have higher priority than the deployment of medical units and medical facilities. The authors calculated that the 91 C–141A retrograde missions daily required to transport 5,000 patients to the United States would in turn generate a requirement for 31 missions from the CONUS to the theater to return equipment needed to reconfigure C–141s for aeromedical evacuation. This would add to the strain placed upon the already overburdened strategic airlift system, which in any case would place lower priority on such missions during the initial period of intense combat.[71]

This situation had a certain irony because, contrary to the lack of military medical facilities in Europe, sufficient hospital beds were becoming available in the United States to handle the large numbers of expected casualties. In 1980, the Secretary of Defense had directed the establishment of a civilian/military contingency hospital system that provided access to civilian and non-DoD federal hospitals for military personnel.[72] Dr. Mayer's office initially reacted negatively to the 1982 ICAF study, and its recommendations were accepted only after a personal visit to the OASD/HA by the president of the National Defense University, an Air Force lieutenant general.[73]

By the middle of the decade with the continued expansion of the USEUCOM contingency hospitals and the additional beds made available for U.S. casualties through NATO host-nation support agreements, assumptions on which the ICAF study was based were no longer completely valid. Many still had salience, how-

ever, including the problem of distributing patients by air to hospitals for definitive care once they had reached the United States. More critical was USEUCOM's tactical aeromedical evacuation capability, which the authors of the ICAF study had deliberately not analyzed but which now assumed increased importance.

Although doctrinally the Army was responsible for evacuating casualties within the combat zone and the Air Force was responsible for moving them from the combat zone to medical facilities in the COMZ, France's departure from participation in NATO's integrated military structure tended to blur these distinctions. USEUCOM's plan was to use all available means of evacuation, including Army medevac and transport helicopters, German hospital trains and ambulance buses, and C–130s to move patients to rear medical facilities, some of which qualified as COMZ facilities.[74] In this phase of evacuation, MAC's theater-deployed C–130s were to play a major role by moving wounded on retrograde missions from casualty collection points as far forward in the combat area as the tactical situation permitted to rear continental hospitals. From these hospitals, the five C–9As based in-theater, with possibly some help from C–141s, would carry the patients to offshore hospitals in the United Kingdom, Spain, Portugal, and other points as contingency hospitals were brought on line or additional host-nation hospital beds were secured.[75] From these offshore hospitals, patients whose recovery periods exceeded the fifteen-day evacuation policy would enter the strategic aeromedical evacuation system and be flown to the United States on C–141Bs. Like the Army's CH–47 Chinook helicopters, C–130s were tasked to provide critical airlift support to combat operations in the event of a Warsaw Pact attack, and the conflict of priorities created great uncertainties regarding the availability of tactical aeromedical evacuation by fixed- or rotary-wing aircraft.[76]

The solution was found in an initiative of the USEUCOM surgeon's office, which proposed that the DCINCEUR approach the MAC commander and ask him to commit deployment of the eleven CONUS-based C–9As to the European theater to provide an additional dedicated aeromedical evacuation capability for transporting casualties to the contingency hospitals. Based on analysis of projected casualty figures and staff-run computer simulations, the proposal was enthusiastically endorsed by the USAFE/USEUCOM surgeon, Maj. Gen. William Greendyke. With the approval of General Lawson, the DCINCEUR, and his superior, General Rogers, the proposal was briefed together with the supporting analysis to the commanders of USAFE, USAREUR, and USNAVEUR, and according to one member of the briefing team, every Army four-star general in the theater.[77]

Although the USNAVEUR commander, Admiral Smalls, expressed strong reservations, the USAREUR commander, Gen. Glenn Otis, whose forces could expect to experience the most casualties, together with USAFE commander and, most importantly, General Rogers, the theater commander, approved making the approach to MAC.[78]

The proposal was presented in the form of a letter from General Lawson to MAC Commander Gen. Thomas Ryan, which General Greendyke carried per-

sonally to Ryan's headquarters at Scott AFB. There he found the MAC commander receptive, although the MAC surgeon initially was opposed.[79]

In his letter, Lawson pointed out that, although USEUCOM had made great strides during the preceding four years toward establishing a viable contingency medical care system in Europe, it was still missing one critical link—a dedicated capability to move patients within the theater in wartime.[80] Lawson pointed out that utilizing C–9As had operational as well as medical benefits. It could satisfy more than 50 percent of USEUCOM's tactical patient movement requirement for the first thirty days while freeing C–130s for other critical wartime missions. Additionally, with a dedicated system, theater medical planners had more latitude in negotiating for additional wartime hospitals because they were currently restricted to searching for sites near airfields programmed for heavy C–130 traffic in wartime.

The DCINCEUR acknowledged the additional challenge for distributing patients through the domestic aeromedical evacuation system that would be created by sending the CONUS-based C–9As to Europe, but he candidly noted that, if patients had to stack up anywhere, it was better that they do so in the United States where multiple resources were available to provide medical services.[81]

Ryan responded positively to the USEUCOM proposal; subsequent joint planning by MAC and USEUCOM medical planners resulted in General Ryan's successor, Gen. Duane Cassidy, accepting the proposal in December 1985.[82] The concept of operations (CONOPS) called for the C–9As to move patients between third- and fourth-echelon medical care facilities in the relatively low-threat environment of rear areas, away from the combat zones. It was envisioned that ANG and AFRES units would fulfill the domestic aeromedical evacuation function once the CONUS-based C–9As had been dispatched to Europe.[83]

Conclusion

On the eve of the Cold War's end, medical readiness in USEUCOM had been brought to a high state of preparedness through the combined actions of aggressive senior command surgeons and the support of senior military commanders, who had been pushed, not always in ways fully acceptable to the military, by the OASD/HA. The first USEUCOM Strategic Medical Plan integrating the component commands' medical planning had also been prepared under the direction of the first USEUCOM surgeon to be appointed directly to this post.[84] Underlying these successes were the increased defense budgets of the Reagan era, which made it easier for the armed forces chiefs of staff to choose between spending for combat forces or for the medical readiness necessary to support them.

Discussions on how to meet the large aeromedical evacuation requirements that a war in Europe could generate highlighted an issue to which MAC had been devoting resources for some time: development of an aeromedical evacuation capability in the CRAF. SAM had four current medical R&D studies in progress

while USEUCOM was negotiating for use of the domestic C–9A fleet in the event of war. The Boeing Corporation was also doing a study for MAC that focused on the new wide-body passenger aircraft, the 767, and MAC was working with the Army and other commercial firms to coordinate requirements. The MAC commander was heavily involved and pressed the MAC staff to develop a low-cost, universal CRAF conversion kit that would permit the CRAF to provide aeromedical evacuation capability for both domestic and theater requirements.[85]

It would remain to be seen what effect the end of the Warsaw Pact threat and the sudden collapse of the Soviet Union would have on the CRAF issue and further development of aeromedical evacuation doctrine and system capabilities to support wartime operations. Small-scale contingency operations like Operation Urgent Fury, the invasion of Grenada to rescue U.S. medical students in 1984, and the evacuation of marine casualties from Lebanon in 1983 had revealed problems in the aeromedical evacuation system during joint operations, which seemingly had been transcended in USEUCOM by unprecedented cooperation among the services in raising the command's medical readiness in the 1980s.[86] MAC's strategic and domestic aeromedical evacuation operations would continue to operate efficiently in their peacetime mode as the decade drew to a close, with 17,689 patients and attendants transported during 1989 on 877 aeromedical evacuation missions by the 375th Aeromedical Airlift Wing.[87]

The blurring of the formal aeromedical evacuation structure in Europe and the distribution of responsibilities that emerged as USEUCOM developed a high state of medical readiness in support of U.S. forces in the theater began to impart a different character to the aeromedical evacuation system. Aeromedical evacuation began to have a *push* aspect, in contrast to the carefully regulated nature of the peacetime or doctrinal system that MAC operated. Staff members in the USEUCOM surgeon's office began to believe that carefully regulated patients, which was the norm in the theater as the 1980s began, simply would not work given the immense numbers of expected casualties.[88]

Removing patients from the combat zone to hospitals in the COMZ or to safe havens as rapidly as possible began to seem more realistic. A logical corollary would be to provide resuscitative care quickly, possibly while airborne, and abandon the more traditional mode of retaining casualties in medical facilities in the rear of the combat zone until they were fully stable. Not without precedent—Tet provided one within recent memory—this trend might or might not be applicable to the evolution of aeromedical evacuation in a post–Cold War world. The nature of the system that had emerged in the course of the 1980s was uniquely oriented toward a single contingency—a large-scale war in Europe that would be extremely violent and produce large numbers of casualties—but it remained untested. Whether this new paradigm was applicable to a different large-scale contingency would remain to be seen.

The aftermath of the bombing of the Marine Barracks in Beirut, 1983.

Chapter 8

AEROMEDICAL EVACUATION IN THE NEW ERA OF JOINTNESS

Operation Urgent Fury, the U.S. invasion of Grenada, and the terrorist attack on the U.S. Marines serving with the multinational force in Beirut, Lebanon, occurred virtually simultaneously in October 1983. Aeromedical evacuation support in both cases was hampered by flaws in planning and in command and control. Formally joint, and in the case of Lebanon, also combined (loosely speaking because the U.S. Marines were part of a multinational force), both operations experienced difficulties in execution that had little to do with their opponents. These difficulties stemmed largely from the weakness of the then-existing joint mechanisms and attitude toward jointness, compared with the greater institutional roles of the U.S. military services and the service cultures within the military decision-making processes.[1] The imbalance was addressed radically and largely successfully by congressional action in 1986 with the passage of the Goldwater-Nichols Act (GNA) which strengthened the authority of the unified commands' CINCs worldwide over their component Army, Navy, and Air Force commands. (Illustrative of previous ambiguities perceived by CINCs, Adm. Robert Long, investigating the terrorist bombing of the Marine Corps barracks in Beirut, recalled asking General Rogers, the CINCEUR, why he had not done something to improve the marines' physical security following the earlier bombing of the U.S. embassy in Beirut. According to the admiral, Rogers replied that he would never dream of telling the marines how to do their job.[2]) Perhaps most important, provisions of the GNA firmly established the CJCS as the preeminent military advisor to the Secretary of Defense, gave him control over the Joint Staff, and imposed a jointness imperative upon the services by requiring that officers of all services participate in joint professional military education and have a tour of duty in a joint organization as a prerequisite for higher promotion.[3]

Although the invasion of Grenada had been successful under the unreformed JCS system, Gen. Colin Powell, the second CJCS under GNA, characterized the operation as a sloppy success, hardly a model of service cooperation. He noted in his memoirs that only at the last minute was Maj. Gen. Norman Schwarzkopf added to Vice Adm. Joseph Metcalf's staff, who commanded the joint operation, so his staff would have someone who understood ground combat operations. According to Powell, "relations between the services were marred by poor communications, fractured command and control, interservice parochialism, and micromanagement from Washington."[4] Planning and coordinating medical support and aeromedical evacuation were also fraught with problems. Powell might have added that none of the combat forces initially knew that aeromedical evacuation personnel from the 1st AMES had established themselves on Barbados, ready to evacuate casualties from the Grenada operation.[5]

By contrast, the next major U.S. military operation in which aeromedical evacuation would have a prominent role, Operation Just Cause, the invasion of Panama, occurred after GNA changed the JCS structure. This operation was successful and efficiently conducted. Medical support of the operation, including the aeromedical evacuation of U.S. casualties, went so smoothly that the surgeon general of the Army at the time of the invasion, Lt. Gen. Frank Ledford, recalled long after the event that he feared the successful arrangements by which medical support was executed might be seen as the paradigm for future operations for which it was inappropriate.[6]

Operation Just Cause

The purpose of Just Cause, which was executed just prior to Christmas 1989, was to arrest Gen. Manuel Noriega, head of the Panama Defense Force (PDF) and effectively that country's dictator, and bring him to trial before a U.S. jury. A corollary objective was to dismantle the PDF because President George H. W. Bush's administration judged it to be so hopelessly corrupt and antidemocratic that its continued existence would preclude any chance for the development of a true democratic government in Panama. The previous Carter administration had committed the United States by 1999 to relinquish control of the Panama Canal to the Panamanian republic, so Noriega's ascendancy began to be perceived by the Bush administration as a threat to U.S. interests. Contingent planning for his removal had begun in 1987, but it was his annulment of a presidential election in May 1989, the brutal torture and murder of one of his enemies, his proclamation of a state of war with the United States, and attacks on U.S. military personnel in December 1989 that resulted in the death of a U.S. Marine officer that triggered U.S. action.[7]

Operation Just Cause began in the early hours of December 20, 1989, with an attack on key targets by more than 26,000 Americans, 10,500 of whom were flown in from the CONUS. Army special forces and Navy SEALs and units of the

The AC–130 gunship.

Army's rapid-response force, the 18th Airborne Corps based at Fort Bragg, North Carolina, spearheaded the operation. The Air Force contributed airlift from MAC for the initial deployment, including parachute drops on PDF positions at Rio Hato and the Torrijos-Tocumen Airport. Continuing logistic support including retrograde aeromedical evacuation by Air Force AC–130 Spectre gunships from MAC's Twenty-third Air Force supported ground forces, and several of the then-secret F–117 Stealth fighters also made night attacks on targets that required extremely accurate weapons delivery. (USAF units with the mission of supporting U.S. special forces were assigned from 1983 to 1990 to MAC under a new Twenty-third Air Force.[8]) The JTF that conducted the operation was commanded by Lt. Gen. Carl Stiner, the 18th Airborne Corps commander with a reputation for toughness. A past commander of the Joint Special Operations Command, he was handpicked for the job by the U.S. Southern Command (USSOUTHCOM) commander, Gen. Max Thurman.

Panamanian resistance was overcome fairly rapidly, although not without U.S. casualties. Organized resistance by the PDF ended within several days after a brief, though stronger than anticipated, opposition to more numerous and better-trained and better-equipped professional U.S. forces. Isolated resistance continued for several days, particularly from the so-called Dignity Battalions, units composed largely of untrained civilians supportive of Noriega and armed by him as a civilian militia. USSOUTHCOM intelligence estimated that from 200 to 500 resisters still operated in Panama City on December 24. Although their effective resistance ended the next day, it took until January 3 to apprehend Noriega, who had taken refuge in the residence of the papal representative, the *Nunciatua*. In the interim, Panamanian candidates whose election had been abrogated by Noriega

The F–117 Nighthawk stealth fighter.

seven months earlier took office, and externally based U.S. forces began to withdraw. The operation had been a notable success for jointness, especially against the background of pre-GNA operations. More important to the evolution of aeromedical evacuation doctrine, the role that aeromedical evacuation played in the operation inadvertently helped shape the outcome of a long-standing internal discussion within the Air Force Medical Service. The issue was whether a physician should be placed onboard each aeromedical evacuation aircraft as a regular member of the aeromedical crew, rather than continuing the practice of the past in which physicians were assigned to special situations, like the strategic aeromedical evacuation of certain casualties during the Vietnam War. Augmenting standard medical crews for all missions would represent a major doctrinal change for the Air Force since it became a separate service in 1947.[9]

Medical planning for the operation against Noriega was conducted for almost two years and involved medical planners from the 18th Airborne Corps, 44th Medical Brigade, 82d Airborne Division, 307th Medical Battalion, USSOUTHCOM surgeon's office, and 1st AMES.[10] The AMES was a former TAC unit that had been reassigned to MAC when, in the mid-1970s, MAC was assigned worldwide responsibility for aeromedical evacuation. Based at Pope AFB, North Carolina, on the Fort Bragg military reservation, the 1st AMES provided support for the Army's 18th Airborne Corps and other rapid-reaction units based there.[11]

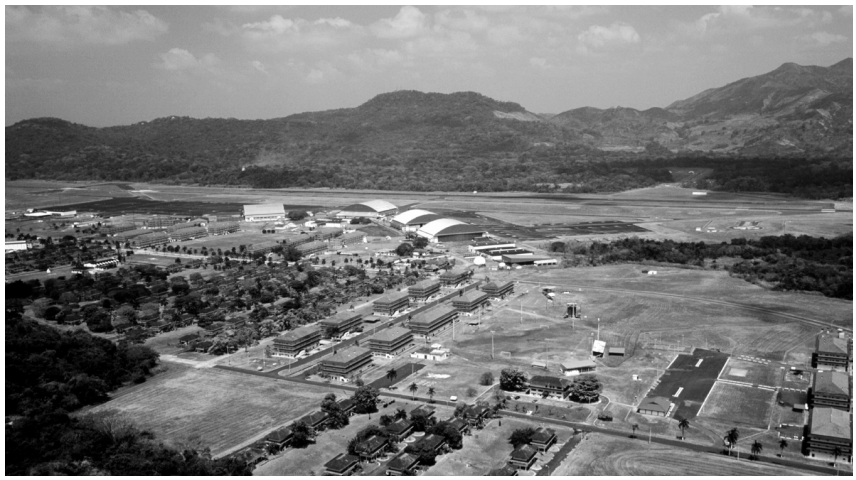
A notable feature of the overall planning was the cloak of secrecy that was placed over the operation and which had the potential to affect the aeromedical evacuation aspect. According to the commander of the 1st AMES, Air Force Medical Service Corps Col. Robert Brannon, security clearance requirements initially inhibited his ability to bring in all the medical planners. Secrecy was so tight

until Just Cause was launched that, when the decision to execute was made, the 375th Aeromedical Airlift Wing surgeon, to whom Brannon was responsible, was not informed of the decision. Brannon's immediate military boss was a line officer, the 317th Tactical Airlift Wing commander, also based at Pope AFB. Of the three service surgeons general and their staffs, only Air Force Surgeon General Lt. Gen. Monte Miller and selected members of his staff were involved in or even aware of the medical planning for Just Cause. This was because the Air Force, and specifically MAC, had responsibility for conducting the aeromedical evacuation of casualties.[12]

Air Force Training Command Commander Lt. Gen. Robert Oaks was also kept unaware of the operation until just before its execution. The plan called for casualties to be evacuated by air to Kelly AFB at San Antonio, Texas, for treatment at the two major service medical centers in the area: Brooke Army Medical Center, and the Air Force's Wilford Hall Medical Center. The two facilities composed the San Antonio area Joint Military Medical Center which was commanded by a major general in the Air Force Medical Corps reporting to General Oaks. Thus, when Oaks was told of the operation only two days before it began, he thought the level of secrecy bizarre, particularly because he was enjoined to tell no one on his staff about the operation, including the Joint Military Medical Center commander, until one hour before its scheduled beginning at 1:00 A.M. Panama time, or 0600 Greenwich Mean Time on December 20. However, Oaks was able to get permission to brief selected members of his staff at approximately 9:00 the night before.[13] The Air Force commander of Wilford Hall Medical Center had also been informed of the operation shortly after Oaks, but he too had been enjoined to tell no one, although he informed a key member of his staff, his readiness officer, so to have the hospital prepared to receive casualties when an alert could be declared.[14]

Aeromedical evacuation was the critical element in medical support of Operation Just Cause. Although the Army had a major medical facility in Panama City—the Gorgas Army Community Hospital—it was located near the PDF headquarters, the *Comandancia*, where fighting could be expected. Additionally, more than 90 percent of the professional hospital personnel were Panamanian, and whether they would be willing or able to report to the hospital for duty was uncertain. For this reason, the JTF commander, General Stiner, directed that during the first seventy-two hours all casualties except those present in the immediate vicinity of Gorgas be aeromedically evacuated immediately. Once Gorgas was available, the evacuation policy was to be five days.[15]

Howard AFB became the focal point in Panama for the initial medical support of Just Cause and the point from which casualties were to be aeromedically evacuated. The medical plan called for a joint casualty collecting point (JCCP) to be established at Howard where casualties were to be triaged and given emergency medical care, including emergency surgery if necessary to stabilize them clinically. Patients were then to be moved to a mobile aeromedical staging facili-



Howard Air Base, Panama.

ty (MASF) to await evacuation to Kelly AFB, a flight lasting approximately three to four hours.[16] At Kelly, in accordance with a long-standing contingency plan, triage would again be performed before patients were distributed for definitive treatment to Wilford Hall or to Brooke. Wilford Hall was apparently designated the primary medical treatment facility (MTF) because it was thought that more effective control over the press would be possible there.[17]

Because the United States already had an authorized military presence in Panama, additional military personnel and equipment were prepositioned at U.S. Panamanian bases in discrete numbers and amounts that it was hoped would not arouse Panamanian suspicions. Tasked to establish a TAES at Howard, Colonel Brannon deployed to Howard from Fort Bragg with elements of the 1st AMES and an Army forward-area surgical team (FAST) the day before the operation was to commence. Brannon's TAES included one AECC, one MASF, two aeromedical evacuation liaison teams (AELTs), and twelve medical flight crews, totaling some sixty-five personnel.[18]

By early afternoon on December 19, the MTFs and personnel at Howard were ready to receive casualties. Brannon's 1st AMES elements were augmented with additional surgical teams and advanced trauma life support (ATLS) personnel from USSOUTHCOM resources. Twenty minutes after Operation Just Cause began early the next morning, a large number of seriously wounded casualties began to flow into the field medical facility at Howard. Arrangements for their treatment were dictated by the tactical situation and General Stiner's directive rather than in accordance with current doctrine. The MASF tent was used as a patient care ward in addition to its primary function as a staging facility. Due to the restricted numbers of medical personnel at Howard, 1st AMES personnel were

required to work with the ATLS doctors to provide both litter support and mortuary monitoring in addition to their normal duties, which focused on evacuating patients by air. Four operating room tables were used by two of the available three FASTs as patients were stabilized for evacuation to Kelly AFB. At the start of hostilities the Army deployed several additional physicians and other medical personnel from various hospitals to Panama. Additionally, nine combat physicians deployed with the special forces units from Fort Bragg, and at least some moved to Howard to support the JCCP.[19]

Evacuees considered to be stabilized were breathing naturally, had any bleeding stanched, their fractures immobilized, and were adequately hydrated. To be considered clinically stable, evacuees would require further surgical or other care before they could be considered out of immediate danger. This situation concerned Air Force personnel because their doctrine prescribed that only clinically stable patients should be aeromedically evacuated.[20] Adding to the pressure to follow General Stiner's directive to evacuate casualties as soon as possible was a concern that the initial heavy flow of patients into Howard might continue and overwhelm the base's limited medical capabilities.[21]

The first casualties brought to the JCCP were mainly seriously injured special forces personnel, including Navy SEALs. Some had been wounded or injured during the parachute drop at Rio Hato, where intense ground fire caused the drop to be executed at a lower than planned altitude of 500 feet; others were casualties of the drop at the Torrijos-Tocumen Airport where they encountered ground fire during their descent.[22] Of some 275 casualties who reached the JCCP, 257 individuals—216 litter patients and 41 ambulatory—were ultimately aeromedically evacuated to Kelly, and the MASF evacuated 192 patients—162 litter and 30 ambulatory—in the first 24 hours. Forty percent of those evacuated to Kelly were resuscitated or stabilized by the medical teams at the JCCP where 21 operations including 14 abdominal procedures were performed. Of these evacuees, 38.8 percent had gunshot fragmentation wounds. Bearing on the issue of how to stabilize patients most effectively for later definitive care, one analysis showed that the debridement of open fracture wounds at Howard before evacuation to Kelly resulted in significantly fewer infections than when such wounds were debrided after the three-hour flight from Howard to Kelly. This conclusion tended to support an evolving view that the speed with which initial surgical care was provided was of greater importance for the survival of the wounded than the speed with which the casualties could be aeromedically evacuated, as important as that might be for their long-term survival.[23]

All but one of the nine flights carrying casualties from Howard to Kelly between December 20 and 27 was made by medically reconfigured MAC C–141s. In addition to patients evacuated to Kelly, four Americans killed in action were flown out on the first two evacuation flights as an exception to doctrine. In view of the unstable condition of some of these first evacuees, the first two C–141s carried additional medical personnel to augment the regular crew of two

Marines on patrol during Operation Just Cause.

flight nurses and three medical technicians. The first aircraft with some of the most seriously wounded carried a surgeon and anesthesiologist; the second carried a medical technician and a flight surgeon.[24]

The initial load of casualties threatened to overwhelm the operating room capacity at Wilford Hall, and the overflow patients were sent to Brooke.[25] The efforts of the staffs at the two hospital centers, combined with the skillful initial resuscitation and stabilization efforts at Howard, succeeded in keeping mortality among the casualties low. Two deaths occurred at the JCCP before the patients could be aeromedically evacuated; a third occurred after arrival at Kelly. This last one was a very badly wounded Navy SEAL who survived the flight to Wilford Hall but died while undergoing surgery. Surviving evacuees received a number of distinguished visitors, including the President. They were flown to medical facilities near their homes by the domestic C–9 aeromedical evacuation fleet supplemented by C–21s.[26] The ultimate number of U.S. casualties during Operation Just Cause was 23 killed and 322 wounded.[27]

The effectiveness of the TAES for Just Cause demonstrated positively the total force concept, although the number of reserves utilized was relatively small. By the end of 1989, more than 90 percent of the USAF aeromedical capability resided in the Air Reserve Component (ARC), which includes members of both the organized AFRES and the ANG. Responding to a request from Col. Brannon Howard for augmentation, small numbers of aeromedical evacuation personnel from the 31st AMES at Charleston and the 32d Aeromedical Evacuation Flight from Kelly deployed to Howard within twelve hours.[28]

One significant issue largely obscured by the special requirements of Operation Just Cause was medical regulation. Medical regulating, the assignment

of sick and wounded military patients to MTFs for the next echelon of medical care or for the definitive care necessary to ensure their recovery or rehabilitation, has been the essential command-and-control element in the modern chain of evacuation since World War II. Matching a patient's medical requirements with the capability of the available hospitals at any given time is its core requirement. Linking the MTFs are the patient evacuation system and all of the ancillary actions performed by AECCs, which include scheduling patient airlift and preparing the manifests for the evacuation aircraft. Medical regulating in a joint environment historically has been a source of friction among the armed services, as was shown in Vietnam when regulated patients were removed for medical reasons at Clark AB. The principal reason is each service's desire to ensure that its sick and wounded are regulated to its own MTFs.[29]

For Operation Just Cause, General Stiner had essentially co-opted the medical regulating function by directing that casualties be evacuated immediately after initial treatment to Kelly AFB, where they would receive definitive care at either Wilford Hall or Brooke Medical Center. From these MTFs in the San Antonio area, patients were medically regulated to other hospitals or convalescent centers near their homes in accordance with medical criteria established by the joint agency charged with this responsibility.

The joint patient regulating system was created in October 1950 by Secretary of Defense George C. Marshall, who established the Armed Services Medical Regulating Office (ASMRO) with authority and responsibility for the medical regulation of all patients from all three armed services to and within the CONUS. The ASMRO was located in Washington, D.C., and directed by the Army as DoD's executive agent. Its actual authority in practice initially was circumscribed by various exceptions injected into the governing DoD directive by the service surgeons.[30] In June 1968, the Air Force estimated that ASMRO regulated less than 1 percent of all patients generated within the CONUS; by comparison, in 1967 the Air Force itself had regulated some 15,000 Air Force–sponsored patients, three-quarters of whom were active duty, among 112 Air Force hospitals and dispensaries.[31]

Theoretically, service preferences for hospitalizing their members in their own MTFs could be accommodated in such a system if all services had a uniformly adequate medical capability including specialists within their medical departments commensurate with the number of their members and casualty rates. Such duplication or, more positively, redundancy, is vital from the perspective of the different missions and operational plans of the military services. However, the various commissions chartered to improve government efficiency, such as the Hoover Commissions of the late 1940s and mid-1950s, have seen it quite differently, as have the OASD/HA and other civilian agencies concerned with costs.[32] This same cost-consciousness has periodically been focused on the aeromedical evacuation system by the use of audits that have resulted in restrictions on the flying hours devoted to aeromedical evacuation. One such audit in 1978 called for a

50 percent cut in worldwide C–9 flying hours.[33] Necessarily, medical regulating and the aeromedical process have been inextricably intertwined.

From the USAF point of view, the ASMRO distribution of patients was uneven from the beginning. In what is admittedly an extreme example, between January 1952 and May 1953 ASMRO regulated 2,686 Air Force patients into Army and Navy hospitals, but it regulated one Army patient and no Navy patients into an Air Force hospital. Because the Air Force lacked a developed system of specialty care in the early years after the creation of a separate Air Force Medical Service in 1949, the service had no particular incentive to challenge this situation. Most Air Force personnel regulated into Army and Navy hospitals in these early years were cases that Air Force hospitals were neither staffed nor equipped to treat, but it increasingly became an irritant in the joint regulating process from the Air Force point of view as its hospital system grew. This was because its members were not being treated in their own service hospitals and because of the undoubtedly adverse effects on its specialty and residency programs.[34] The situation eased after the ASD/HA directed in late 1981 that ASMRO be collocated with MAC's aeromedical evacuation agency, the Patient Airlift Center (PAC) at Scott AFB, in the interest of improving ASMRO's wartime effectiveness. OASD/HA also wanted the new ASMRO/PAC to rely on greater automatic data processing, a goal that had concerned MAC's PAC for some time.[35]

In the case of Operation Just Cause, medical regulation was obviously not accomplished according to doctrine because the sending MTF, the deployed medical facility at Howard AFB, had no need to request that ASMRO designate a receiving MTF. However, ASMRO did regulate the subsequent distribution of patients to hospitals near their homes. Operation Just Cause did not require regulating patients with the automated Defense Medical Regulating Information System (DMRIS), which was adopted in 1984 and by the late 1980s was in use within the CONUS and USEUCOM, but not yet in PACOM. The special forces participating in the Panama operation did not necessarily consider this an issue because their leadership was and is constantly wary of having their troops identified.[36]

DMRIS constituted a sophisticated advance in medical regulating developed under Air Force auspices. It reflected the interest in automating the aeromedical evacuation process as represented in the 1960s by the development of the MAC aeromedical airlift model. It was an attempt to devise a computer model that would determine the manifests and itineraries for aeromedical airlift aircraft, enabling the efficient transportation of military patients among certain CONUS hospitals while providing a tool for analyzing and optimizing daily operations.[37]

Regulating patients worldwide was a greater challenge. As late as 1978, regulating requests were transmitted to ASMRO by message over normal communications systems, and a specific request and ASMRO's decision to which hospital the patient should be transported were entered into the computer database of the Armed Services Medical Regulating Reporting System. Once a month, a lengthy report drawing on data contained in the computerized database was distributed in

paper copy.[38] By contrast, requests for medical regulating using DMRIS were input to terminals that automatically compared the request with a database that contained periodically updated information on hospital capabilities and bed availability. DMRIS then generated a regulating decision, which in peacetime could produce manifests for the AECC to use in scheduling patients on appropriate retrograde or scheduled aeromedical evacuation flights.[39]

The DMRIS has two modes: peacetime and contingency. The former has ninety-seven data elements about an individual patient, including name, to assist the ASMRO with the regulating decision; the contingency mode has far fewer elements, and regulation is done by gross number only. In both modes, the principal information concerns the patient's wound or illness to facilitate identification of the appropriate receiving MTF. In the contingency mode, the patient's name is excluded and his or her medical problem is coded against eight clinical categories.[40] Although the peacetime mode theoretically permits tracking patients as they move through the evacuation chain, because names appear in the regulating requests and on aircraft manifests, the system cannot easily account for changes in aircraft itineraries or other aircraft movements that are externally controlled.

Because patients' names are not transmitted in the contingency system, it is purposefully opaque and not capable of producing aircraft manifests. The system lacks in-transit visibility of patients being aeromedically evacuated, negating the services' ability to track their sick and wounded or to respond to requests from family members or legislators. In Operation Just Cause, General Stiner complained that the Army's system for reporting casualties had been unable to match the tempo of combat; as a result, the wounded who had been evacuated to San Antonio were calling their families before they had been formally reported as casualties.[41]

While medical regulating remained an open question with respect to combat applications, the issue of physicians on aircraft tended toward resolution. A careful clinical analysis shortly after the conclusion of Just Cause by an Air Force flight surgeon, Maj. Courtney Scott, cast doubt on the previous doctrine contraindicating aeromedical evacuation. Major Scott was stationed in San Antonio at the time of the evacuation. While studying for certification in public health, he took advantage of this opportunity to conduct in-depth research on the clinical effect of aeromedical evacuation on the Just Cause casualties. His study provided credible data that the inadvertent transport of unstable patients, on balance, had a substantial positive effect, and that any negative effects on their survival and recovery were relatively few. Notably, the most seriously wounded had survived (with, he later admitted, a bit of luck), and many who would ordinarily have suffered amputations did not because an advanced microsurgery capability was available in San Antonio. The shortness of the flight to Kelly also factored in.[42]

The clinical implications of the Just Cause aeromedical evacuation process heightened interest within the Air Force medical community in the concept that physicians should serve routinely on aeromedical evacuation crews. MAC flight

surgeons had augmented the initial C–141 aeromedical evacuation missions flown in support of the Grenada invasion six years earlier, but medical support, like the operation itself, was too haphazard in many respects to provide clear precedents.[43] The situation in Operation Just Cause presented a paradox. The effective work of the small group of medical personnel trained in emergency medicine and who manned the JCCP at Howard, combined with the rapid aeromedical evacuation that MAC provided to higher-echelon MTFs, seemed to demonstrate that transporting patients previously considered too unstable for travel by air could be clinically beneficial for the patient. The corollary to preventing patient deterioration en route is to have onboard physicians to perform medical interventions beyond the skill level and training of the normally present nurse and medical technicians.

Aeromedical evacuation of stabilized patients can also be beneficial to a commander in operational terms by clearing the battlefield and relieving him of the necessity of supporting a large forward fixed medical presence and its concomitant logistic train. The Just Cause experience certainly suggested that this concept was workable, at least for relatively small-scale contingencies like the invasion of Panama, although not all evacuation flights carried augmenting physicians. Issues remained about the applicability of moving stabilized patients in general war or even large-scale contingencies, and doubters were found at very high levels. General Ledford, the Army surgeon general, was concerned that the effectiveness of the medical support of Just Cause would cause some to see it as a new paradigm with general applicability, rather than as a response to a unique situation. General Miller and MAC's aeromedical evacuation community still believed that only completely stable patients should be moved by air. Within a year, this issue would become acute because of the unexpected prospect of combat operations in the Middle East.

Other Factors Affecting Aeromedical Evacuation in the 1980s

In addition to restructuring the JCS system to emphasize more effective joint planning and operations by U.S. armed forces, GNA reforms had directly affected MAC and potentially affected the worldwide aeromedical evacuation system it controlled. In 1987, MAC became the air component of a new joint command, the U.S. Transportation Command (USTRANSCOM), which included the Navy's Military Sea Transport Service and the Army's Military Traffic Management Command. The MAC commander found himself dual-hatted as the commander of USTRANSCOM, and although he now had authority to ensure that all forms of transportation needed by the U.S. armed forces would be provided in a more efficient and coordinated manner, he would always fulfill the role of the supporting CINC. The supported CINC—the unified commander who was assigned command of U.S. forces in the designated area of responsibility (AOR)—would assign the priorities for the movement of men and materiel to his AOR. In a fast-moving contingency in an AOR with no major U.S. military presence, the sup-

ported CINC's first priority would undoubtedly be for combat units and their equipment—bullets and bayonets—rather than for medical support. Although theoretically equal in status to other unified commands, USTRANSCOM would have little direct impact on the aeromedical evacuation system, at least initially. During its early shakedown years, the command focused on clarifying relations with the Medical Service Corps and Military Traffic Management Command, and it allowed MAC to conduct the aeromedical evacuation function with minimal oversight until the Persian Gulf War. Not until February 1992 did USTRANSCOM have authority over its components in peacetime.[44]

More significant for the further evolution of aeromedical evacuation was the development of an aeromedical segment in the CRAF. The Congressionally Mandated Mobility Study (CMMS) of 1981 recommended increasing intertheater airlift capability, including enhancement of the CRAF, to rectify shortfalls in airlift capability for deploying troops and their equipment to meet the most likely contingencies worldwide. The CMMS evaluated mobility requirements for four representative scenarios: conflict in the Persian Gulf; a Soviet invasion of Iran; a NATO–Warsaw Pact conflict; and confrontation in the Persian Gulf, with a precautionary reinforcement of Europe.[45] Shortfalls in the aeromedical evacuation capability required for these four scenarios using retrograde airlift were also identified. MAC would soon pursue expanding the CRAF as a partial answer to rectify both shortages.

The successful Greendyke-Lawson initiative of 1985 was an attempt to fill the European theater's portion of this shortfall with a dedicated resource for aeromedical evacuation. Although MAC agreed to deploy the domestic C–9 aeromedical evacuation fleet to Europe to support the USEUCOM contingency hospital system, this amount of strategic airlift was inadequate to provide the retrograde capability necessary to move the projected number of patients from Europe to CONUS hospitals. Moreover, deploying domestic C–9s to Europe, though critical to the viability of the emerging USEUCOM contingency hospital system, would also create a severe shortfall in intra-CONUS aeromedical evacuation capability. During the Vietnam conflict, ANG and AFRES units had been used to help meet domestic and near-offshore aeromedical evacuation requirements. These units were not equipped with the aeromedically configured C–9s, and their use would have represented a degradation of aeromedical evacuation capability. If a dedicated civil jet aircraft could be obtained from the CRAF and configured with something approaching the onboard clinical capability of the C–9, it would make an ideal replacement for the domestic aeromedical evacuation fleet. If the CRAF could provide additional aeromedical evacuation capability to ease, or ideally eliminate, the requirement that the C–141 fleet provide retrograde patient transport, it would eliminate the requirement to configure C–141s for aeromedical evacuation and then reconfigure them for normal airlift. It would allow the C–141s to return directly to onload airfields for cargo and troops and allow for greater flexibility in managing the airlift fleet.

Throughout the 1980s, MAC had sought to increase participation of civil air carriers in the CRAF because of the increased passenger and cargo airlift capability that additional civil aircraft could provide. By the end of the decade, the effort had succeeded . Civil carriers had responded to increased financial incentives provided by Congress to place a significant number of additional commercial aircraft in the CRAF program.[46] Attempting to augment MAC's aeromedical evacuation capabilities for contingencies by involving the CRAF was a logical extension of MAC's interest in CRAF's cargo- and personnel-carrying capability. The idea was all the more attractive because the airlines had begun to acquire the new Boeing 767 wide-body aircraft that had extended-range capabilities. With more than 90 percent of the USAF's aeromedical evacuation personnel, flight nurses, and medical technicians now resident in AFRES and ANG units, employing the reserve and Guard aeromedical evacuation crews on CRAF aircraft could allow active-force C–141s and aircraft in associated reserve and Guard airlift units to perform their primary airlift mission with greater flexibility. By the 1980s, AFRES airlift organizations were being modernized, and a few had received C–141s, but most were equipped with C–130s.

The actual development of the aeromedical evacuation segment reflected the long interest of successive Air Force surgeons general and MAC surgeons in using civil aircraft for aeromedical evacuation. The specific impetus came from a JCS-directed patient distribution study rooted in the need to address aeromedical evacuation capability deficits that the CMSS revealed. As early as 1983, SAM had commissioned Texas A&M University to conduct a study of the feasibility of using the CRAF for aeromedical evacuation. The study concluded that such use was feasible, and it recommended a modular conversion system for the civil aircraft assigned to perform this mission.[47]

By the mid-1980s, SAM was conducting three additional R&D studies on CRAF airlift and their aeromedical evacuation applications, with emphasis on wide-body aircraft. Their efforts included studies for the design of interchangeable litter stanchions, tests of the stanchions, and a reconfiguration study incorporating the results of other studies to use in developing a modular aeromedical evacuation system for the CRAF. The Boeing Company was also conducting a study of adjustable litter stanchions for various-sized aircraft, and MAC was studying the subject of dedicated aircraft for this purpose. MAC kept the Army and Air Force surgeons general informed of its deliberations.[48]

The issue was complicated by the fact that the requirements needed to help determine the size of the CRAF aeromedical evacuation segment were not yet clear. The MAC surgeon noted that approval of the Army's new concept of moving sicker patients more quickly—an interesting foreshadowing of the evacuation arrangements for Operation Just Cause, five years hence—could affect evacuation requirements. Additionally, MAC planners found the parameters the JCS had provided for the patient distribution study appeared unrealistic and insufficiently detailed for the models they used to determine requirements. Importantly, the

planners also discovered that these parameters did not permit them to quantify a sufficiently significant requirement to justify procuring a replacement for the nearly 20-year-old C–9 fleet, once it was phased out.[49] Wary of JCS and Office of the Secretary of Defense concerns about costs, the MAC commander directed that modular conversion kits be developed with a focus on inexpensive portable medical conversion kits for the CRAF.[50]

Based on the promising results of the various studies, the MAC commander formally recommended to the Secretary of the Air Force on November 17, 1985, that a segment of the CRAF be dedicated to the aeromedical evacuation of casualties to and within the CONUS.[51] The Department of Transportation subsequently approved MAC's inclusion of an aeromedical evacuation segment in a future memorandum of understanding on the CRAF. MAC then entered into a formal agreement with the Aerospace Medical Division of the Air Force Systems Command, the Air Force R&D agency, for the medical division to develop the necessary aeromedical evacuation–unique hardware for the conversion kits. For its part, MAC undertook to pursue contractual arrangements with civil carriers to commit Boeing 767 and McDonnell-Douglas MD–80 aircraft to an aeromedical evacuation role when an appropriate stage of the CRAF might be implemented.[52]

The initial plan called for MD–80s to replace the C–9s for domestic evacuations, with C–9s deploying to Europe in the event of a NATO–Warsaw Pact conflict. The 767 was to be used primarily for aeromedical evacuation from overseas theaters to the CONUS. Once activated and reconfigured for this purpose, the aircraft were to remain so configured and dedicated for the duration of the emergency. Depending on when they were activated during a wartime emergency, the CRAF aircraft could free much of the C–141 fleet from retrograde missions and of the necessity to reconfigure their cargo and passenger airlift functions to those of patient airlift.[53]

The conversion kits developed by the Aerospace Medical Division required no permanent modification to an aircraft, merely the removal of the passenger seats. The kits, designated CRAF aeromedical evacuation shipsets (AESS), consisted of four basic elements: litter stanchions that fitted into the tracks to which the passenger seats had formerly been fastened; medical work stations for the nurses; a therapeutic oxygen system to provide oxygen for each patient; and an electrical power conversion capability to operate medical equipment. The oxygen subsystem consisted of six 75-liter liquid oxygen supply containers installed in the cargo bays, together with the electrical converters that changed the aircraft electrical voltage to one compatible with the carryon medical equipment used by nurses and medical technicians. With this system installed, the patient-carrying capacity of the 767 was impressive: the Boeing 767-200 could carry 87 litters and 26 ambulatory seats, or 111 litters and 2 seats; the 767-300 could carry 87 litters and 46 seats, or 111 litters and 20 seats.[54]

Conclusion

The MD–80 was eventually dropped from the program due to potential problems with FAA certification of the liquid oxygen subsystem of the AESS, but by the late 1980s, the 767 intertheater aeromedical evacuation program was very much alive. Because the CRAF aeromedical evacuation segment would produce the first use of civil and military crews flying on the same aircraft (the civil carrier aircrews were activated with the CRAF aircraft), MAC proposed that, when the AESS were available, the scheduled C–141 flight from Rhein-Main, Germany, to Andrews AFB be replaced with a Boeing 767. This would permit the gradual qualification of military crews on the 767. Additionally, MAC proposed that the Air Force surgeon general consider purchasing a Boeing 767 cabin mockup for use at Brooks AFB where the aeromedical evacuation crews trained.[55]

As the 1980s ended, the AESS for the aeromedical evacuation segment of the CRAF were completing development and going into production. Like the problem MAETS personnel faced during World War II with the C–54s, the high cabin door on the 767s again raised the problem of how to lift litter patients to the level of the cabin floor. In the previous situation, MAC had determined that the rear cargo door of the C–141 should be at truck-bed height and level with the cabin floor. It also developed special equipment, the 463L system, to eliminate loading concerns in the C–141. However, this promised to be an issue of no great significance in view of MAC's pre-Vietnam experience with C–118s. MAC appeared to be well on the road to solving the shortages of aeromedical evacuation capability that various studies since the early 1980s had indicated would be a detriment to sufficient military readiness for countering a Warsaw Pact attack. Although the development of aeromedical evacuation had moved positively into the new era of jointness prescribed by GNA, it remained to be seen how the aeromedical evacuation system as part of this new armed forces structure would meet the major tests of its capability. A potential problem might be a reluctance by the airlines to enroll their 767s in the CRAF because these aircraft had become perhaps the airlines' most profitable passenger carrier.

Chapter 9

THE PERSIAN GULF WAR TEST OF THE TOTAL FORCE

In the summer of 1990 the U.S. Central Command (CENTCOM) concluded its annual wargame, a command post exercise codenamed Internal Look. The exercise scenario was an invasion of Kuwait by its northern neighbor, Iraq, directed by Iraq's powerful leader, Saddam Hussein.[1] Within months, the scenario became reality, and President Bush's determination to restore the status quo produced the first real test of the United States' total force concept. The test would not only address how well active duty and reserve and National Guard combat and combat support forces could meld and form a military force capable of achieving U.S. objectives, it would also demonstrate how well the same mixture of active duty and non–active duty personnel could provide a medical system capable of supporting that force in the field. Because some 93 percent of the Air Force's aeromedical evacuation capability resides in its ARC, the test of the aeromedical evacuation system was especially important.

The Context for Aeromedical Evacuation in the Gulf Crisis

The wartime role envisioned for the U.S. worldwide aeromedical evacuation system had evolved in the decade and a half since the end of the Vietnam War into a scenario primarily focused on supporting a NATO–Warsaw Pact war. In the late 1980s the United States had proposed that NATO create a NATO-wide intratheater aeromedical evacuationl system in which the European members would provide precommitted civil aircraft to the headquarters of the SACEUR, which would man them with crews drawn from an international aeromedical force under SACEUR's command and control.[2] By the summer of 1990, the Soviet Union was in internal disarray, the Cold War had abruptly ended, and the possibility of a NATO–Warsaw Pact conflict was remote. The U.S. public and Congress were

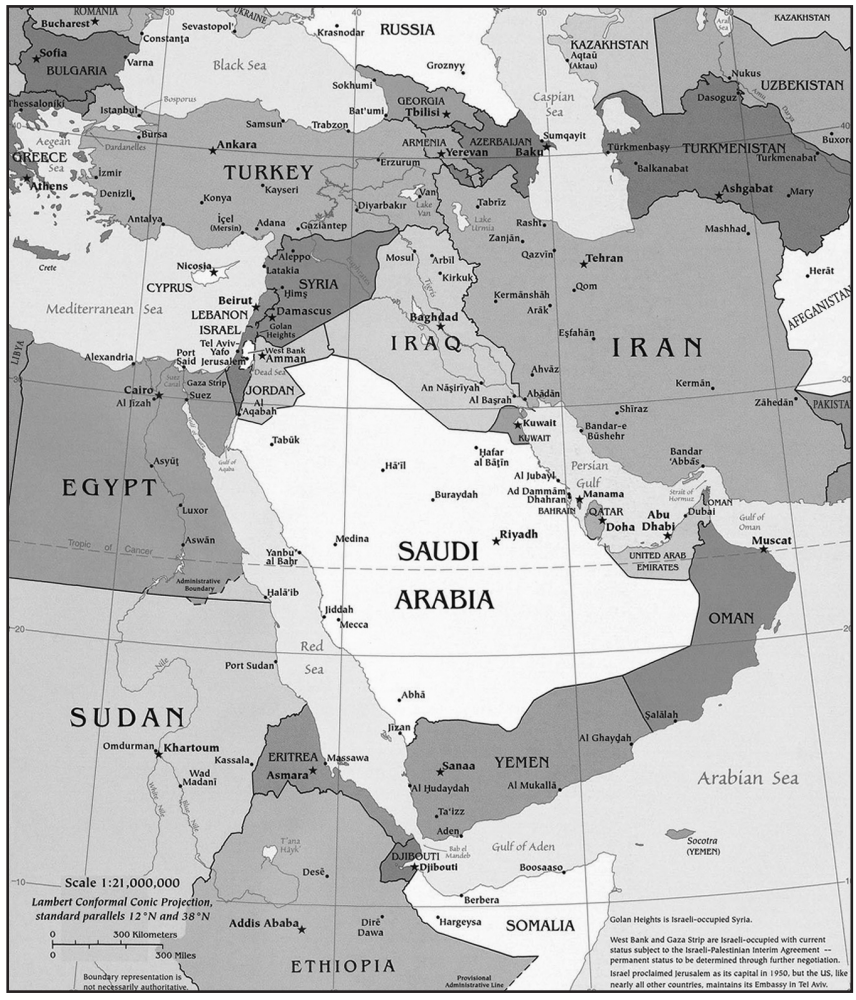
looking forward to reduced expenditures for the armed forces that would produce a peace dividend from the defense budget.

From the perspective of the chiefs of staff of the individual services, the issue of medical readiness, for which civilian and military officials in the Pentagon had successfully sought programmatic attention in the 1980s, now seemed of less importance than their broader institutional interests. Their primary concern was force reduction, which would bring the armed forces more into line with whatever threats continued to exist to national security in an international environment no longer dominated by Soviet–U.S. rivalry.[3] The prospect of force reduction and a smaller defense budget elicited interservice tensions that continued, despite GNA-mandated jointness.

Medical readiness issues, including aeromedical evacuation, lost visibility at the highest levels of the U.S. military except the offices of the surgeons general. There, readiness tended to be secondary to congressional pressure and pressure from the DoD leadership to contain the costs of the military medical system. Some of the increasing costs the system was experiencing were due to the changing nature of the military's mixed constituency of active duty and retired personnel and military dependents. In 1960, the ratio of eligible civilians to active duty military treated by the military medical services was 185:100; by 1990, this ratio had grown to 327:100, making costs of benefits borne by military medicine increasingly significant.[4]

At the beginning of the Persian Gulf crisis, the worldwide aeromedical evacuation system available to support a conflict in the CENTCOM AOR looked very much like the system extant during Operation Just Cause at the end of 1989 when the vast bulk of aeromedical evacuation capability resided with the ARC. Another element of potential continuity in the late summer of 1990 was that the cadre of the 1st AMES, which again would deploy first in a contingency, had recent experience in Just Cause, but whether the way aeromedical evacuation was conducted during that operation would be applicable to another, larger contingency was not at all clear.[5]

New, positive attitudes toward the idea of augmenting aeromedical evacuation crews with physicians to move unstable patients were beginning to develop among some members of the Air Force medical community. Even before Just Cause, unit type codes (UTCs) delineating the types of personnel required to provide operational capability in an aeromedical evacuation unit had been created to require the inclusion of flight surgeons, although they had been assigned few specific functions to perform.[6] According to a retired Air Force surgeon general, the therapeutic results of the tactically driven aeromedical evacuation of unstable casualties from Howard AFB during Operation Just Cause had tended to resolve the long-standing debate within the Air Force medical community about moving patients by air sooner after resuscitation or initial surgery. Flight surgeons or other physicians could provide onboard medical intervention should a patient require it during flight.[7]



Air Force and MAC doctrine officially remained that patients aeromedically evacuated would be stable, requiring nothing more than in-flight nursing care. Should exceptional circumstances require the transport of an unstable, or a green, patient who might require medical intervention while in flight, the Air Force stated that the MTF delivering the patient provide physicians or other specialized medical care providers and that any required equipment, such as ventilators, accompany the patient during flight.

The Military Context

Reports addressing medical support and aeromedical evacuation during the Persian Gulf War are few.[8] Because getting combat troops on the ground as fast as possible was the emphasis, medical support not integral to the combat forces was assigned a lower priority. On the eve of actual hostilities in February 1991, some six months after the first U.S. deployments, medical support was largely in place for the units originally deployed in what was codenamed Operation Desert Shield, but by that date the size of the force had essentially doubled.[9]

UN-sanctioned military action against Iraq, christened Operation Desert Storm, began with a massive aerial campaign against Iraqi targets on January 15, 1991. Strikes were made against a range of targets throughout January and into the middle of February as a prelude to a planned ground assault intended to push the Iraqis from Kuwait. The aerial campaign was totally successful, allowing the coalition commander to move his forces far to the west in a strategic flanking movement. In this position, he could mount a simultaneous assault into Iraq while he attacked the Iraqi forces in Kuwait. The distance between these flanking forces and the medical facilities established during Desert Shield now challenged medevac evacuation capabilities and emphasized the need for forward surgical capabilities to stabilize patients within the most efficacious period for initial surgical intervention, the golden hour, prior to evacuation.[10]

Aerial attacks helped sap the resistance of many units in the Iraqi army, and the coalition ground attack, which began on February 19, 1991, was spectacularly successful. It inflicted large casualties upon the Iraqis while U.S. forces and their allies suffered surprisingly few. This outcome was unexpected because the casualty estimates provided to CENTCOM medical planners had been extremely high and promised to place great stress on the aeromedical evacuation system and the medical facilities immediately supporting the ground combat forces. An average of 3,600 intratheater patient movements and 2,500 intertheater patient movements per day was projected as the maximun during the period of ground combat.[11] Actual casualties during the initial days were expected to exceed the projected average because coalition ground forces would have to force their way through what appeared to be formidable defensive barriers. These included extensive minefields, tanks and artillery dug in behind revetments, long earthen or sand berms, and ditches filled with oil to be ignited when coalition forces attempted to breach them.[12]

The rapidity with which Iraqi resistance collapsed and Kuwait was abandoned was consequently both welcomed and somewhat unexpected. An unanticipated result was that Saddam Hussein's continuance in power generated a requirement for humanitarian intervention that included the use of aeromedical evacuation resources. Operation Provide Comfort was mounted to succor members of Iraq's Kurdish minority who were driven from their homes in northeastern Iraq when Hussein reconsolidated his power after the war.

A wounded soldier being evacuated from the battle during Desert Storm.

The larger issue of how well the aeromedical evacuation system functioned can be examined by addressing the following questions: What do accounts of the system's performance during the crisis reveal about how well the total force concept was realized with regard to aeromedical evacuation in the support of deployed forces, and what impact would the lessons of the war have on the evolution of aeromedical evacuation in the USAF?

Utilization of the Medical Air Reserve Component

In contrast to the Vietnam War, reserves of all the services played a significant role in the Persian Gulf War. Nowhere was this more true than in medical support. President Bush did not utilize his legal authority, the Presidential Selected Reserve Call-up (PSRC), to call up to 200,000 reservists to active duty until August 22. Even then, he directed the Secretary of Defense to limit the first call to 48,000 personnel.[13] Volunteers from the ANG and AFRES provided immediate augmentation to the small active duty aeromedical evacuation forces, and large numbers of individual volunteers from the ARC began arriving in the AOR early on to help establish an aeromedical evacuation system to support the deploying combat forces.[14]

The experience of Capt. Virginia Snyder, Chief Nurse of the ANG's 142d AMES, based at New Castle, Delaware, was typical. She volunteered for active duty and was ordered to McGuire AFB where she was processed with a large group of other volunteer flight nurses. On arrival at Riyadh on August 12, her first impression was one of great confusion, a condition which Lt. Gen. William G. Pagonis, the CENTCOM logistics chief, had also remarked upon three days ear-

Navy Lt. Devon Jones, left, runs towards the PAVE LOW that rescued him during Operation Desert Storm. The 20th SOS conducted the first combat search and rescue since the Vietnam War.

lier. Told they would deploy to Al Kharj, she and her fellow travelers ended up at Dhahran, where they were billeted in an old school.[15]

The Air Force also moved quickly with hospital support. Squadron medical elements had accompanied the fighter squadrons, and the service quickly supplemented them with ATHs. The first arrived at Dhahran on August 12. It provided the only U.S. military hospital facilities in the AOR for several weeks.[16]

Analyses of the course of Desert Shield and Desert Storm and their successful results have focused properly on the fact that the United States and its assorted coalition partners had some six months to prepare. Time was essential to provide both the forces and supporting logistic structure for Desert Shield and Desert Storm, particularly because the adoption of the total force concept gave U.S. reserve forces prominent roles in any national emergency. For the Army, this meant integrating the previously designated and appropriately trained Army Reserve and National Guard brigades with active duty Army divisions. Although some combat brigades were not deployed during the Gulf conflict because of concerns that they were inadequately trained, various key support functions such as civil affairs which had been eliminated in the Army's active force and allocated to reserve units were mobilized early in the emergency and deployed to the AOR.[17]

Aeromedical evacuation capability had not been completely eliminated in the active Air Force, but like the Army, its aeromedical evacuation capability resided overwhelmingly in its reserves.[18] Unlike the ANG round-out brigades, aeromedical evacuation personnel in the ARC were already extremely capable in their basic competency, that is, in-flight patient care aboard the tactical or strategic airlift aircraft on which they trained. Medical personnel in the ARC also had more experience as flight

nurses and medical technicians, on average, than their active duty counterparts because of the usual Air Force policy to assign graduates of flight nurse training to only one tour of duty in their specialty. Medical technicians had somewhat more flexibility in that regard, but over their total careers on active duty they generally also had relatively brief assignments to aeromedical evacuation crew duty.[19]

During the Gulf crisis, aeromedical evacuation personnel from the ARC deployed initially as individual volunteers, and volunteers continued to provide the core of the evacuation system in the AOR until the end of 1990.[20] The first involuntary call-up of aeromedical evacuation personnel from the ARC was not done by units, but by groups of personnel and equipment from within various ARC units. Although done pursuant to the President's invocation of his statutory authority on August 22, it did not occur until November 3.[21] Then, the call-up was done by UTCs, according to the three-letter alphanumeric codes assigned to specifically designated personnel or equipment packages, each of which was created to perform a specified mission or portion thereof. MAC filled these aeromedical evacuation requirements by drawing upon different ARC units. In some cases, MAC mixed individuals from different units and deployed them together to fill existing UTCs; in others, it created new UTCs and filled them in the same way.[22] This surprised and upset the ANG bureau and the AFRES, which always expected that entire units would be activated under this authority. What led MAC to activate by UTC was the desire to keep the U.S. presence in the AOR low, and unit integrity received little concern.[23]

In December, continued Iraqi intransigence, the increase in the scale of offensive operations planned, and the larger casualty estimates made clear that greater capability for both intra- and intertheater aeromedical evacuation would be needed and could not be filled solely by volunteers or by activating UTCs. MAC began to activate ARC aeromedical evacuation units as entire units. Although seemingly more straightforward, this process was complicated by the fact that volunteers already in the AOR could not legally be mobilized in place; they had to be returned to the United States for mobilization before they could return to the AOR and be assigned as needed.[24]

The Legislative Basis

The role played by ARC volunteers in supporting aeromedical evacuation is special because the components continue to be the source of qualified personnel for contingencies, large and small, in many scenarios. Legislation permitting the ARC to be mobilized became law in 1952. It allows mobilizing any member of the reserve component, with his or her permission. It neither requires a presidential declaration of national emergency nor invoking the PSRC statutory authority to involuntarily call up to 200,000 reserves, as President Bush did on August 22, 1990.[25]

The purpose of either a voluntary or involuntary PSRC mobilization is to augment the active force for a specific mission. The voluntary option potentially

provides augmentees for the aeromedical evacuation system until involuntary call-ups of ARC personnel are made, but the medical planner confronts a certain ambiguity when developing deliberate OPLANs because he cannot count on the availability of ARC medical crews to meet the OPLAN requirements unless the reserves are formally activated. In 1990, Air Force regulations had few guidelines for accessing reservists or using volunteers,[26] so the enthusiasm of ANG and AFRES aeromedical evacuation personnel in the uncertain context of the Persian Gulf crisis made the voluntary option extraordinarily valuable in meeting the immediate need.

The Development of Medical Support Requirements

The lengthy interval between the UN resolutions and actual combat provided time for the forces to become acclimatized to desert conditions; to acquire intelligence, especially target data, on which to plan both tactics and strategy for the coming assault on the Iraqi forces; and to train to operate in the new environment.[27] Similarly, the interval also provided time to develop a system of MTFs to support the CENTCOM forces, although the facilities were not fully deployed when conflict began. The development of the aeromedical evacuation system reflected the changing CENTCOM mission, but it was always expected to play a key role in the command's plans for handling casualties incurred during combat with the Iraqis.

In the initial weeks after Hussein's forces invaded Kuwait, when it seemed likely that Iraq would also attack Saudi Arabia, heavy U.S. casualties were thought to be inevitable because U.S. force strength on the ground was small. With essentially only first aid and emergency surgery available to the U.S. forces, aeromedical evacuation would have been a principal means of saving lives.[28] As the Iraqis remained quiescent and U.S. strength grew, traditional Army medical doctrine focused on return-to-duty and shaped the planning of third-echelon medical support for the deploying forces. The sick and wounded whose expected return to duty exceeded the evacuation policy adopted for the AOR (initially fifteen days) would be evacuated to hospitals in USEUCOM which, according to plan, would serve as the COMZ for the CENTCOM AOR. If necessary, patients would be further aeromedically evacuated to the ZI. Remaining casualties, excluding those capable of rejoining their units after first aid and brief stays in forward medical facilities, would return to duty following their recovery in hospitals in the rear areas of the combat zone or in the COMZ.[29]

Should an extremely large number of casualties result after a ground assault by CENTCOM forces on the Iraqis holding Kuwait, other considerations would become critical. A large enough number of beds would have to be available in the AOR to hold such casualties, and if a high casualty rate was sustained for any length of time, these beds would have to be cleared of patients frequently enough so that empty beds would be available for succeeding waves of the injured.

Several physical factors would have to be taken into account in dealing with the situation: first, and foremost, the estimated level of casualties; second, the number of patient beds and medical personnel and the amount of equipment that could be deployed to the AOR, or perhaps be provided by Arab states in the Gulf region; third, the capability of the aeromedical evacuation system to move patients from the AOR to the COMZ rapidly enough to prevent an imbalance between the number of available beds and the number of new casualties arriving from the areas of combat; and, fourth, the number of beds and medical personnel in the COMZ able to receive and care for the evacuees.

Medically, there would be an issue of whether patients were air transportable—could they withstand the rigors of aeromedical evacuation during a seven- or eight-hour flight to Germany and the United Kingdom? If they could not be evacuated by air, the possibility existed that too few beds could be cleared in the AOR. An imponderable factor shaping decisions about aeromedical evacuation was the threat to third-echelon MTFs in the rear areas of the combat zone from Iraqi Scud missiles and the chemical and biological agents they might contain, the threat of which CENTCOM medical planners were all too well aware.[30]

With regard to beds in the AOR, the emphasis on readiness during Bud Mayer's tenure as ASD bore apparent fruit in Desert Shield/Desert Storm with the Army's DEPMEDS and the Navy's fleet hospitals and hospital ships. The delineation of aeromedical evacuation responsibilities between the Army and Air Force that had evolved from the Vietnam experience also tended to be accepted as doctrinally sound.[31] Controversy during the Vietnam conflict concerning the roles and missions of aeromedical evacuation was at least tacitly resolved by the Air Force–Army agreement that essentially gave the Army exclusive control of rotary-wing aircraft.

Staffing CENTCOM's Medical Support System

Medical personnel to staff the facilities supporting CENTCOM were to come from the reserves and ZI medical establishments, which all medical planners assumed would stop serving non–active duty personnel during a national emergency. Any shortages in their staffs would be filled with reservists.[32] USEUCOM deployed approximately 2,000 active duty medical personnel to the Persian Gulf, 1,300 from the Army and 700 from the Air Force. The initial cadre of USAF aeromedical personnel arrived contemporaneously with the first Army troops from Fort Bragg. The first Army medical personnel to deploy were first-echelon medical troops integral to the 82d Division and other units of the 18th Airborne Corps. By the end of August, second-echelon Army medical treatment units also began deploying. They were the 44th Medical Brigade, the 28th Combat Support Hospital, and the 5th MASH. One third-echelon facility, the 47th Field Hospital, also deployed.[33] Only after the November decision to move the VII Corps from Germany to the Gulf did additional third-echelon units begin deploying to the

AOR from Europe and the ZI, although the CENTCOM surgeon, Col. Robert P. Belihar, and others had been surveying the possible availability of medical facilities in Saudi Arabia and other potential host nations.

Deploying additional medical personnel from either the ZI or USEUCOM to support CENTCOM had unexpectedly become more complicated as soon as the President authorized involuntary mobilization of the selected reserve in late August. To their great surprise, the service surgeons general were directed to maintain staffing levels in their hospitals sufficient to provide the same level of care to military dependents and retirees that they had been providing before the crisis. Although this undoubtedly had some positive effect on the morale of servicemen dispatched to the Persian Gulf, the directive was largely motivated by budgetary considerations. The intent was to help contain the costs of alternative civilian medical care which would otherwise have to be paid for by the government's Civilian Health and Medical Program of the Uniformed Services.[34]

The initial aeromedical evacuation capability in the AOR came from elements of MAC's 2d AMES based at Rhein-Main AB, Germany. These personnel deployed to Saudi Arabia on August 8, 1990, to provide a limited aeromedical evacuation capability. Four days later the 1st AMES established the theater AECC with 1st AMES Commander Col. Robert Brannon serving as both the AECC director and the TAES commander.[35] Brannon reported to the Commander, Airlift Forces (COMALF), a MAC general officer, who in turn was responsible to the joint forces Air Force commander, Gen. Charles "Chuck" Horner. Ten flight surgeons were also deployed to the Gulf region to help support the aeromedical evacuation system, although Colonel Brannon neither expected their arrival nor initially identified functions for them to fulfill under his command.[36] Ultimately, their potential worth would be demonstrated.

Staffing the Aeromedical Evacuation System

Personnel manning the initial aeromedical evacuation system established in the AOR were overwhelmingly volunteers from the ARC; most were from ANG tactical aeromedical squadrons. Their ANG training and experience was conducted aboard C–130s, with which all but two ANG airlift units were equipped.[37] Their tactical experience dictated that they would serve predominantly in the AOR, but many AFRES aeromedical personnel whose units were assigned to Air Force bases with active and reserve strategic airlift wings were deployed during Desert Shield to bases outside the AOR to support the strategic system. The initial strategic crew capability in-country was provided by volunteers from the 72d and 69th AMESs, AFRES units assigned to McGuire AFB, New Jersey. These strategic crews made themselves available on August 8 and arrived in the AOR on an L–1011 commercial aircraft three days later with the other initial voluntary aeromedical evacuation contingent from the ARC.[38]

The process by which these volunteers were obtained from the ARC is a useful case study of the responsiveness and flexibility that ARC and the volunteer

system provide to the total force's aeromedical evacuation component. MAC formed a crisis response cell immediately after the Iraq's invasion of Kuwait and began to prepare for possible deployment requirements.[39] It approached the AFRES's 69th and 72d AMESs at McGuire and notified each of a probable requirement for ten strategic aeromedical evacuation crews. Each squadron identified ten crews and put them on alert, using previously allocated training days for authority.[40] At this time, the squadrons clearly expected that, if the requirement became firm, their crews would be formally mobilized in accordance with the PSRC authority.

The 1st AMES, the single MAC tactical aeromedical evacuation unit on active duty, was alerted shortly after the invasion, and after discussions at MAC headquarters, Colonel Brannon, its commander, began a confidential preliminary survey of ARC units for possible help. Several days later, he informally approached the ANG surgeon's office by secure telephone to inquire how well the ANG might be able to respond to a tasking from MAC for twenty-five tactical aeromedical evacuation crews, twelve strategic aeromedical evacuation crews, an AECC, and an aeromedical evacuation control element (AECE).[41] His query generated a series of what-if telephone calls from Lt. Col. Paul McGuire of the ANG air surgeon's office to five ANG AMESs near the eastern seaboard—New York, Delaware, Tennessee, West Virginia, and North Carolina—applying the criteria of "proximity, immediacy, availability, and ability to provide the needed UTCs." He received very positive responses.[42] Brannon had previously approached AFRES headquarters with a similar informal query, but AFRES already had indicated to the 1st's tactical aeromedical evacuation unit counterpart in the reserves, the 37th AMEG at MacDill AFB, Florida, that a requirement might come to mobilize its members in support of a possible deployment to Saudi Arabia, so Brannon's queries seemed to be premature.[43]

When, instead of a presidential call-up of the reserves following the initial deployment of U.S. forces, MAC requested volunteers to man the supporting aeromedical evacuation system, virtually all of the twenty strategic aeromedical evacuation crews at McGuire volunteered and deployed to the Gulf, arriving by mid-August. Brannon was formally directed by MAC "to rapidly set up a tactical airevac system in anticipation of going to war within two weeks for the defense of Saudi Arabia." The bulk of the other aeromedical evacuation personnel required to supplement Brannon's 1st AMES came from volunteers from the ANG, mostly from the 142d AMES of the Delaware ANG, who arrived with him in the AOR on August 11.[44]

Volunteers in large numbers from the ANG and AFRES responded to the AMC initial tasking, and both organizations continued to provide volunteer personnel to operate the aeromedical evacuation system throughout Desert Shield as it evolved under the direction of Colonel Brannon and his staff.[45] These volunteers were rotated periodically, with ANG personnel generally remaining in the AOR for an average of forty-five days. As a result of these rotations, by the end of the

year the vast majority of aeromedical personnel in both the ANG and AFRES had served in the AOR.[46]

Oriented for years to supporting OPLAN 4102, the reinforcement of Europe, and with only partially validated time-phased force and deployment data to support plans for moving CENTCOM forces to the Gulf region, medical planners successfully resorted to ad hoc methods to conduct the actual activation and deployment of the required personnel.[47] Because the AOR lacked the rich military and civil infrastructure present in Europe, deploying military units could no longer draw on the dense military and civil communications networks present in Europe to link their units to relevant command and control (C^2) and logistic systems, nor could strategic aeromedical evacuation be supported by a large number of major airfields. Determining where to locate personnel in the AOR to operate the TAES would depend largely on where U.S. ground forces deployed and where they would be engaged in combat operations, should the CINC order them. Here, geography could affect doctrine.

Factors Shaping the Chain of Evacuation

In contrast to Vietnam where the AOR was relatively small, distances in CENTCOM's AOR from the Kuwaiti border to the rear areas and some third-echelon MTFs were quite large. Distances from casualty pickup points were small enough in Vietnam that medevac helicopters could and did overfly second-echelon MTFs directly to third-echelon facilities—evacuation and field hospitals—and the average time from patient pickup to delivery to a medical facility by Army medevac helicopter was thirty-five minutes.[48] By contrast, in the Gulf, the commander of the 44th Medical Brigade worried that the U.S. forces, already more than 200 miles into the Saudi Arabian interior at the beginning of the strategic flanking attack, might outrun their medevac support capability, given the rapidity with which armored forces had demonstrated historically they could advance in desert warfare.[49] The 18th Corps penetration of Iraq occurred approximately 225 miles west of the Persian Gulf coast and 370 miles north of Riyadh.

Whereas the Army concentrated a large number of hospitals—MedBase America was within twenty-five miles of King Khalid Military City, some sixty miles from the Kuwaiti border—other CENTCOM military treatment facilities were dispersed widely.[50] During Desert Shield and the air war, the Army's 46th Combat Support Hospital was located in mideastern Saudi Arabia, some 150 miles west of Dhahran, the principal aerial port of debarkation in the Saudi kingdom for troops and equipment.[51] During the ground war, the 46th moved from the coast of the Persian Gulf south of Kuwait to a position west of Kuwait, a hundred miles north into Iraq.[52]

From Riyadh, where the AECC was located, the Kuwaiti border was almost 300 miles away, and the Air Force contingency hospital at Seeb in Oman was almost 1,000 miles distant. Air Force ATHs were scattered over Saudi Arabia near airfields, from King Khalid Military City to Taif and Jeddah, more than 500 miles

from Riyadh across Saudi Arabia, on the Red Sea. The Navy's Fleet Hospitals 5 and 15 were located near each other at al-Jubayl (Jubail) on the Persian Gulf coast, nearly 120 miles south of the Kuwaiti border and 240 miles east of Riyadh. At such distances, the unrefueled range of Army medevac helicopters posed problems. The Huey helicopters' range was less than 200 nautical miles, and the newer Blackhawks could fly roughly 250 nautical miles on internal tanks.[53]

Potential difficulties were exemplified by the 332d Medical Brigade, a reserve Army medical unit that deployed to the Persian Gulf in late November to support the VII Corps arriving from Europe. The 332d was composed of fifteen hospitals: five MASHs, five combat support hospitals, and five evacuation hospitals. When established in the AOR, the brigade's forward hospital units were approximately 150 miles away from third-echelon evacuation hospitals, a distance that would have required the medevac helicopters (85 percent of them Hueys) to refuel at both ends of the flights between the front and rear hospital facilities. Forward-area refueling points were established, but they were sometimes difficult to find in the desert, particularly at night,[54] and refueling could impose additional stress and transit times on patients. From the perspective of the brigade commander, Brig. Gen. Michael Strong, even with the availability of faster, longer-range Blackhawks, the kinds of distances his hospitals had to deal with made medical evacuation "extremely difficult and very tough to coordinate."[55]

As in Vietnam, Air Force tactical airlift filled gaps in the evacuation system when it moved patients among the many fixed hospitals to the debarkation ports for aeromedical evacuation. In the Persian Gulf AOR, C–130s provided a broader spectrum of evacuation capabilities than had originally been contemplated, but the capability of the TAES to move patients from second- to third-echelon hospitals was especially important. Given Navy and Marine Corps doctrine to rely on opportune helicopter lift to evacuate patients, the availability of the Air Force C–130s would have proven essential had the marines suffered a high casualty rate and only their CH–46 Sea Knight or CH–53 Sea Stallion helicopters been available for medevac. The use of C–130s for evacuation forward of second-echelon medical units was also considered and actually conducted in support of some special forces units inside Iraq. The use of C–130 aircraft for casualty evacuation was also contemplated by the commander of the medical group designated to provide medical support to the 18th Airborne Corps when General Schwarzkopf's left-hook forces penetrated far into Iraq.[56]

Uncertainties surrounding medevac generated a certain amount of frustration. Fourteen months after ground combat ended, one veteran of medical service in the AOR offered his opinion to an audience of fellow veterans:

> We had the greatest capability to provide the definitive medical care in theater that we ever had before, [but] at the same time we had an almost non-existent capability to transport the

> [inaudible] line soldier, Marine, service person to the next level of medical care.[57]

Although his first proposition was somewhat hyperbolic, his second accorded substantially enough with the experience of others in the audience that he was not challenged and was, in fact, echoed by some.[58]

As increasing numbers of U.S. combat forces and combat support forces deployed to the AOR, the medical structure needed to support them, particularly third-echelon MTFs (where theater evacuation policy became a consideration), did not deploy until late in Desert Shield. One of the CENTCOM medical planners estimated that as the January 15 deadline approached, U.S. medical forces were only 50 percent ready.[59]

There were exceptions. Two U.S. Navy hospital ships, USNS *Comfort* and USNS *Mercy*, arrived in the AOR in mid-September. Each was capable of providing 1,000 beds, of which 100 constituted an intensive care unit and 400 were devoted to acute care. Each ship had twelve operating rooms and four radiology rooms. The core medical staff consisted of professionals from major Navy medical centers augmented by reservists. *Comfort* drew heavily from the Navy's flagship hospital, the National Naval Medical Center in Bethesda, Maryland. Both ships were essentially floating general hospitals, that is, fourth-echelon facilities, where definitive care could be provided if the evacuation policy was long enough.[60]

Although superbly equipped and staffed, the capability of the hospital ships to receive mass casualties, unless tied up alongside piers in Saudi Arabia or Bahrain, was problematic. Despite extensive experiments, attempts to embark patients from various types of surface craft to the ships while the vessels cruised offshore were essentially unsuccessful. The Navy found that patients could not be brought aboard at sea by any means other than helicopter.[61] Given the unique medical capabilities of the two hospital ships, strict adherence to Navy–Marine Corps doctrine regarding opportune helicopter medevac obviously risked wasting some of CENTCOM's potentially most valuable medical support because the tactical situation might dictate using the Navy and Marine Corps helicopters for operational missions. Consequently, doctrine was adjusted to need, and a squadron of Army UH–60 Blackhawk helicopters was assigned to assist with medevac support for these vessels. Because the Navy required that helicopter pilots be certified to land on the hospital ships, a program to certify Army as well as marine helicopter pilots was undertaken during the relative quiet of Desert Shield.[62]

Uncertainties regarding the availability of Marine Corps medevac assets also affected Navy third-echelon MTFs deployed to support the marines. Fleet Hospital 15 was established at al-Jubayl in early September at the request of Gen. Walter Boomer, commander of CENTCOM's marine forces, rather than on Bahrain as originally planned. The general wanted this 500-bed, well-equipped and well-staffed, third-echelon facility to be closer to his troops if they were to

battle in Kuwait. Its twin, Fleet Hospital 5, located some five miles away, was also dedicated to support the marines.[63] As he acknowledged later, Boomer chose al-Jubayl in the erroneous belief that, as in Vietnam, medevac accomplished by opportune helicopter lift would prove adequate to move marine casualties to these facilities.[64] Apparently less sanguine than the general about the adequacy of Navy–Marine Corps doctrine in the event of large-scale casualties, and in spite of the marines actually reserving eight CH–46s for medevac, the hospital itself apparently requested help from the Army, which eventually assigned eight medevac Blackhawks to the hospitals in another example of out-of-doctrine cooperation.[65] According to CENTCOM Deputy Surgeon Col. Benjamin Knisely, the absence of adequate marine medevac capability caused his office to plan to use C–130s as the primary means of evacuating casualties to the Navy fleet hospitals, once the ground war commenced.[66]

The difficulties with Navy–Marine Corps doctrine regarding fleet hospitals were further demonstrated when the ground war began. Both fleet hospitals were within the unrefueled range of Blackhawks, but because the hospitals were approximately 120 miles from Kuwait, helicopter evacuation to them was effectively precluded because the time it would have taken to transport a casualty by helicopter from the battalion aid station or clearing and collecting company to the hospital ship would have adversely affected patient outcome. As foreseen by the CENTCOM surgeon's office, when the ground war actually began, patients were brought to rear-area airfields near the fleet hospitals by Air Force fixed-wing transports, although not always in as timely a fashion as medically desirable, before they were moved to the fleet hospitals by helicopter.[67]

Aside from the restriction that helicopters were the only access to the Navy hospital ships, other questions regarding the utility of the hospital ships arose because of the problem that helicopter range limitations posed for medevac in certain parts of the AOR. Assuming that helicopters had been available for the medevac of wounded marines in accordance with Navy–Marine Corps doctrine and that they were available in sufficient numbers, their use to transport casualties to the hospital ships from the second-echelon MTFs supporting the combat units would have required that the hospital ships be brought farther into the Persian Gulf, closer to the forward areas of the combat zone, where they might face some risk in spite of their Geneva Convention status.

The *Comfort* did, in fact, move north of Al Khafji during the marine assault in February and was attacked by Exocet missiles, even though it and the *Mercy* were marked in accordance with and formally protected under the Geneva Convention.[68] In this location, the *Comfort* also encountered floating mines and, as the Exocet attack demonstrated, was subject and vulnerable to attack, even possible seizure, by a clearly unprincipled enemy.[69] Here, the Air Force–directed TAES could provide the means to fill the range and provide security. As was done for the fleet hospitals during the ground combat phase, C–130s could have moved patients to rear airfields near the coast, where helicopters could transport them to

the *Comfort* and *Mercy* while the ships remained at safer distances.[70] In any event, the *Comfort*'s admirable willingness to accept a calculated risk during the actual marine assault on Iraqi troops in Kuwait was moot because the marine's advance took them rapidly out of helicopter range, and neither hospital ship received marine combat casualties.[71]

Development of the Aeromedical Evacuation System

Although deployment of Army hospitals to support the growing ground forces allocated to CENTCOM may have lagged behind deployment of the forces themselves, plans and activities to develop an aeromedical evacuation system capable of supporting the estimated need were proceeding well. Instead of a war for the defense of Saudi Arabia that Brannon had been told to expect within two weeks as he deployed to the AOR, the many months of Desert Shield saw the CENTCOM mission change from deter and defend, as enunciated by the CENTCOM surgeon, to one of offensive action to expel the Iraqis from Kuwait. The decision in late October to more than double the size of the U.S. force, though quantitative, had qualitative implications for aeromedical evacuation as well, and it affected issues such as command, control, and communications. Even more important to the development of the system was the fact that so little of the previous planning for the aeromedical evacuation of patients during a contingency actually applied to the current situation. What Desert Shield/Desert Storm became for aeromedical evacuation in the USAF was virtually a laboratory for evaluating and elaborating—currently called reengineering—the existing system to make it more capable of performing its increasingly important function in the new joint world and in the kinds of contingencies that the United States would face in the post–Cold War world.[72]

The initial aeromedical evacuation system that elements of Brannon's 1st AMES established in mid-August consisted of the AECC, which was located together with COMALF's ALCC at Riyadh; two MASFs deployed at Riyadh and Dhahran; and two AELTs for stationing with second- or third-echelon Army medical units. A third ANG-manned AELT deployed to Incirlik, Turkey, to facilitate communications between the aeromedical evacuation elements in Saudi Arabia and an AECE established by ANG personnel at Rhein-Main AB in Germany.[73] The intra- and intertheater aeromedical evacuation flights consisted of twenty-four tactical aeromedical evacuation crews from the ANG units initially polled; twenty were strategic crews from the 69th and 72d AMESs at McGuire AFB; four were strategic aeromedical evacuation crews from the 2d AMES, the active duty aeromedical evacuation squadron based at Rhein-Main AB. The TAES attained initial operational capability on August 13, and the first aeromedical evacuation mission flew that night.[74]

Once the initial estimates of casualties from operations against the Iraqis were provided to Brannon and his AECC staff by the CENTCOM surgeon's office, they calculated the requirements for an aeromedical evacuation system capable of supporting a force of some 200,000, the size General Schwarzkopf's

force was originally scheduled to become. In late August, these calculations yielded an increase in required personnel to 432 assigned in two AECEs, seven AELTs, five MASFs, and twenty-four strategic aeromedical evacuation crews. Included in this total were the unchanged requirements for one AECC and twenty-four tactical aeromedical evacuation crews.[75] When Washington decided to reinforce CENTCOM with the VII Corps from Europe and additional units from the United States, revised casualty estimates were generated. After MAC Commander Gen. H. T. Johnson refused a request from the theater to deploy the MAC's C–9s assigned to USEUCOM, it became clear that the aeromedical evacuation system supporting CENTCOM would be operated primarily with retrograde airlift in accord with Air Force doctrine.[76]

In mid-December the number of personnel with the necessary equipment needed to provide the required aeromedical evacuation capability was recalculated on the basis of higher casualty estimates, and substantially increased. The new requirements totaled 1,400 personnel, 92 percent of whom were drawn from the ARC. With their equipment, they provided one AECC, five AECEs, twenty-two AELTs, sixteen MASFs (four with personnel only), ninety-nine tactical crews, and fifty strategic crews. Additionally, 109 more strategic crews also drawn from activated ANG and AFRES units were assigned to Brannon's organization but were staged in Germany under the operational control of the USEUCOM AECC.[77]

All these personnel were assigned to the new 1611th AMES (Provisional), a unit created in early November 1990 under Brannon's command as part of a new provisional MAC unit, the 1610th Airlift Division (Provisional). Commanded by the COMALF, the 1610th was intended to provide a single organizational structure for administrative and disciplinary purposes within which to fold the mixture of active duty, AFRES, and ANG personnel. Under MAC operational control, this single organization would provide airlift services including aeromedical evacuation for CENTCOM in the AOR.[78]

Well before the planned increases of December, Brannon's organization had begun to evolve in ways that mirrored the complexity of the requirements that Desert Shield had imposed on the personnel and equipment that MAC had dispatched to Saudi Arabia. While the UN Security Council sought to reverse Iraq's occupation of Kuwait through diplomacy, peace, or at least the absence of conflict, reigned in the AOR. Regardless that U.S. military personnel now living in the AOR were awaiting a decision to go to war, the aeromedical evacuation system had to function in an essentially peacetime mode, a fact that affected some Army second-echelon medical facilities.

The new (after mid-October) COMALF, Brig. Gen. Edwin Tenoso, and Colonel Brannon had to establish a theater aeromedical evacuation system that during Desert Shield would function like the domestic aeromedical evacuation system in the ZI, but its ultimate purpose was to support combat operations by providing tactical aeromedical evacuation capability within the AOR as well as strategic evacuation from the AOR to the COMZ. During this period, deployed

MTFs had to treat various illnesses, numerous sports-related injuries, and victims of motor vehicle accidents, all the while preparing for combat.[79] If these patients, categorized as Disease/Nonbattle Injuries (DNBI), could not return to duty within the fifteen-day theater evacuation policy, they had to be processed through the aeromedical evacuation system and be aeromedically evacuated via C–141s to Europe, the COMZ.[80]

Because U.S. forces, particularly Air Force squadrons, were dispersed widely across the Arabian peninsula, beginning in November 1990 C–130 Samaritan missions provided intratheater patient transport to designated bases for evacuation to Germany. These C–130 missions were conducted on a scheduled basis among the principal aerial ports of entry—Dhahran and Riyadh—and among a network of airfields serving U.S. medical facilities in Saudi Arabia, Bahrain, Oman, and the United Arab Emirates (UAE).[81]

The C–130s operated from six initial bed-down sites, five of which were located outside Saudi Arabia in Oman and the UAE. They flew the Samaritan channels on a dedicated-mission basis and not as aircraft dedicated exclusively to aeromedical evacuation. The C–130 bed-down sites were at Bateen, Al Ain, and Sharjah in the UAE; Seeb, Mashirah, and Thumrait in Oman; and Al Kharj near Riyadh, Saudi Arabia. Some C–130 units, including a detachment from South Korea, moved to more forward bases in Saudi Arabia in January 1991 to ferry troops west in preparation for the flanking attack, the left hook.[82]

Each aircraft normally carried all the equipment necessary to reconfigure it for aeromedical evacuation, but the primary role of the C–130s was to move supplies, equipment, and personnel throughout the AOR. After the air war began, C–130s performed the critical task of ferrying troops of the 18th Airborne Corps to the marshaling points from which the invasion of Iraq was launched. Samaritan missions continued throughout Desert Storm, evacuating casualties as well as DNBI patients.

By the time the coalition forces began combat, the tactical and strategic aeromedical evacuation systems intersected at five strategic hubs: King Khalid Military City and the International Airports (IAPs) at al-Jubayl, King Fahd, King Khalid, and Muharraq.[83] As a measure of the activity of this peacetime aeromedical evacuation system, during Desert Shield, from August 12, 1990, to January 16, 1991, the theater aeromedical evacuation system carried 551 litter and 1,585 ambulatory patients intratheater, and 1,194 litter and 2,071 ambulatory patients intertheater.[84]

The theater aeromedical evacuation system that General Tenoso and Colonel Brannon established functioned well in spite of the fact they had no directly relevant model upon which to shape the system. Vietnam was more than twenty years in the past and had been fought with a different kind of force in quite different geographic and logistic circumstances, which General Boomer acknowledges he was forced to realize after the fact. The never-fought but intensively planned- and trained-for NATO–Warsaw Pact war had involved a much different scenario and infrastructure than the one the planners now confronted.

Perhaps the major problem in the AOR from the point of view of not just the aeromedical evacuation system but the entire medical support structure for Schwarzkopf's forces was the thin communications infrastructure.[85] Compounding the problem of uncertain communications, for which technical solutions could offer at least some help, other factors directly affected aeromedical evacuation but offered few solutions. Those responsible for the aeromedical evacuation system, General Tenoso and Colonel Brannon, had to deal with the tacit personnel ceiling for U.S. forces, the complex nature of the aeromedical requirements posed by CENTCOM's offensive planning, and the sheer size of the aeromedical evacuation forces that actually deployed, as well as the various sources from which they came.

Although ultimately untested in its ability to respond successfully to the predicted levels of casualties against which it was sized, the theater aeromedical evacuation system that Brannon and Tenoso created functioned well and reflected a thoughtful, creative approach to fulfilling the system's requirements. Their success demanded flexibility and a willingness to transcend doctrine and make ad hoc decisions within the AOR, MAC headquarters, TAC, and USEUCOM, all of which were constantly in contact during the crisis.

Perhaps symbolic of the nature of obstacles to be overcome was the fact that neither Tenoso, the COMALF, nor Col. Leonard Randolph, the CENTAF surgeon, initially understood what their respective responsibilities were regarding the aeromedical evacuation system. General Tenoso was surprised upon arrival in Riyadh to learn that, as COMALF, theater aeromedical evacuation was under his command, and Randolph initially believed that the AECC and the aeromedical evacuation system were responsible to him as the CENTAF surgeon.[86] Randolph's general responsibility for the medical support of deployed Air Force personnel and his specific responsibility for the Air Force's ten ATHs in the AOR suggested that the Air Force–operated system should fall under his control. In spite of the somewhat complex command relationships that existed in the AOR, all available evidence points to excellent working relationships among Tenoso, Brannon, Randolph, and the CENTCOM surgeon, Colonel Belihar, and his deputy, Colonel Knisely, and their senior subordinates.[87]

Many problems remained in building an aeromedical evacuation system capable of effectively supporting the CENTCOM forces. Most arose from the expanded medical requirements generated by the scope of the projected combat and casualty estimates. The small management elements deploying with the strategic crews and the personnel of the AECC were no longer adequate, and the UTCs for the tactical flight crews contained no management elements. Additionally, the number of personnel authorized and assigned to the AECC, AELTs, MASFs, and certain other elements of the system were found to be too few to provide this function on a continuous basis as operations required. Certain technical support in logistics and maintenance for equipment, such as generators upon which the deployed aeromedical evacuation teams depended to provide

power for their Pacer Bounce HF radios, were simply unavailable in the austere environment of the AOR.

To help solve such personnel-related problems, Brannon initiated requests that ultimately resulted in MAC's generation of new UTCs to provide the capability that the ARC aeromedical evacuation units required.[88] In addition to the need for more personnel and specific capabilities, effective command and control of the widely dispersed, and in many cases augmented, aeromedical evacuation elements required adjustments to existing doctrine and procedures. In Desert Shield/Desert Storm, MAC had deployed for the first time AECEs to manage strategic aeromedical evacuation operations at each of the five strategic hubs. Later, as the concept of the strategic hub evolved, the AECE functions were expanded to include operational control of all medical and aeromedical elements, both tactical and strategic, at each hub where there was direct involvement in aeromedical evacuation.

The officer-in-charge (OIC) of each hub was designated Director, Aeromedical Operations and made responsible ultimately to the AECC.[89] At any given strategic hub, the director exercised operational control over the AECE, MASF, aeromedical evacuation crew members (AECMs), aeromedical staging facility, and whatever type of patient reception element was present to receive patients and provide triage. Organizations over which he had control thus included an Army clearing company or platoon, a Navy or Marine Corps collecting and clearing company, or any similar element from any service component—Army, Navy, or Marine Corps.[90] The inclusion of elements not normally under AECC authority, such as aeromedical staging facilities and the patient-receiving elements from other services, suggests the high degree of cooperation and substantial amount of trust accorded Brannon and the aeromedical system that he had largely been responsible for creating.[91]

Brannon also requested augmentation of the AECC, and the arrival of augmenting personnel in mid-September allowed him to expand the capabilities of the AECC beyond its primary function of daily operations. The new functions, assumed as the need arose, permitted the 1611th to operate largely as an essentially autonomous unit under the air division that Tenoso commanded. These functions included a contingency planning cell, a training and standardization section, a flight clinical coordinator/aircrew manager section, a medical logistics section, and an orderly room.[92]

The planning cell was given the mission of preparing the AECC to support its wartime requirements. Its tasks included discussing requirements of the unit-level medical planners of the different service components for aeromedical evacuation support, developing intratheater aeromedical evacuation flow proposals to support the casualty estimates provided by the CENTCOM command surgeon, and coordinating C–130 aeromedical evacuation mission requirements based on flow proposals with the ALCC.

The training and standardization section was established only in early November after the OICs at various medical-crew staging locations ascertained

that some AECMs were not fully prepared to perform their duties, a situation largely rooted in the diverse ARC units from which the crew members were drawn. Some AECMs had never flown actual patient missions, many were unfamiliar with certain types of equipment or with the aircraft being flown, and all flew missions according to the standards of their home unit. In many cases, these standards included configuring an aircraft for patient evacuation according to the preference of the MCD, a practice that tended to create confusion when crews from different ARC units were mixed or when they relieved other crews to continue a mission on an already configured aircraft. Programs created to remedy these situations included cross-training strategic and tactical aeromedical evacuation crews so they could function efficiently on either a C–141 or a C–130.[93]

Orderly room functions were the traditional ones—administrative support for routine matters such as pay, promotion, and mail for personnel assigned to the aeromedical evacuation system. Performed as additional duties by the AECC and AECEs for the first five months, the 300 percent increase in personnel assigned to the squadron just before the onset of hostilities made this extra task impossible to sustain. Consequently, Brannon requested a contingent to establish a dedicated orderly room for the 1611th, with a Medical Service Corps officer as the headquarters squadron section commander, a first sergeant, and three medical administrative specialists assisted by eight to ten temporary personnel.

More directly related to the operation of the aeromedical evacuation system as a whole was the medical logistics section. As in USEUCOM, the Army was charged as the single integrated logistic agency for CENTCOM forces. The establishment of the main logistics unit in the AOR, the Medical Support Optical and Maintenance (MEDSOM), as Army medical supply centers were called, proved to be extremely slow. Only at the start of the air war in January was it beginning to provide most theater needs well, according to the then-CENTAF surgeon.[94]

Whereas Brannon created a formal chief of logistics position reporting directly to him only in February, medical logistics support had been a major problem for both Army and Air Force medical units deployed to the AOR since August. When the commander of the 44th Medical Brigade arrived with an advance party on August 11, he found the prepositioned supplies on Bahrain totally lacking in some important medicines. To order stocks of the medical supplies, he and his staff spent literally hours, at huge expense, on the telephone to the Army Materiel Agency at Fort Dietrick, Maryland, passing nomenclature and federal supply catalogue numbers to obtain the requested items.[95]

The only aeromedical supplies initially available in the AOR were those brought by the MASFs and the reserve aircrews from several ARC units.[96] The situation gradually improved, in part because of an unconscious replay of the way the AAF Medical Service provided medical supplies to their flying units overseas during World War II when the Army surgeon general's staff was having trouble doing so. Until stopped by the CENTAF surgeon, ATHs drew upon CONUS stocks through requests to their parent bases for needed items, which were then

shipped by air directly to the AOR, bypassing normal supply channels that, in fact, had not yet been established. The aeromedical evacuation supply situation also improved because Brannon directed that all newly assigned aeromedical evacuation personnel come fully equipped.

Medical supplies were also purchased locally, but the major source came through the use by the CENTAF surgeon's office of agents within USEUCOM who requisitioned medical supplies directly from the U.S. Army Medical Support Center, Europe, at Pirmasens, Germany. This method provided a relatively short turnaround time for requests, sometimes only a week, depending on the availability of airlift from Germany to the AOR.[97] CENTAF also drew upon the generosity of the USAFE surgeon for special equipment, although this was done sparingly for the same reason that requisitions to the CONUS units had ultimately been stopped: CONUS units and USAFE both needed the same equipment. As the beginning of the air war approached and in anticipation that its air bases would probably be struck soon after hostilities commenced, CENTAF gradually built up its own MEDSOM, a stockpile of medical supplies at Thumrait, one of the C–130 bed-down bases.[98]

The difficulty of obtaining medical supplies notwithstanding, Brannon's staff gradually established a workable logistics system, drawing upon the aforementioned sources to provide medical materiel that various elements of the aeromedical evacuation system needed to function. Flight nurse Capt. Jill Von Rothe is a prime example of the versatility demonstrated by aeromedical evacuation personnel until adequate staffing was finally obtained on the eve of Desert Storm. Aided by two medical logistics technicians and several other flight nurses, Captain Von Rothe created an aeromedical evacuation logistics system that assembled and shipped weekly an average of eight pallets of medical supplies to aeromedical evacuation elements throughout the AOR, collected equipment packages with which to outfit ten MASFs prior to their deployment, and had the capability to respond to major new requirements as they appeared. As a volunteer, Von Rothe built this aeromedical evacuation logistics system largely without supervision. These flight nurses taught themselves how to manage medical logistics.

After receiving the substantially increased casualty estimates in early December, the AECC directed that thirty-day resupply packages be prepared for the AECEs, C–130 bed-down sites, and MASFs. The logistics section was able to build approximately fifty pallets and deploy forty-two to their required destinations within eight weeks. All the required pallets were completed and delivered prior to the start of the air war.[99]

Elements of the aeromedical evacuation system to be supplied were widely dispersed, but they were knitted together by the sometimes uncertain HF radios or occasionally by the varied and limited (and heavily used) other communications means available at the different sites in the AOR where U.S. forces were located. For example, before the ground assault, twelve MASFs were deployed to forward locations near airheads close to Army evacuation hospitals or Marine Corps sur-

gical support companies, and several were designated to follow the advancing troops into Iraq and Kuwait. Nineteen AELTs deployed primarily in support of the combat forces, and some were located at fixed Navy and Army medical facilities in Saudi Arabia and Bahrain.

To ensure aeromedical evacuation system responsiveness to requirements, by the beginning of the air war tactical aeromedical evacuation crews were stationed at the two tactical airlift bed-down bases and at each of the five strategic hubs where patients were to be staged for evacuation to Europe. For retrograde evacuation missions to Europe, prepositioned strategic crews obviated the need for C–141s to bring in crew members on routine airlift missions to the AOR from Germany to reconfigure the aircraft and provide in-flight medical care in the return flight. The tactical AECMs not only provided an immediately available capability to reconfigure C–130s that had terminated other operational missions at the strategic hubs, they also provided a source from which to draw flight crews so the aircraft could be dispatched with minimal delay on intratheater evacuation missions. As the time for the ground campaign neared, the tactical crews were also stationed at MASFs for retrograde aeromedical evacuation missions, further increasing the responsiveness of the theater aeromedical evacuation system. To assist the widely distributed evacuation elements in communicating with Army units, the CENTCOM surgeon's office purchased a large number of FM radios from commercial sources and distributed them to the Air Force MASFs and AELTs.[100]

During Desert Shield, the medical regulation of patients from the AOR to USEUCOM was conducted by the Joint Medical Regulation Office (JMRO) in Riyadh, which was in direct contact with the USEUCOM JMRO. The USEUCOM JMRO routinely used the DMRIS in its peacetime mode, which required the identification of the patient and the patient's medical condition.This, in addition to the regulating information, required filling in some twenty-odd data fields. It was a lengthy process that raised questions about the realism of expecting such a system to work if CENTCOM's medical support facilities were inundated with casualties.[101]

The Role of Flight Surgeons in the Aeromedical Evacuation System

Aeromedical evacuation operations in the Persian Gulf War were to further advance the arguments of those in the Air Force Medical Service who believed that the policy restricting evacuation by air to stable patients should change. These physicians wanted MAC to accept stabilized patients for movement, with the implicit corollary that Air Force medical attendants with critical-care skills would accompany such patients to provide medical intervention if necessary while in flight. Not yet accepted as doctrine within the Air Force or MAC, this concept also had its adherents in the Army. In spite of continuing the formal adherence to a

return-to-duty concept, other ideas had begun to gain ground in the Army Medical Department. "Return to duty" required relatively large and sophisticated MTFs located in the combat zone where patients could be held pending return to their units in the field. Some senior physicians in the medical department had begun to look seriously at the concept of clearing the battlefield, which implied keeping fewer casualties forward.[102]

The Army's positive experience with aeromedical evacuation during Operation Just Cause had also impressed some members of its medical department, although the Army surgeon general later expressed concern that the successful evacuation of unstable patients during the Panama operation might be interpreted by Congress as an indication that funding for the Army's forward-based medical units should be reduced. More favorably inclined toward the evacuation of such green patients was the commander of the 44th Medical Brigade, Col. Jerome Foust, with whom Brannon had worked at Howard AFB during Just Cause and who had deployed with him to Saudi Arabia. Foust expected and would have welcomed the same degree of responsiveness, as he termed it, in the aeromedical evacuation system in the CENTCOM AOR that the Air Force established during the Panama operation.[103]

The key to the successful aeromedical evacuations from Howard during Just Cause was the availability of rapid initial surgical intervention—surgery within the golden hour, as it were—to stabilize the patient and enable him or her to endure the flight to San Antonio without suffering further harm. Ideally, though actually done on only two of the Howard evacuation missions, placing a physician onboard as a precaution against a possible decline in the patient's condition while airborne was a logical corollary to the decision to move a patient who was not yet fully stable clinically.[104] Within this context, the perhaps unwitting agents in helping build a new consensus within the Air Force medical community regarding the transportation of unstable patients were the ten flight surgeons who had arrived in the AOR early in Desert Shield and whom Brannon had neither requested nor particularly wanted.

With no specified function to fulfill in the aeromedical evacuation system, the flight surgeons tended to languish in Riyadh. Chosen quickly and somewhat arbitrarily in a few cases, most among this first group had only limited experience in aeromedical operations. Consequently, their collective utility was limited although their individual contributions varied and, according to observers, depended to a large degree on individual initiative and drive. Throughout 1990, operating from Riyadh, these ten flight surgeons were used primarily as flight attendants and periodically visited tactical units, but they were not assigned to any specific organization, nor were they integrated fully into the system.[105]

The arrival in early January of MAC Deputy Command Surgeon Col. Earl Mabry provided the catalyst to create a more meaningful role for flight surgeons during Desert Storm and ultimately provided grist for those favoring a change in the Air Force policy on transporting only stable patients. Mabry, a flight surgeon

himself, was sent to the AOR in an advisory role by MAC Commander General Johnson to provide a physician's perspective to the CENTCOM surgeon on the operation of the aeromedical evacuation system. Responsible for the system established by Brannon, General Johnson wanted to ensure that this pioneering effort was effective in supporting CENTCOM requirements and that the operational concept underlying the system worked.[106]

Brannon apparently developed a CONOPS for utilizing the flight surgeons, but experience with aeromedical evacuation was so scarce as to make it impracticable to attempt to implement his concept immediately. In any case, more pressing concerns—manning, organization, and medical supply—demanded his attention. Eight of the ten flight surgeons were rotated from Riyadh among the five C–130 bed-down sites to better acquaint them with the evacuation system and the medical flight crews assigned. Of the two remaining flight surgeons, one was assigned in Riyadh to the CENTAF surgeon's office and the other was assigned to the JMRO, which was equipped with the DMRIS terminal and collocated with the AECC.[107]

Finding ways to utilize flight surgeons in aeromedical evacuation was not part of the charter that General Johnson provided Colonel Mabry with when he departed MAC headquarters. In fact, Mabry was not even aware of the flight surgeons' presence in the theater until after his January arrival in Riyadh.[108] As he surveyed the evacuation system and had discussions with the physicians at the numerous Army MTFs that were rapidly being established in anticipation of the ground war, Mabry became convinced that flight surgeons, twelve more of whom arrived shortly after the air war began, could fulfill several important functions. At the MTFs operated by the other service components, he discovered a considerable lack of understanding about the evacuation process, such as how the system functioned, what were the procedures for requesting evacuation by air, how patients were to be prepared for evacuation aeromedically, and which patients were candidates for aeromedical evacuation. Moreover, this lack of understanding was coupled with a tendency to designate patients for this type of evacuation perhaps too readily, an understandable tendency given the imminence of the ground war and the large numbers of casualties that Army physicians had been led to expect.[109]

Perhaps more important, Mabry learned from these conversations that the MAC policy that required an MTF delivering an unstable patient for evacuation to provide an accompanying medical attendant and any necessary equipment such as a ventilator or cardiac monitor was untenable in the AOR. Given the expected level of casualties, an Army or Navy hospital that adhered to such a policy would soon be denuded of its physicians and equipment, including the more prosaic but vital litters on which patients were transported.[110]

This meant that the aeromedical evacuation system, particularly the intratheater segment, would almost certainly have to carry unstable patients who required physicians trained in critical care and having some experience in aeromedical

evacuations to assist the usual medical flight crew. These augmentees would have to come from the Air Force, and Mabry realized that flight surgeons provided a cadre that could be tapped for this purpose. The original ten flight surgeons received refresher ATLS training at their quarters in Riyadh and were then dispatched to aeromedical evacuation units in the field. They developed a uniform trauma management kit, drew upon local supply sources to assemble their kits, and had begun flying aeromedical evacuation missions on a regular basis by January 15. Twelve additional flight surgeons arrived in January, and Mabry solicited the assignment of more with critical-care backgrounds to perform the newly specified functions of aeromedical evacuation flight surgeons (AE/FS). Eventually Mabry was able to assemble a group of thirty-two flight surgeons in direct support of aeromedical evacuation. As more flight surgeons arrived, they were assigned either as tactical AE/FS at one of the six C–130 bed-down sites or as strategic AE/FS at one of the five strategic hubs from which C–141 flights evacuated patients to England and Germany.[111]

To facilitate the smooth functioning of the system, the AE/FS in the field established direct liaison with local MTFs where, among other things, they presented briefings on the wartime function of the system, its capabilities and limitations, and its requirements for preparing patients. They also conducted in-patient consultations to address special transportation problems with the local medical staffs.[112] Several provided trauma training to aeromedical crews who, because they were predominantly from the ARC, had limited experience in transporting seriously injured patients. The AE/FS were also assigned to MASFs, and they served as squadron medical elements for the aeromedical evacuation units at the bed-down sites and strategic hubs because, alone among all Air Force flying organizations, the aeromedical evacuation squadrons had no assigned flight surgeons. The flight surgeons flew all missions, including scheduled Samaritan missions, and, although they deferred to nurses who were MCDs on flights not requiring their skills, they performed a number of in-flight interventions when it became necessary.[113]

Mabry and his flight surgeons were also able to secure outside help. They recruited sixty additional physicians from local MTFs to act as aeromedical evacuation opportune physicians, forty of whom volunteered to support the TAES and twenty of whom volunteered to support the strategic system. Most of the volunteers were Air Force flight surgeons from other Air Force organizations, and some served as squadron medical elements with U.S. flying units at the same base or were assigned to aeromedical staging facilities. A few were non–flight surgeons from Air Force ATHs and Army evacuation hospitals.[114]

These volunteer physicians were used most commonly to support aeromedical evacuation missions with a large number of critical-care patients. None were used without coordination with their unit commanders, who tended to favor this tactical system because physicians could be returned to their station on the same day, whereas strategic missions to Europe caused their return to be delayed by 48

to 72 hours. These additional resources permitted 1,200 patients to be transported through King Khalid Military City during Desert Storm, with physicians available on the evacuation flights.[115]

Paralleling this modification of Air Force medical doctrine and complementing it to some degree were similar informal changes in the Army tactical medical doctrine dictated by the situation in the Gulf. The DEPMEDS hospitals the Army dispatched to the AOR were designed to be mobile, but they proved to be much less so because of the nature of the theater and the character of the combat envisioned. In Vietnam, Army mobile and relocatable hospitals became fixed installations early on. In the Persian Gulf War, DEPMEDS took a great deal of time to erect and disassemble and they required not only a large number of aircraft to deploy but also the ground vehicles to transport them.[116] It became evident quite early in Desert Shield that there was simply no way that, as constituted, the DEPMEDS could be moved quickly enough (or, depending on the terrain to be crossed, perhaps moved at all) to provide medical support to rapidly moving armored forces in desert warfare.[117] The solution was to lighten MASH units, including their FASTs, and create forward surgical elements (FSEs) for even greater mobility. The 5th MASH was the first to develop FSEs by extracting small teams of surgeons and other trauma specialists from the MASH's surgical staff, equipping them with minimal essential medical equipment, providing transportation to make them extremely mobile, and deploying them forward, close to the areas of combat. There they could provide the initial time-sensitive surgical intervention on patients, and they were mobile enough to keep up with the armored formations.[118] After casualties had received resuscitative surgery at these FSEs, they could be moved as "green" patients on C–130s to hospitals in the rear for further care or aeromedical evacuation to the COMZ by C–141s. The new availability of en route critical care in both the tactical and the strategic aeromedical evacuation systems complemented this FSE concept precisely.

USEUCOM's Role in CENTCOM's Medical Support Structure

With the initial deployment of forces to the Persian Gulf, USEUCOM was suddenly placed in the position of having to fulfill its designated role as CENTCOM's COMZ. As in the AOR, a great deal of improvisation would be required because little detailed planning had been done for USEUCOM to assume such a role in a Middle Eastern conflict. Its mission for decades was to support Allied Command, Europe, the military arm of the NATO alliance. In terms of the unified command plan that governs relationships among U.S. theater commanders, CINCEUR would have been viewed as the likely supported CINC in the most probable conflict the United States would have faced during the NATO–Warsaw Pact period, subsequent to the Vietnam War. Instead, CINCEUR was suddenly cast in the role of a supporting CINC, as were the other U.S. theater CINCs.[119]

Fortuitously, a functioning vehicle for medical coordination was already present in USEUCOM. It was the Medical Coordinating Committee (UMCC) composed of the USEUCOM surgeon, Maj. Gen. Alexander "Rusty" Sloan, USAF, and the command surgeons of USEUCOM's component commands, including USAFE's Brig. Gen. Charles "Chip" Roadman. The UMCC had been meeting quarterly prior to the Persian Gulf crisis, and within a week of the initial U.S. deployments it initiated a series of monthly meetings that served as the principal vehicle for deciding and executing medical policy during Desert Shield/Desert Storm.[120]

The UMCC used initial planning parameters of an assumed 350,000 U.S. personnel at risk in the Gulf region, an evacuation policy of seven days in the AOR and fifteen days for USEUCOM, and all patient evacuations flowing through USEUCOM rather than being transported directly from the AOR to the ZI. Modeling based on these parameters at both USEUCOM and the Pentagon using the Joint Staff's medical planning model led the UMCC to adopt General Sloan's recommendation that USEUCOM plan to provide 5,500 beds.[121] The issue of how to fill such a large requirement quickly focused the committee's attention on the Air Force's contingency hospital system.

Developed to require essentially only staffing to become quickly operational in the event of a NATO–Warsaw Pact conflict, USAFE's contingency hospitals provided the potential to substantially increase medical treatment capability in the European theater.[122] Consequently, USAFE Commander General Oaks directed in September that preparatory steps be taken toward activating the contingency system to provide beds for casualties from the AOR. USAFE was tasked to provide 3,750 of the planned 5,500 beds. To fulfill this requirement, four Air Force contingency hospitals were to be opened: one at Zweibrucken, Germany, and three in the United Kingdom at RAF Little Rissington, RAF Nocton Hall, and RAF Bicester. Additionally, the capacity of four regular Air Force hospitals was also to be expanded. The four were at Wiesbaden, Germany; Torrejon, Spain; RAF Lakenheath; and RAF Upper Heyford. These actions imposed on USAFE the additional task of bringing out aeromedical staging facilities from storage and assembling them at the reception airfields. Not until early December, roughly a month after the VII Corps was ordered to the AOR from Europe, was the Air Force contingency hospital system formally activated and personnel to staff them deployed.[123]

The Danes offered another contingency hospital at Holstebro; they also offered medical staff and airlift to move U.S. patients from Germany to Denmark on a Danish aeromedical evacuation Boeing 737. Further, the Danish government identified Danish families to host the relatives of U.S. casualties who became patients at Holstebro.[124] Other NATO partners of the United States were also extremely supportive in the medical care area. According to the then-MAC commander, several of his C–141s landing in Luxembourg were not even allowed to pay for refueling.[125]Germany reserved 1,000 beds for U.S. patients, primarily in

surgical wards in hospitals in Koblenz, Ulm, Hamburg, Giessen, and Munich. Helicopters and ambulances sufficient to transport up to 1,000 wounded U.S. personnel per day from the airfields at Ramstein, Rhein-Main, and Nuremberg to U.S. or German military hospitals were also marshaled. A total of 10,000 beds were promised by allied nations if they became needed. USAFE also established aeromedical staging facilities in which patients arriving by air could be received, triaged, restabilized, and held until transported to MTFs.[126]

USAFE Command Surgeon General Roadman, through what he later called stand-off oversight of the aeromedical evacuation system, sought to determine early in the crisis just how ready the European segment of MAC's worldwide aeromedical evacuation system was to support a patient flow from CENTCOM.[127] The issue was of far more than passing interest to Roadman because he was responsible for administering the Air Force hospital system into which casualties from the AOR would flow. The 2d AMES and the C–9A Nightingales of the 55th Aeromedical Airlift Squadron based at Rhein-Main AB would be essential to distribute evacuees from the AOR to the various Army and Air Force MTFs distributed within Europe, or perhaps to evacuate patients from the AOR.[128]

The late activation of the contingency hospitals in Europe paralleled the late deployment of Army third-echelon MTFs to the AOR, and for generally similar reasons: the low priority given the airlift of medical capabilities and resupply. The senior Air Force medical leadership was also concerned not to deploy capabilities too early.[129] What especially hampered the problem of planning and generating the required medical capabilities was the fact that the information on which the projections were based—casualty estimates provided to USEUCOM—varied significantly over time, creating difficulty for the medical planners. General Roadman, who was reassigned to MAC after the war, noted in 1992 that he had found these changes particularly distracting. He related that at one point the medical planning module used by the JCS to project casualty figures had provided different versions almost simultaneously, one doubling the projection of the other.[130]

The final evacuation requirements that Tenoso and Brannon received as actual hostilities grew imminent—up to 2,500 per day from the AOR to the COMZ—within a few days would have swamped the beds that USEUCOM had been tasked to provide. The original evacuation policy for the COMZ established by USEUCOM had been modified with CENTCOM's agreement to increase to sixty days until hostilities commenced, after which it would revert to fifteen days, but the projected initial casualty rates would have made even this an unsustainable policy. Strategic aeromedical evacuation of patients to the ZI after being stabilized in COMZ MTFs could provide the means to clear beds sufficiently to cope with large subsequent groups of patients. Complicating the issue was USAREUR Commander Gen. Crosbie Saint's concern to retain casualties from his VII Corps in Europe, where their families were still largely located. Ultimately, the situation resulted in a three-day flow-through policy, adopted originally as a temporary expedient until the contingency hospital system became fully operational but

becoming policy for all patients evacuated from the AOR to USEUCOM once hostilities began.[131]

This accorded well with the optimal medical treatment of potential evacuees because it is generally accepted that the three- to five-day period immediately following initial resuscitative surgery is when patients can be transported with the least chance of infection or medical complication.[132] Transportation as quickly as possible to definitive care in the United States, where greater medical capability is available at MTFs, VA hospitals, and civilian medical centers, might be clinically beneficial, but it tended to contradict the return-to-duty philosophy underlying the medical support system that had been built to support CENTCOM. CENTCOM's acquiescence in this policy, realistic as it might have been, marked perhaps the first overt step toward the 1998 evacuate-and-replace policy that implies profound modification of the entire echelons-of-care concept.

Also realistic was the Air Force's willingness to depart from the retrograde airlift principle on which aeromedical evacuation had depended, with some exceptions since the early 1930s, and accept the potential need for dedicated strategic aeromedical evacuation missions. The need for dedicating missions to aeromedical evacuation rather than relying on retrograde airlift became apparent in December with dissemination of the final casualty-rate projections. The AOR raised the issue in message traffic with MAC headquarters, and while the airlift command temporized its view of the effect that removing C–141s from the airlift of personnel and supplies to the combat zone would have on CENTCOM preparations for war, it indicated it was open to the idea.[133] Informally, MAC agreed that, when casualty rates had reached such a level that retrograde airlift aircraft were unable to evacuate patients from the AOR quickly enough to free sufficient beds to accept fresh casualties (traditionally, the Army Medical Department sought to keep 40 percent of forward hospital beds unoccupied to provide surge capability[134]), the airlift command would reconsider its adherence to retrograde airlift for aeromedical evacuation. Dedicated aeromedical evacuation missions were therefore injected into the CONOPS for aeromedical evacuation that the surgeon general's staff was finalizing.[135]

Another resource would also be called upon, if necessary. The aeromedical evacuation segment of the CRAF could be activated to supplement the strategic aeromedical evacuation capability available in retrograde and dedicated missions. Before the war, MAC had contracted for the AESS, and a number of commercial airlines had committed themselves to support an aeromedical evacuation segment in the third stage of the CRAF. Delivery of the AESS was not scheduled to begin until July 1991, but heavy pressure from General Johnson compelled the contractor to advance the schedule. By mid-January, ten AESS were available and a decision to activate the aeromedical evacuation segment was being considered.[136]

The experience of USAFE Commander General Oaks also affected the aeromedical evacuation system. During Operation Just Cause he had been the senior Air Force officer in the San Antonio area with responsibility for the mili-

tary medical facilities receiving the casualties of the Panama operation. Remembering the problems encountered then, Oaks directed that family reception centers be established at all the major civilian airfields to assist civilians arriving from the United States in finding family members who had been evacuated from the AOR to USAFE hospitals. Oaks also directed General Roadman in early January to create a patient-tracking system that would be initiated when a casualty entered the aeromedical evacuation system.[137]

The Final Planning for Aeromedical Evacuation

Almost daily telephone conferences throughout December among the principal medical officers at TAC, MAC, USEUCOM, USAFE, CENTAF, and CENTCOM were part of the intensive efforts to provide the necessary medical support for CENTCOM. MAC published a draft CONOPS for aeromedical evacuation on December 15, 1990. Final planning for how the system was going to work was realized at a two-day conference in the AOR where representatives from MAC, the concerned commands, and agencies in Europe and the AOR met face-to-face. Col. Carroll Bloomquist, MAC's director of Readiness Planning, arrived at Rhein-Main in late December to talk with the 2d AMES staff. On successive days he briefed General Roadman, General Oaks, and members of the USEUCOM staff, including the European theater JMRO, on the aeromedical evacuation CONOPS. Representatives from these European agencies accompanied Bloomquist to Riyadh where the conference was held at CENTCOM headquarters.[138]

Many details were settled at this conference led by Colonel Belihar, but the two major issues were hub-to-hub regulating and dedicated aeromedical evacuation missions, and agreements were reached in both cases. That a consensus transcended doctrine itself was perhaps the most important because the agreements themselves were overcome by events: the quick end to the war and the low level of casualties. Interestingly, the conferees agreed on tentative solutions for problems inherent in any large-scale operation conducted in the CENTCOM AOR with the then-current state of doctrine and readiness of the aeromedical evacuation forces. The critical element in the situation was the fact that the duration of Desert Shield had allowed these issues (and others in the structuring of medical support for General Schwarzkopf's forces) to be addressed without a cost in lives, as might have been the case had the eventual conflict occurred earlier in the buildup of U.S. forces.

The proposed solutions were grounded in the unique realities of the situation that General Schwarzkopf faced and the collective experience of those involved with aeromedical evacuation. Hub-to-hub regulating was an attempt to anticipate and avoid the problems that evacuations on the scale predicted would have created for the medical regulators at the JMROs at Riyadh and Rhein-Main. DMRIS terminals for automated medical regulating linked to the JMRO at Rhein-Main had been deployed at Riyadh and Bahrain. The Army's equivalent of DMRIS, the

Theater Army Military Medical Information System (TAMMIS) for regulating Army patients in the AOR, had a design capability for an automated input to DMRIS.[139]

This theoretically provided a comprehensive system for medical regulation linking evacuation hospitals to the ASMRO at Scott AFB, which regulated patients to MTFs in the ZI. Medical regulation during Desert Shield, in the measured but obviously strongly felt words of the commander of the 44th Medical Brigade, had some very serious problems, not the least being that TAMMIS interfaced with DMRIS imperfectly.[140] Even if the automated systems had been compatible, the contingency regulating system provided no way to track a patient. When hostilities commenced (or preferably before, to allow the regulating officers to familiarize themselves with the changes), contingency regulating information transmitted to the USEUCOM JMRO from its counterpart at Riyadh would consist only of the number of patients categorized by their wounds or illness. The extended use of the peacetime regulating system during Desert Shield, with its vast information requirements, prevented regulators from familiarizing themselves with the contingency system.[141]

Also described as a *push* system, the concept of hub-to-hub regulating originated with Medical Service Corps officers experienced in aeromedical evacuation in MAC. Colonel Bloomquist's observation of the aeromedical evacuation system in Europe during five years in USEUCOM followed by three more on the SHAPE staff convinced him that the European regulating system would be unable to handle the predicted flow of casualties. Brannon shared this conviction, not least because of his intimate knowledge of the strength and weaknesses of the intratheater aeromedical evacuation system and its interfaces with the strategic aeromedical evacuation system, all of which were essentially his creation. He also undoubtedly drew on his observations of JMRO capabilities, because it was collocated with the AECC.[142]

The concept of hub-to-hub regulating was relatively simple: patients evacuated from a particular strategic hub in the AOR would be transported by a mixture of retrograde and dedicated aeromedical evacuation missions to a paired airfield in Germany or the United Kingdom. From there, patients would be distributed to appropriate hospitals after triage and processing through the aeromedical staging facility. The paired hubs were King Khalid IAP at Riyadh with Rhein-Main AB, Germany; King Khalid Military City, the MedBase America, with Ramstein AB, Germany; King Fahd IAP near Dhahran with RAF Waddington, United Kingdon; al-Jubayl IAP, farther north on the coast, with RAF Upper Heyford, United Kingdom; and Muharraq IAP on Bahrain Island with RAF Upper Heyford.[143] Depending on location and distance to be traveled, patient distribution would be made by C–9s from Rhein-Main, by helicopter, or by ground ambulance. When hostilities commenced later in January, it became painfully obvious that conferees had carried away from the January aeromedical evacuation meeting a different understanding about when this system was supposed to be instituted.[144]

A corollary issue decided at the January 4 meeting involved dedicated missions in which aircraft come under the Geneva Convention and cannot be used for any other purpose. MAC agreed to allocate eleven such missions per day to the strategic aeromedical evacuation of patients from the AOR to the European COMZ. When the requirement for patient movement reached an agreed-upon level, aircraft arriving at Rhein-Main would be reconfigured for aeromedical evacuation to save time and be launched as necessary with medical flight crews deployed to Europe to support such missions.[145] The same approach was approved by General Tenoso, the COMALF, who agreed to dedicate two squadrons of C–130s for intratheater aeromedical evacuation at the point when retrograde airlift could no longer support the required patient movement in the AOR.[146]

The somewhat tenuous understanding of these agreements by the concerned agencies was revealed fairly rapidly when Brannon, using one of the dedicated missions allocated, sought to test the hub-to-hub system after the air war began. MAC disapproved the diversion of airlift missions from CENTCOM's operational priorities because airframes were in short supply and retrograde C–141s were still capable of handling the then-existing patient airlift requirements.[147]

While these issues affecting the operation of the aeromedical evacuation system within the CENTCOM AOR and between it and USEUCOM were being worked out, planning for the reception and further distribution of patients in the United States moved ahead. In late December, MAC directed that aeromedical staging facilities be established at bases selected as reception points for evacuees from the Persian Gulf: McGuire AFB, New Jersey; Andrews AFB, Maryland.; Charleston AFB, South Carolina; Kelly AFB, Texas; and Norton AFB, California. The day after the air war began, CENTAF requested that the aeromedical staging facilities be activated, and once the ground war commenced in February, MAC headquarters alerted all to be prepared to receive patients. The three eastern bases were scheduled to receive the greatest number of patients, with Andrews AFB being the primary reception center.[148]

The Test: The Aeromedical Evacuation System in Desert Storm

In spite of minor but disturbing regulatory problems, notably, patients regulated to MTFs in Germany but arriving at reception airfields in the United Kingdom, the low level of casualties precluded an actual test of the system. At the initiation of the ground war, an additional tactical aeromedical evacuation channel had been created. An extremely well-equipped and staffed contingency hospital, the 1702d, was established in the AOR at Seeb, Oman, under the leadership of Col. P. K. Carleton, formerly on the medical staff at Scott AFB. Part of a joint Army–Air Force medical complex, the 1702d was tasked to receive patients directly from the front lines.[149] The complex was fruit of Colonel Belihar's early search for third-echelon facilities in host nations, and it was far enough from the

Marines evacuating casualties on a C–141 in February, 1991.

forward area of the combat zone—a 4½ hour flight by C–130—to almost qualify as a COMZ facility. It was little used, and after January 22 the TAES was far busier flying enemy prisoners of war (EPWs) to the rear areas for medical treatment than it was in evacuating U.S. battle casualties.

Some 632 wounded enemy prisoners were transported on nineteen aeromedical evacuation missions beginning in January; a smaller number was transported on eight combined U.S.–Saudi aeromedical evacuation missions that began on February 17. The February missions were manned by U.S. aeromedical crews on nine dedicated Royal Saudi Air Force C–130s specially configured for aeromedical evacuation and flown by Saudi flight crews. Some 82 pan-Arab coalition and enemy casualties were evacuated either to the single MTF dedicated to enemy prisoners, the 300th Field Hospital, or to hospital facilities in Saudi Arabia and other host nations.[150] By contrast, of the 7,231 patients aeromedically evacuated on intra- or intertheater missions (4,856 of them on strategic aeromedical missions to USEUCOM) from January 17, the start of the air war, to March 31, 1991, only 355 were battle casualties.

Between August 12, 1990, and March 31, 1991, the aeromedical evacuation system established to support CENTCOM transported a total of 12,632 patients—5,099 litter and 7,533 ambulatory—on 671 missions. More than half of the total, 415, were intratheater evacuations, and 256 carried 8,121 patients from the AOR to hospitals in the USEUCOM, CENTCOM's COMZ.[151] On March 4, General Tenoso directed the 1611th to begin redeployment, and most of its members were gone by the end of March. On April 7 replacement active duty and ARC personnel from USEUCOM assumed command and control of the remaining aeromedical evacuation force in the AOR.

Proven Force and Provide Comfort

During Desert Shield/Desert Storm, the focus of medical support to CENTCOM, including aeromedical evacuation, was on the AOR and the forces deployed there. However, part of the air war against Iraq was conducted by USEUCOM from Turkey, a NATO member country within USEUCOM's AOR. Codenamed Proven Force, aeromedical evacuation support requirements existed for U.S. air forces deployed to Incirlik and other Turkish air bases. Because no ground offensive was planned, meeting the high patient movement issue that concerned CENTCOM, CENTAF, and the COMALF in the AOR was moot. Brannon deployed one of the first seven AELTs activated to Incirlik early in Desert Shield, but aeromedical support for the fighter units assigned to various Turkish air bases appears to have been provided by C–9s and medical flight crews from the 2d AMES. Incirlik had been one of the stops on the theater aeromedical evacuation channel mission itinerary for many years.[152] In the wake of Desert Shield/Desert Storm, Operation Provide Comfort, the provision of humanitarian assistance to Kurdish refugees in northern Iraq, generated broader medical and aeromedical evacuation requirements. Provide Comfort, like Desert Shield/Desert Storm, was an operation that demanded flexibility in planning and execution of the needed medical support. For this operation, CINCEUR was the supported CINC.

Iraqi Kurds took advantage of Saddam Hussein's defeat to mount a rebellion against control from Baghdad in an attempt to create an independent Kurdistan. Iraqi forces suppressed the rebellion, particularly relying on the armed helicopters that CENTCOM had mistakenly allowed Iraq to continue operating. By April 9, 1991, 300,000 Kurds were refugees in the mountains along the Turkish-Iraqi border, others had crossed into Iran, and another 280,000 fled into Turkey. Beginning on April 6th, the United States with twelve other nations mounted Provide Comfort to provide humanitarian aid to the refugees who were suffering harsh weather conditions and a critical lack of potable water, food, shelter, sanitation, and medical supplies.[153]

A combined task force of representatives of the participating nations established itself at Incirlik, which became the strategic aeromedical evacuation hub. USAFE deployed an ATH to Silopi in southcentral Turkey near the Iraqi-Syrian border where a humanitarian services support base had been established to provide logistic support to two JTFs and other allied forces. The JTFs missions were to succor the Kurds in the mountains, clear Iraqi forces from northern Iraq, establish transition camps for Kurds brought in from the mountains, and negotiate the Kurds' final resettlement in Iraq.[154] Aerial reconnaissance revealed groups of refugees at forty-three separate locations and eleven major campsites. Silopi had no airfield, and the mountainous terrain throughout the border area placed the primary burden of patient evacuation on Army medevac helicopters, whose responsiveness was hampered by inadequate communications. Initially, rotary-wing aircraft took patients to the Turkish air base at Diyabakir. From there, Blackhawk

Operation Provide Comfort in 1991.

helicopters with extended-range fuel tanks, C–130s, or other fixed-wing aircraft could evacuate the injured or ill to Incirlik. Even Gen. John R. Galvin's VIP-configured C–9 was used for an emergency airlift from Diyabakir to Incirlik during the general's inspection visit to Turkey. Another general officer's C–12 Huron was used for the same purpose, also for a flight from Diyabakir to Incirlik.[155]

Volunteers from among AFRES medical flight crews who had served in the 1611th deployed to Incirlik in May to provide the crews for aeromedical evacuation flights by the C–130s based there. Within a month, an airfield opened at Sirsenk in northern Iraq to provide a more direct route to Incirlik. Volunteer crews who staffed these missions were based in a tent city at Incirlik, but they staged at Diyabakir for short periods to be readily available for emergency aeromedical evacuation requirements.[156]

Neither Diyabakir nor Sirsenk had MASFs deployed, but Incirlik had one. At Sirsenk were a British combat hospital, a French medical unit, and a U.S. AELT composed of one Medical Service Corps member from Brannon's 1st AMES, two flight nurses, and four medical technicians, all of whom had deployed to Turkey in May from the Gulf. The Incirlik USAF hospital had been expanded for the operation, and patients were either held at the hospital for treatment or evacuated on routine C–9 flights with medical flight crews from the 2d AMES at Rhein-Main.[157]

By late July, Operation Provide Comfort was essentially over, and the Kurdish situation had been stabilized under a no-fly zone enforced by international combat aircraft patrols. Although the 2d AMES from Rhein-Main supported patient lift to Germany from Incirlik, aeromedical evacuation units from the ARC also played important roles in Provide Comfort as they had in Desert

A Kurdish refugee camp in 1991.

Shield/Desert Storm. The 32d AMEG from Kelly AFB provided the MASF at Incirlik, and the 74th AMES from Westover AFB, Massachusetts, provided the medical flight crews for C–130 evacuation flights.[158]

Conclusion

It seems abundantly clear from talking with many of the senior medical leaders and reading their candid comments to one another in various postwar encounters that, even as they went about developing a medical support system for CENTCOM during Desert Shield, they tended to share the view ascribed to them later by the CENTCOM deputy surgeon: We aren't going to do it this way again![159]Facing a situation quite different from the one they might have anticipated during the Cold War years, and with the Vietnam experience rapidly becoming a distant and not too fond memory, senior surgeons and their medical planners from all the U.S. services took the tools they had—the doctrine, equipment, mobilization system, and personnel resources of a new total force—and adapted them to the unique requirements posed by an offensive war in the desert. Not only were the requirements of offensive war quite at variance with the defensive posture of NATO, which the United States led, the force mix had changed; U.S. armed forces were now composed entirely of volunteers, the inclusion of reservists was absolutely necessary, and jointness was a statutory imperative.

Nowhere was this adaptability more evident than in those who shaped the aeromedical evacuation system. The General Accounting Office (GAO) was justifiably critical of shortcomings in each of the U.S. services' medical readiness programs, including the Air Force's aeromedical evacuation system, in support of

operations in the Persian Gulf,[160] but what does not appear in any of the GAO reports is the truly remarkable willingness that senior medical leaders had to transcend in breaking down institutional rivalries and conflicting medical doctrines to fashion a comprehensive medical support system that, although ultimately unstressed, nevertheless appears in retrospect to have been capable of meeting the challenge.

Regarding medical cooperation in Desert Shield/Desert Storm, one extremely knowledgeable observer of contemporary military medicine observed recently that whatever it was, it wasn't joint.[161] Compared to admittedly smaller but nonetheless illustrative events involving medical practitioners from different services prior to the 1986 GNA, military medicine in the Persian Gulf War represents a quantum leap forward in jointness that evolving trends in world conflict seem to demand.

An effective aeromedical evacuation system was the critical link in the medical support system. Perusal of the GAO criticisms of the CENTAF aeromedical evacuation system suggest that investigators used a snapshot approach rather than evaluating how the system had evolved and what its actual capabilities were on the eve of the ground war. Citing, sometimes erroneously, individual deficiencies identified in Brannon's after-action report, the GAO does not evaluate the report as a whole. It does not assess the cumulative effect of the remedial actions that Brannon describes were taken to correct deficiencies and create what appears to have constituted an effective system when the ground phase of Desert Storm began.

Brannon simply does not state in his after-action report, as the GAO asserts, that "the predicted flow of casualties would have overwhelmed the aeromedical evacuation system because not enough aircraft were allocated to evacuate patients."[162] This is the conclusion that the GAO investigator drew from Brannon's theoretical calculations of the number of C–141s needed to evacuate the predicted number of patients, given assumptions about the number of available aircraft, the evacuation policy, and other important factors that the investigator implicitly accepts as accurate and immutable. Similar conclusions regarding the probable collapse of the aeromedical evacuation system must also be taken skeptically. After the fact, although the whole issue regarding possible collapse of the aeromedical evacuation system is ahistorical because it was never stressed as predicted, experienced observers have expressed their belief that the system could have handled the peak loads as predicted. These observers include the USEUCOM surgeon who went on to become surgeon general of the Air Force, the senior CENTAF medical planner, and MAC's director of Medical Readiness and Evacuation.[163] The *Gulf War Air Power Survey* comment that the intertheater evacuation system was probably incapable of handling such a load without major reinforcements and workarounds may be quite correct; however, the capability for allocating additional aircraft and crews, if required, was real, according to the MAC commander, and the USAFE surgeon's reasonable concerns about the avail-

ability of patient-care equipment ignored the extremely large amount of such equipment that did in fact arrive in the AOR in January and in the CENTAF MEDSOM at Thumrait, of which the USAFE surgeon admitted after the war that he was unaware.[164]

Brannon's after-action report not only describes the evolution of the aeromedical system from its modest beginnings in August to the peak of its capabilities on the eve of ground hostilities, it very consciously lays out what capabilities an aeromedical evacuation system will require in any future similar conflict. The aftermath of the Persian Gulf War would reveal whether the lessons Brannon drew from the event and the prescriptions he made in his after-action report would be seen to be applicable to the inevitable reengineering that the aeromedical evacuation system would receive.

Chapter 10

EMERGENCE OF THE POST–GULF WAR AEROMEDICAL EVACUATION SYSTEM: TRENDS, ISSUES, AND BUREAUCRACY

Institutionalization of the Desert Storm/Desert Shield Aeromedical Evacuation Experience

The medical components of the U.S. Army, Navy, and Air Force shared common experiences during Desert Shield/Desert Storm providing the basis for a new paradigm upon which to base the organization of a more truly joint aeromedical evacuation system. Whether each service would draw the same lessons learned, or whether there would be internal agreement within the individual services as to what the proper lessons were, also remained to be seen. The events of Desert Storm would, however, provide a powerful impetus toward further realization of the objectives of the GNA.[1]

Some lessons, such as the relative lack of mobility of DEPMEDS combat support and MASHs in the CENTCOM AOR, were immediately obvious, and the Army Medical Department quickly dealt with the problem. As an immediate solution, it formed forward surgical elements and teams, FSEs and FSTs, from its combat support hospitals and began to lighten the DEPMEDS. Other apparent lessons, such as the widely voiced conviction by many Army veterans of the Gulf War that the Army required a new fixed-wing, medium-range aircraft with short takeoff and landing characteristics for medevac, were somewhat more problematic and implicitly threatened to resurrect controversies with the Air Force over roles and missions.[2] A serious move by the Army to procure such an aircraft would

surely provoke Air Force resistance as well as undoubtedly irritate C–130 pilots who had flown aeromedical evacuation in the Gulf, considering that Army Medical Corps personnel had publicly praised the Air Force's willingness to send its C–130s forward of second-echelon MTFs to retrieve casualties.[3]

Not all potential customers in the AOR were positive about their experience with the Air Force and the TAES. One was Cmdr. Gary Breeden, the naval officer commanding the 1st Medical Battalion of the Marine Corps' 1st Service Support Group. His medical battalion deployed six second-echelon MTFs close to the Kuwaiti border in support of CENTCOM's marine component, and the CENTCOM surgeon's plans were that Air Force C–130s would conduct patient evacuation to the fleet hospitals near al-Jubayl. Based on the Air Force's record in evacuating patients from his forward hospitals during the short ground war, Breeden, who became the USTRANSCOM deputy command surgeon, thought the service promised more timely evacuation support than it could deliver.[4] His comment about Air Force support to his hospitals may have reflected unique problems rather than inadequacies in the TAES as a whole, but the issue was valid and had implications for future conflicts. The availability of airlift to meet aeromedical requirements was an issue the Air Force had to address, considering General Tenoso's difficulties in implementing his decision to use two squadrons of C–130s for aeromedical evacuation during the period of actual hostilities.

Historically in large-scale modern wars, tension exists between requirements to use airlift for operational support of the combat forces and the aeromedical evacuation of casualties. Desert Storm proved no exception. Looking back on events, General Tenoso indicated he would have found it impossible to honor his commitment because even the relatively short ground war had generated heavy tactical airlift requirements.[5] Whatever might have occurred in a longer ground war incurring heavier casualties, the theme sounded by many Army medical veterans of Gulf operations and the senior marine, General Boomer, reflected the reality that Desert Storm revealed serious potential shortcomings in the chain of evacuation for Schwarzkopf's forces.[6]

Aside from medical readiness, this issue had budgetary implications that were not inconsiderable. The steady decline in the overall defense budget that predated the Gulf crisis had only temporarily been arrested with the heavy expenditures necessitated to cover the costs of U.S. involvement, even though the United States' costs were partially recovered from Saudi Arabia. Declining budgets had only heightened pressure on each service to develop more efficient methods for organizing, deploying, and supporting combat forces, and, indirectly, to attain greater jointness.[7]

In this regard, several specifically Air Force issues could have proven central to how aeromedical evacuation might be conducted in future contingencies. For example, would the MAC policy of requiring MTFs to hold patients long enough for them to become clinically stable be reaffirmed in the postwar period? The policy stated that if unstable patients required emergency aeromedical evacuation,

the MTFs from which they came must provide accompanying attendants and life-sustaining equipment. This procedure had been blurred somewhat because AE/FS had been present on most aeromedical evacuation flights within the AOR. The surgeons could intervene medically if the condition of a stabilized patient deteriorated unexpectedly, and their presence had allowed the transportation of "greener" patients than MAC normally carried. Flight surgeons also provided insurance against the possibility that casualties might have to be evacuated quickly in such high numbers that forward MTFs would be overwhelmed. It remained unclear whether the Air Force would change its doctrine to place flight surgeons or other physicians routinely on aeromedical evacuation missions in future contingencies.

An implication derived from the possibility of providing critical care in the air was that forward medical support required could be reduced, just as the Army surgeon general had thought (and feared) the experience of Operation Just Cause might indicate to an economy-minded Congress. The fact that the Army deployed relatively small FSEs and FSTs in Desert Storm, when coupled with the speed with which patients could be (and were) aeromedically evacuated from the AOR to the CONUS after surgical intervention, could be seen to foreshadow such a change. It was also obvious that the MAC requirement that MTFs provide medical personnel and equipment to accompany unstable patients would be impossible to sustain in a large-scale contingency when large numbers of casualties had to be evacuated after initial resuscitative surgery.

This MAC requirement also had implications for the sensitive internal sociology of the Air Force Medical Service. If the lesson taken from the Gulf War was that physicians should fly routinely on aeromedical evacuation missions, implementing such a policy could create friction between physicians and flight nurses, who since the end of World War II had routinely served as MCDs responsible for overseeing aeromedical evacuation missions. General Tenoso notes that reports of friction between some flight nurses and Mabry's flight surgeons over who was in charge while in the air had occasioned lively discussions in Riyadh among senior officers who were responsible for these evacuations.[8]

During Desert Shield/Desert Storm, this was a control rather than a medical issue because flight surgeons routinely flew on all aeromedical evacuation missions. An underlying issue was the AMC policy that authorized an MCD to reject patients for aeromedical evacuation who were not clinically stable, but how was *stable* to be defined, and was *stable* defined differently in peacetime that it was for the wartime movement of patients? The answer to these questions would largely determine whether the standard AMC medical flight crew under the direction of an MCD would require augmentation by physicians and/or intensive-care specialists during evacuations. The authority of the MCD had evolved as a reflection of the increased sophistication of nursing skills and MAC's primary focus on strategic, intertheater aeromedical evacuation, which generally did not have the urgency generated by aeromedical evacuation in a tactical situation. The authority of the nurses had come a long way from the emergence of aeromedical evacu-

ation in World War II when the tactical situations and physician-nurse relationships were different. As one of the pioneering flight nurses who landed on Guadalcanal in March 1943 put it many years after the event, doctors provided the patients for evacuation, and "we took all the wounded since there wasn't any kind of real hospital on the island."[9]

Whether a patient was stable for movement generally involved considering several aspects of his or her medical condition, including free breathing, controlled bleeding, treatment of shock, and hydration. For peacetime evacuation, the condition of a patient was considered against certain specific criteria in some twelve categories to determine whether the individual was stable for routine movement by air. After abdominal surgery, patients might travel on the fifth day after their operation if they were functioning physiologically and experiencing no complications. Anemic patients who had a hemoglobin value less than seven might require that the aircraft fly below a certain altitude, or they might require oxygen or transfusions. Patients who had experienced a cerebrovascular accident were not to be routinely moved until seven days after their bleeding had ceased and they showed no subsequent complications. For those with fractures, fresh casts should be between forty-eight and seventy-two hours old and applied with allowance for tissue expansion. For wartime evacuations, the criteria were somewhat more subjective and focused on the professional judgment of the responsible physician. As defined by the JCS Medical Steering Committee in 1985, a stable patient was

> one who, in the clinical judgment of the responsible physician, can withstand a bed to bed evacuation of 6–24 hours without sustaining complications requiring invasive treatment of intervention beyond the scope of general supportive care during evacuation.[10]

In practical terms, the MCD of a standard AMC flight crew generally would not accept a patient for evacuation if the care required in the air during the evacuation was beyond the clinical skill of the medical flight crew under the MCD's direction.[11]

For patients who were stabilized—patients who received resuscitative surgery were not to be considered stable for either peacetime or wartime movement, but if intensive care could be provided during the flight, they could still be evacuated by air—augmentation of the standard flight crew was necessary. Flight surgeons provided such augmentation for the flight crew, although not all were trained in critical-care specialties. An aeromedical evacuation flight crew consisted of two flight nurses, the senior one serving as the MCD, and three enlisted medical technicians. In peacetime, MCDs generally required that augmentation be provided before accepting stabilized rather than stable patients, a prime example being the general rule that a respiratory therapist accompany a patient who required a ventilator to breathe.[12]

Other important issues and questions arising affecting aeromedical evacuation demanded resolution. Perhaps the major one was how to use the Gulf war experience to improve the aeromedical evacuation system within what would prove to be a much more dynamic context than even the end of the Cold War would have suggested. The 1611th AMES commander's report was an obvious starting point. Colonel Brannon deliberately intended that his encyclopedic after-action report be more than the usual narrative of events. He included a comprehensive description of the problems and issues that arose in establishing an aeromedical evacuation system for the Persian Gulf operations, its actual operation during Desert Shield/Desert Storm, and the ways in which problems and issues that had arisen were successfully addressed. His report also offered recommendations intended to achieve a reengineering of the Air Force aeromedical evacuation system to prepare it to function more efficiently in a future contingency. Many lessons from Desert Shield/Desert Storm would have seemed familiar to those involved with aeromedical evacuation since World War II, problems like litter availability and inadequate communications regarding patient movement between echelons of care.

These and other similar issues, many of them discussed in Brannon's report, might be termed generic with regard to changes necessary to improve aeromedical evacuation procedures. Some could be addressed by the service principally concerned through budgetary decisions, policy changes, and new training programs, although the heavy emphasis on jointness placed tacit limits on purely unilateral solutions. The C^2 system for theater evacuation might have appeared to be an area for unilateral Air Force action, given the initial confusion about the nature of command relationships in the C^2 of the TAES. Was this confusion inherent in the way the C^2 system was established, and if so, would changes make the aeromedical evacuation system more efficient and more effectively joint? A consideration of the larger C^2 structure within which the TAES established command and control is necessary to address the question.

The aeromedical evacuation system supporting CENTCOM during Desert Shield/Desert Storm consisted of a mixture of active duty and reserve organizations operating within a command structure at whose apex was the commander exercising combatant command (COCOM)—the supported CINC in joint operations—who assigned the operational mission. When the aeromedical evacuation organizations were called to active duty, they deployed to the AOR and USEUCOM. The Air Force aeromedical evacuation capability overwhelmingly resided in the ARC, under MAC Commander General Johnson. He did not nor could he exercise COCOM.[13] After the aeromedical evacuation units formally arrived in the AOR, the CENTCOM commander assumed COCOM. The membership of these ARC units, together with members from the MAC active duty AMESs, over whom the MAC commander also exercised command, less COCOM, was composed of the provisional unit of MAC, the 1611th AMES that Colonel Brannon commanded in the AOR. The CENTCOM commander, General Schwarzkopf, the

joint force commander charged with the mission of defending Saudi Arabia and expelling the Iraqis from Kuwait, exercised COCOM of the 1611th through the Joint Force Air Component Commander (JFACC), General Horner. Horner exercised operational control of both the 1611th and the tactical airlift forces sent to the Persian Gulf through the COMALF, General Tenoso.[14]

Whatever the seeming complexity of these organizational relationships, the positive personal relationships among the principals made the theater aeromedical evacuation system work. To the degree that there some initial confusion existed among them, not least between Generals Tenoso and Randolph about how authority was distributed within the system, it was rooted in the senior players' lack of previous experience with the new system. The fault lay not necessarily in the system itself. The C^2 structure for aeromedical evacuation was merely a subset of the larger C^2 system for the joint air forces, which was also being exercised for the first time by General Horner in his role as the JFACC.

As one evaluates the effectiveness of aeromedical evacuation during Desert Storm, a potentially bigger issue than the C^2 system was whether sufficient airlift would have been available to move the larger numbers of casualties that Schwarzkopf's forces might have incurred had they engaged in more extended ground combat with the Iraqis. Although this is moot because of the war's early termination, an indication that USTRANSCOM had concern that the available airlift might not have been sufficient was its postwar decision to assign civil aircraft to stage two as well as stage three of CRAF's aeromedical evacuation segment. The intent was to augment its strategic aeromedical evacuation capabilities earlier in a crisis.[15] Having CRAF 767s available earlier in the conflict for transatlantic evacuations would have increased MAC's confidence that other priorities would be less likely to override its decision to retain dedicated C–141s to move patients from the AOR to the COMZ.

Although questions regarding the availability of sufficient airlift to support the aeromedical evacuation system might have been moot, what was definitely not moot was the fact that medical regulating for even the relatively small number of casualties who had been evacuated from the AOR to the COMZ in Europe had by all accounts been demonstrably inadequate.[16] Medical regulators for CENTCOM lay outside the aeromedical evacuation system because the JMRO at Riyadh and a subarea JMRO in Bahrain were joint organizations reporting to the Joint Force/CENTCOM surgeon, Colonel Belihar. Additionally, Army and Air Force medical regulators serving with their third-echelon medical units functioned as requestors for aeromedical evacuation. Complicating the medical regulation process for Desert Storm was the fact that the Riyadh JMRO formally interacted with the USEUCOM JMRO at Rhein-Main, and the regulators did not always agree on the process to be used. According to a senior MAC staff member who helped establish the ad hoc push system for regulating casualties from the AOR to contingency hospitals in Great Britain and Europe, one of the Rhein-Main regulators argued strongly that he could handle the regulation of patients from the Gulf

area even if their number reached the highest level projected—a position with which no one else involved in the process reported any confidence.[17]

The perceived need to bypass the normal contingency medical regulating system for Desert Storm and the disappointment expressed about the deficiencies and confusion of the medical regulating that did occur made the regulating system a prime candidate for improvement. MAC and AMC, its successor organization after July 1992, considered how the aeromedical evacuation system should be reengineered, particularly with an eye toward injecting in-transit visibility of patients. Proposals to change medical regulating could well prove contentious. The Army had opposed ASMRO's earlier move to Scott AFB and the designation of the Air Force as its executive agent.[18] Changes that might appear to increase an Air Force role might trigger some lingering discontent. Medical regulating was a joint function, and USTRANSCOM, rather than the Air Force, was the natural agent for achieving change. This was a role that General Johnson actively sought and one his successors pursued, who as dual-hatted USTRANSCOM and AMC commanders were assigned the task of improving the aeromedical evacuation system.

Another approach to increasing the efficiency of aeromedical evacuation in future contingencies might involve further rationalizing the C^2 of the worldwide aeromedical evacuation system for which MAC had been assigned responsibility in 1975. MAC had assigned management of the system to the commander of the 375th Aeromedical Airlift Wing, and his wing surgeon served as the wing's deputy commander for aeromedical evacuation. The 375th controlled the active duty aeromedical evacuation squadrons of nurses and medical technicians worldwide and the single domestic aeromedical airlift (flying) squadron based at Scott. The aeromedical airlift squadrons deployed in Europe and the Pacific were under the operational control of the respective theater commanders, which meant separate reporting chains controlled the personnel and the aircrews who flew the missions.

Months before the beginning of the Persian Gulf crisis, General Johnson, the then-new USTRANSCOM commander, had evaluated the MAC system as organizationally too complex and confusing to the Air Force line organizations it served. Consequently, he eliminated the 375th's role and directed that operational control of the aeromedical evacuation and the aeromedical airlift squadrons devolve to the airlift wings at which the active duty aeromedical evacuation units were based. Thus, wing commanders at Yokota AB and Rhein-Main AB assumed operational control of their respective evacuation units in addition to their airlift units. The aeromedical evacuation squadron commanders became wing deputy commanders for aeromedical evacuation. In the CONUS, the 317th Wing commander at Pope AFB assumed operational control of Brannon's 1st AMES.[19] Because General Johnson vested his command surgeon with administrative command of the aeromedical evacuation units worldwide, it gave the command surgeon control of training, personnel assignments, medical policy, and standardiza-

tion, thus preserving centralized management of the system. This attempt to introduce a measure of decentralization while preserving the seamless nature of the worldwide aeromedical evacuation system would not last beyond the Persian Gulf War.

Reengineering the Aeromedical Evacuation System: Initial Steps

The task of reengineering the aeromedical evacuation system in the Air Force was given to General Roadman who in October 1991 became the dual-hatted command surgeon of USTRANSCOM and MAC. His USTRANSCOM deputy surgeon was Navy Comdr. Gary Breedon, who had commanded the 1st Medical Battalion in the Gulf AOR. Colonel Bloomquist, who had strong views on how MAC's aeromedical evacuation system should be reengineered, retained his position as chief of Medical Plans and Aeromedical Evacuation.

Other senior Air Force Medical Corps officers with direct experience of the medical support created for CENTCOM were also reassigned in the post–Desert Storm period to positions in which their experience could be valuable in restructuring not just aeromedical evacuation but the entire area of contingency medical support. Alexander "Rusty" Sloan, the USEUCOM surgeon, was promoted to lieutenant general and surgeon general of the USAF, and Col. Leonard Randolph, the CENTAF surgeon, was promoted to brigadier general and made CENTCOM surgeon. His predecessor, Colonel (later Brig. Gen.) Belihar was reassigned to the Air Force Military Personnel Center. The former COMALF, General Tenoso, became USTRANSCOM's Director of Operations/Logistics (J–3/J–4).[20]

Colonel Carleton, who had developed the Air Force contingency hospital at Seeb in the UAE during the war, was assigned to the USAF's Air Education and Training Command as deputy chief of staff for Medical Services and Training. Carleton, who would later command the Air Force's premier medical installation, the Wilford Hall Medical Center at San Antonio, and succeed General Roadman in September 1999 as surgeon general of the Air Force, had strong views on aeromedical evacuation and was an influential voice in the matter, both during the Gulf War and after its conclusion.[21]

As USTRANSCOM/MAC command surgeon, Roadman was ideally suited temperamentally and as a result of his recent experience to direct improvements in the aeromedical evacuation system. He had successfully directed creation of an ad hoc system to provide limited in-transit visibility for patients who entered the USEUCOM theater evacuation system. According to officers who worked for Roadman at AMC, he was extremely competent and focused, always businesslike with his subordinates, extremely thorough and demanding, and admired for his strong sense of mission. One former medical planner in the MAC surgeon's office noted that he had learned more from Roadman than he had from any other command surgeon with whom he had worked.[22]

Roadman's assignment was eminently logical in view of his active involvement with the aeromedical evacuation system as the USAFE surgeon during the Gulf crisis. More importantly, General Johnson specifically requested him.[23] Dual-hatted as commander of MAC and USTRANSCOM, Johnson was keenly aware of his command responsibility for both strategic and tactical aeromedical evacuation. However, he was extremely concerned about his lack of control over all elements of the relevant systems that the Gulf experience had demonstrated.[24] He consequently sought Roadman's assignment not only for his role in Desert Storm but because he considered Roadman to be the best-qualified Air Force medical officer for dual command who could aggressively pursue his objectives regarding aeromedical evacuation.[25] According to Johnson's vice commander, Lt. Gen. Robert Rutherford, who relayed the comment to the newly arrived Roadman, the USTRANSCOM commander considered aeromedical evacuation "the single most important subject on your plate."[26]

Even before General Roadman arrived at Scott AFB, General Johnson had initiated the reengineering process. On July 23, 1991, some five months after the end of the ground war, Johnson's deputy commander, Army Lt. Gen. Dane Starling, invited representatives of the joint staff, commands, and concerned agencies to the initial organizational meeting of a joint casualty evacuation working group (JCEWG) to be held from October 8th to 10th at Scott AFB. Starling's letter stated the JCWEG's purpose was to "review issues of resource commitment and patient in-transit visibility appearing in lessons learned from Operation Desert Shield and Desert Storm."[27] From USTRANSCOM's perspective, the major goal was to explore how acceptable the conferees would find USTRANSCOM's control of worldwide medical regulating. USTRANSCOM also hoped to establish permanent working groups to address joint casualty evacuation issues after the Desert Storm experience and with a view to the future.[28]

General Johnson and the USTRANSCOM surgeon's office were extremely pleased at the results of this first working group. Support for USTRANSCOM's proposal to take control of medical regulating was well received, with only PACOM and the Air Force surgeon general's representatives initially in dissent. The former offered the curious comment that it would be too incestuous for medical regulating to belong to the transporters, while the latter stated no rationale. The conferees did eventually agree that

> Armed forces need a single integrated data system for worldwide medical regulating that operates in both peace and war. The system should provide simultaneous access by all Joint Medical Regulating Offices (JMRO) and the Armed Services Regulating Office (ASMRO) and provide for in-transit visibility of patients.[29]

Additionally, to replace the current fragmented system, the conferees recommended that USTRANSCOM staff[30] a proposal to the JCS through the theater CINCs

and services that would allow it to assume an effective level of COCOM and operational control, and/or responsibility for medical regulating worldwide. While USTRANSCOM did this, the Joint Staff Logistics Directorate's (J–4) Medical Readiness Division would prepare and staff a joint doctrine paper to address joint casualty evacuation issues arising in joint contingencies, like Desert Storm.[31] The conferees also established two JCEWGs: one to handle joint issues; the other to work toward integrating and improving the data systems associated with medical regulating.

Buoyed by their success, by early February General Roadman's staff, led by Breeden, prepared a draft of the proposal recommended by the JCEWG and secured concurrence of the remaining USTRANSCOM directorates. After agreement within USTRANSCOM, the proposal was briefed to a meeting hosted by the J–4 Joint Staff Medical Readiness Division, which included representatives from the U.S. Army Forces Command surgeon general's office. The conferees supported the proposal, and by February 24, 1992, the USTRANSCOM staff's draft had also secured the support of the surgeons general of the Army and Navy as well as the deputy ASD for Medical Readiness, thus moving the USTRANSCOM proposal significantly toward final approval by the Secretary of Defense.[32]

The USTRANSCOM proposal called for providing centralized global management of patient movement by integrating what heretofore had been the separately controlled processes of medical regulating and aeromedical evacuation. The formal process for moving a patient from one theater to another had been that the sending JMRO first ask the receiving JMRO to designate an empty bed for the patient in an appropriate MTF, wait for an answer, and only after receiving one, coordinate with the AECC for space on an aircraft to evacuate the patient. The USTRANSCOM proposal would create and manage a database containing all DoD bed status information (which it termed a reservation system) from which each supported JMRO could itself identify an appropriate bed for each patient and coordinate the required airlift with the supported AECC. The necessary data drawn from separate DMRIS databases would be uploaded on the Global Transportation Network, USTRANSCOM's C^2 system then in development, which would contain data providing in-transit visibility of the personnel and equipment being transported by USTRANSCOM aircraft.

Johnson's intent was to acquire control over strategic aeromedical evacuation, and the USTRANSCOM proposal specifically retained the theater CINCs' control over their JMROs and intratheater medical regulating and aeromedical evacuation missions. USTRANSCOM proposed managing the integrated regulating and aeromedical evacuation system through a new organization over which the TRANSCOM commander would have authority. In formal organizational terms, it would be a USTRANSCOM direct reporting unit created by merging the ASMRO and AMC's PAC (the old AECC), both located at Scott AFB.[33]

Over the next several months, USTRANSCOM aggressively pursued securing the necessary final coordination by the services and the CINCs, working with the J–4 Deputy Director for Medical Readiness Rear Adm. Joseph Smythe, who

favored the proposal. Perhaps predictably, service comments included an alternative proposal that ASMRO be assigned to the Army joint specified command, Army Forces Command, that had responsibility for nationwide medical support if the United States went to full mobilization, rather than to USTRANSCOM. Surprisingly, the Air Force surgeon general's office objected to the role USTRANSCOM proposed for itself as manager of an integrated worldwide medical regulating system. The office characterized the proposal as adding unneeded management changes to what it saw as the basic solution to the regulating problems revealed during Desert Shield/Desert Storm and identified in USTRANSCOM's proposal, the "improved automation systems" to which end efforts were "now underway." The surgeon general's office did see merit in merging ASMRO with PAC for CONUS operations.[34]

In early June, Roadman wrote Admiral Smythe to rebut these objections vigorously, pointing out that the automation improvements cited by the surgeon general's office as underway were either part of the USTRANSCOM proposal, on which USTRANSCOM had already been working with the DoD Director of Defense Information for six months, or were complementary to it, namely, theater-focused initiatives to integrate TAMMIS with DMRIS, whose database allowed a theater JMRO to track and manage its own hospital beds and field an automated data storage card for patients. Roadman pointed out that the proposed fundamental change to medical regulating, together with the required global connectivity and accompanying automation improvements, created by default a "previously nonexistent global command and control (C^2) system for seamless intertheater medical regulating and aeromedical evacuation of patients," and it was this new intertheater C^2 system that would require a single global manager or command.[35] Roadman's arguments carried the day, and the Director of the Joint Staff forwarded the USTRANSCOM proposal to the theater CINCs a week later for their approval. By the end of that month, all had done so, and the CJCS then approved the concept of the new USTRANSCOM mission, an indication of the strong support that USTRANSCOM's proposal had gathered.[36]

General Johnson's quest to have USTRANSCOM gain control of intertheater medical regulating was finally realized by his successor, Gen. Ronald Fogleman, with the issuance of DoD Directive 5154.6 on April 29, 1993. The directive made the USTRANSCOM commander the DoD single manager for implementing policy and standardizing procedures and information support systems for intertheater medical regulating. It granted USTRANSCOM authority to regulate patients from combat theaters into other theaters, and it gave USTRANSCOM authority over ASMRO; it affirmed the responsibility of the theater JMROs or surgeons for intratheater regulating; and it directed USTRANSCOM to provide for the establishment of a C^2 system for global patient movement and patient in-transit visibility, decentralizing control to the supported CINCs. USTRANSCOM responded by initiating a development program named the USTRANSCOM Command and Control and Execution System (TRAC^{2}ES).[37]

In pursuing General Johnson's objective of securing control of medical regulating, the USTRANSCOM surgeon, General Roadman, and his deputy, Commander Breeden, had successfully established a link to the so-called Corporate Information Management (CIM) project directed by Dr. Paul Strassman, a well-funded and powerful DoD official who was the Director of Defense Information. Based on a successful business career, Strassman received a charter from the Secretary of Defense to apply new business management principles to the DoD's command, control, communications, and intelligence (C^3I) information system, improve its effectiveness, and save $70 billion by FY 1997.[38]

CIM involved applying a rigorous analytical methodology to C^3I problems to develop so-called business process improvements. USTRANSCOM's proposal appealed to Strassman's staff as a potentially successful case study that could validate the value of the CIM project. It could demonstrate how the total quality management (TQM) approach to producing a product in the civilian business world could be applied successfully to military organizations. Quality in the TQM sense was something General Johnson began to implement in MAC in the mid-1990s, and General Roadman demonstrated his own commitment to TQM soon after becoming command surgeon.[39] In the USTRANSCOM case, the TQM objective was to change medical regulating and patient movement processes to improve the transport of patients in peace and war.[40]

Strassman's office allocated a significant grant to USTRANSCOM to help fund the required analytic work. In a display of true hands-on leadership, both General Roadman and Commander Breeden spent two hours daily for fifteen weeks participating in CIM workshops, together with other members of the USTRANSCOM staff.[41] Successive workshops, under the rubric of "Administrative Support of Medical Evacuees Business Process Improvement," were conducted from late November 1992 to June 1993. These modeled and analyzed the existing regulating and evacuation processes as a baseline, identified improvement opportunities and requirements, and developed a strategy for measuring costs that was then used to determine the benefit of functional process improvements for related investments in information technology.[42] The high-priority issues identified by the analyses validated the abundant comments of participants in the Gulf War and other anecdotal evidence available. The workshops found:

> efficient medical regulating and patient evacuation decisions are impossible because accurate, timely information is not available;
>
> neither USTRANSCOM, the CINCs, and their service components have visibility of critical medical resources needed to forecast shortfalls and prevent bottlenecks in the patient evacuation process;

> DoD requirements and public expectations demand in-transit visibility (ITV);
>
> manual data entry to support by-name medical regulating and ITV during contingencies is a practical impossibility;
>
> lack of available communications and information resources place severe operational constraints on medical regulating and patient evacuation systems; and
>
> peacetime medical regulating and patient evacuation are at variance with wartime/contingency practice and policy.[43]

The quality of these analyses and the ongoing TRAC^{2}ES development earned the plaudits of Strassman's office and the ASD for C^{3}I, who chose TRAC^{2}ES as the best example of DoD business reengineering to present to the deputy Secretary of Defense. The National Business Process Review Conference '94 recognized USTRANSCOM's effort to improve the medical regulating and aeromedical evacuation processes as one of the federal government's best examples of business process engineering.[44]

Success brought unforeseen complications for the further development of the system. General Johnson's objective had been to secure control of intertheater medical regulating. In an inspection report of September 1993, the DoD IG reported on his evaluation of DoD's ability to provide adequate medical support for military mobilization contingencies, and he singled out TRAC^{2}ES for praise and recommended it for expedited development "to provide for the needs of both intra- and inter-theater patient movements and the information needs of the medical personnel and casualty programs of all services." He requested that within sixty days USTRANSCOM provide a schedule with the times of key events identified for the development and fielding of the new system, which presented a more complex challenge.[45]

Improving Aeromedical Evacuation: MAC Assesses Internal Changes

With its medical regulating proposal, USTRANSCOM had assumed the lead in what was inherently a joint area. The JCEWG conference and the proposals advanced by the command surgeon's office were paralleled by efforts at MAC headquarters to assess how MAC could improve its own processes to better execute its responsibility as the DoD executive agent for aeromedical evacuation. As the commander of MAC, General Johnson tasked his deputy chief of staff for Quality Support and Readiness to conduct an independent assessment of MAC's worldwide aeromedical evacuation system and to recommend corrective actions.[46]

Between August 9 and 13, 1992, a team of four experienced officers, two with line operational experience and two from the MAC surgeon's medical plans

office, conducted the required assessment after thoroughly reviewing all available background data. They reviewed Desert Shield/Desert Storm after-action reports dealing with aeromedical evacuation issues; 549 items from the Joint Staff's Joint Universal Lessons Learned System dating back to 1983; a so-called Aeronautical Evacuation Tiger Team[47] trip report of 1989 from the 375th Aeromedical Airlift Wing; and the medical sections of Admiral Long's report on the Beirut bombing of October 1983. The assessment team developed some twenty-seven questions that were sent to all active duty and MAC-gained aeromedical evacuation units in the ARC, and the units were required to respond. During the assessment, the team conducted a series of field visits to selected aeromedical evacuation units from both components. They also attended an aeromedical evacuation working group conference in late August that General Roadman hosted.[48]

The team's thirty-one-page report is impressive both by virtue of the evident thoroughness of its investigations and its candid portrayal of the strengths and weaknesses of the aeromedical evacuation system. The team keyed their observations and discussions to their questionnaire and produced twenty-seven recommendations. General Johnson's interest and careful reading is evident from his sometimes forceful annotations that appear throughout. In addition, he wrote further questions and comments on the transmittal document, characterizing the team's product as a good assessment.[49]

Johnson pointed to another aspect of aeromedical evacuation that he believed had to be addressed if MAC was to be able to program the correct amount of funds for personnel, their training programs, and the equipment necessary for the command to conduct its mission: the joint requirement for aeromedical evacuation, that is, knowing how many patients would have to be evacuated during a contingency. From his perspective, Johnson believed that MAC had too many aeromedical evacuation crews, and in a kind of reverse echo of General Ledford's concern about the Air Force success during Operation Just Cause in evacuating casualties immediately following emergency surgery without encountering adverse clinical outcomes, Johnson wrote that MAC's aeromedical evacuation capability should not be increased to meet others' shortfalls.[50] Although *others* were not identified, Johnson was obviously referring to the possibility that budgetary pressures might drive the Army to reduce the numbers of deployable third- and fourth-echelon MTFs, thereby compelling a theater to set an unreasonably short evacuation policy that would drive aeromedical evacuation requirements upward.

Although the assessment team made twenty-seven specific recommendations based on its prior questioning, it identified eight general areas that were ripe for improvement efforts, noting that many were not new.

> Training: The team recommended establishing a formal AE "schoolhouse," pointing to the deficiencies of the largely unit training and materials then in use that had forced Brannon to institute training programs in the Gulf AOR. (Gen. Johnson

wrote, "I strongly agree" by the "schoolhouse" recommendation. Knowingly or not, the team recommended a precise analogue to the WWII School of Aeromedical Evacuation established at Bowman Field, Kentucky, in 1942.)

Organization: The team pointed out that the current peacetime AE structure did not change smoothly to accommodate large-scale contingency operations such as Desert Shield/Desert Storm or provide in the contingency structure the administrative and support functions needed by the ARC units that composed 93 percent of MAC's AE capability.

Equipping: AE contingency kits needed to be standardized and available at all times to units for effective, hands-on training.

Exercising: The participation of all AE units in JCS exercises should be increased.

Command and control: The peacetime reporting channels for flight and medical crews differed and hindered understanding of AE operations by the line community as well as the reverse.

Operations: The team noted that, whereas C–141 ARC AE units had the opportunity to fly peacetime missions with actual patients, C–130 ARC units had none and needed training with live patients.

Formal schools: The quotas that were needed to permit AE personnel to attend USAF schools such as airlift operations and joint contingency warfare planning were too small for such personnel to develop proper understanding of AE in the context of contingency operations as a whole.

Inspections: The absence of readiness inspections for ARC AE units such as the operational readiness inspections (ORIs) that line units received precluded accurate assessments of the ARC units' combat readiness posture.[51]

The major objective of these recommendations was to improve the readiness and medical effectiveness of MAC's aeromedical evacuation capability as an essential element of the U.S. total force. The means included better, standardized, and more realistic training and inspection of the ARC units in which evacuation capability predominantly resided. There also appears to have been an implicit intent to elevate the aeromedical evacuation mission to a higher status within the command by breaking down barriers between line airlift forces and aeromedical evacuation, much as General Johnson had sought to do by his October 1, 1990, removal of the 375th's control over aeromedical evacuation as a step in impressing quality on MAC.[52] In his response to General Johnson's annotations, the command surgeon assured the CINC that his office had updated its briefings for the

MAC-conducted Air Operations School to emphasize the role of aeromedical evacuation as "an integral part of the overall MAC airlift process."[53]

Roadman also addressed the CINC's other major concerns in a positive vein. With regard to the issue of obtaining accurate aeromedical evacuation requirements, the command surgeon assured General Johnson that these requirements were not going to be driven by the number of service beds available. Instead, the JCS was going to specify an evacuation policy for planning scenarios that would involve combat and the generation of casualties and which were being developed for the forthcoming Airlift Mobility Requirements Study and Defense Planning Guidance. The policy would be used to determine the size of the aeromedical evacuation force that MAC would be directed to plan for. Roadman asserted that he expected overall aeromedical evacuation crew requirements to decrease.

The surgeon was able to report that both USAF headquarters and Air Force Systems Command, which controlled SAM where Air Force flight nurses trained, had concurred with the MAC vice commander's proposal to study the feasibility of establishing a MAC aeromedical evacuation schoolhouse. Roadman also noted that the forthcoming JCEWG would discuss the baseline regulating and movement process and identify improvements to the aeromedical evacuation process that required joint action.[54]

The mobility requirements study cited by Roadman was to update the CMMS, which was published in 1981 and had sought to determine the proper mix of airlift, sealift, and prepositioned materiel that the United States required for dealing with tensions in the Middle East and the ongoing buildup of Warsaw Pact forces in Europe. Subsequent analysis by the MAC staff of the requirements determined by the CMMS, when it compared MAC's existing and projected airlift capabilities, identified shortfalls and made recommendations to remedy them. These recommendations were published in 1983 in the Master Airlift Plan.[55] Similar concerns resulted in assigning MAC's C–9s from a dedicated aeromedical evacuation mission to a wartime mission in the mid-1980s in order to augment the Air Force.

The destruction of the Berlin Wall in 1989 created a different world. The new challenges and potential military requirements that it presented raised the same congressional concerns for efficiency and jointness which in 1987 had resulted in USTRANSCOM's creation. In the National Defense Authorization Act for FY 1991, Congress directed DoD to conduct a mobility requirements study that would include a comprehensive review of all transportation requirements generated by the mobilization and deployment of U.S. forces for Operation Just Cause, Desert Shield, and Desert Storm, and to project future mobility requirements to meet U.S. national security needs in the new world environment of the late 1990s. An interim report had been delivered to Congress in April 1991; the final three volumes were scheduled for delivery beginning in January 1992.[56]

These reports included aeromedical evacuation requirements as an integral part of total airlift requirements, and the study led to a greater integration of aeromedical evacuation planning within the larger context of deliberate opera-

tional planning. Combined with the ongoing USTRANSCOM initiative to secure control of medical regulating (in which General Roadman played the key role) and the increasing importance of General Johnson's vision of *quality* in the MAC culture, this period was something of a watershed in the emergence of a major role for the command surgeon in readiness planning. The May 1993 publication of the first in a series of strategic plans for the USTRANSCOM surgeon began with a classic quality statement:

> The vision of the TCSG [Office of the Transportation Command's Command Surgeon] is a commitment to leading change for continuous improvement of the global transportation system to provide timely, sensitive and safe patient transportation every time.[57]

The plan noted that, upon establishment in 1987, both the USTRANSCOM surgeon's office and USTRANSCOM, per se, had trouble defining their missions. At the time, the surgeon's office had only one full-time and two dual-hatted members; by the end of 1993 it would grow to thirteen full-time members and a fourteen-member direct reporting unit, the ASMRO, with another twenty-four Category A reservists en route—reservists assigned to fixed units, in this case, the ASMRO. With new global responsibilities, ASMRO—soon to be the Global Patient Movement Requirements Center (GPMRC)—needed to train these incoming reservists to deploy and establish or augment medical regulating activities in the theaters.[58]

Based on new DoD directives that gave USTRANSCOM control of its components in peace and war and granted the command new authority over global patient movement, the plan outlined for the command surgeon's office a new, clearer mission. To achieve these goals, it detailed a set of actions to be taken and the milestones for their completion. The mission of the command surgeon's office included

> serving as the DoD single manager for medical regulating;
>
> exercising authority, direction, and control over ASMRO;
>
> having authority to regulate patients into other theaters from combat theaters;
>
> having trained deployable medical regulators [the Category A reservists];
>
> establishing a centralized C^2 system for global patient movement that integrated the separate theaters and processes and offered both patient in-transit visibility and decentralized control to the supported CINCs;
>
> reviewing and producing plans as well as assisting at conferences to develop time-phased force deployment data (TPFDD) (schedules of personnel and equipment which had to be deployed to support specific operational plans); and

> planning and participating in exercises to test medical readiness.[59]

The mission description emphasized that success would require "teamwork and a directed effort toward strategic goals which everyone helps establish and meet." Such a statement seems a reflection of Johnson's interest in pushing quality within his command and an indication of the success that the command surgeon, Roadman, experienced in establishing TQM principles as the framework for planning by the surgeon general's office.[60] Roadman for perhaps the first time consistently systematized aeromedical evacuation planning and requirements on the basis of rigorous analysis. As one of his staff members described his approach on the staff, "If you couldn't show him what value-added the system got from a proposal, you got turned away."[61]

These were not isolated efforts. Gen. William Creech, TAC commander in the late 1970s, used quality principles to reform his command, a task for which he received extremely high praise from civilian management experts as well as from Air Force Chief of Staff Gen. Merrill McPeak and from General Schwarzkopf's JFACC, General Horner. Both attributed much of the Air Force's success in the Persian Gulf War to Creech, and Horner wrote that he wanted everyone to know of the monumental contribution Creech made to the success of the air campaign by his "fresh ideas on how to organize and lead in the late seventies."[62] General Johnson had similarly stressed to his senior staff that MAC focus on meeting the customers'—the supported CINCs'—needs, which, as he sought to impress on his command surgeon, meant primarily aeromedical evacuation support. In the two years immediately preceding his assignment to command USTRANSCOM, Johnson had served as thr CENTCOM deputy commander and Director of the Joint Staff, where he had become interested in quality management.[63] His imprint of quality on AMC and then on USTRANSCOM is important because it provided an appropriate setting for General Roadman to pursue a TQM management approach to the changing requirements for aeromedical evacuation. The development of aeromedical evacuation during General Roadman's tenure as the dual-hatted USTRANSCOM/AMC command surgeon occurred largely within the TQM framework which he imposed on his staff after he arrived at USTRANSCOM headquarters and which he emphasized during his subsequent three years as surgeon general of the Air Force.[64] Roadman was working to fix the deficiencies in the patient movement system that Desert Storm had revealed, but his work was complicated by changes that the Air Force chief of staff had imposed somewhat unexpectedly on the Air Force's basic organization which significantly affected its aeromedical evacuation system.[65]

General McPeak Reorganizes the Air Force and the Aeromedical Evacuation System

In the autumn of 1991, General Johnson was diverted from the normal business of his dual commands by fundamental questions raised by the Air Force chief of staff, General McPeak, about the commands' structure and function. Johnson became heavily involved in discussions with McPeak about reorganization proposals that McPeak had advanced to prepare his service for what he believed would be the challenges to U.S. national security that the Air Force would face in a post–Cold War world.[66] McPeak believed that the existing Air Force structure by functional organizations by major commands (MAJCOMs)—both the operational and support commands—was no longer the structure with which the Air Force could best meet future threats or budgetary circumstances. To better prepare the Air Force for these challenges, McPeak proposed a radical reorganization of his service, with substantial implications for how the Air Force would perform its aeromedical evacuation responsibilities.

Within AMC, the major command to which the Air Force had assigned the aeromedical evacuation mission, the initiatives that General Johnson had sponsored went forward under the leadership of General Roadman and his staffs in USTRANSCOM and AMC. Not all would be realized, sometimes for surprising reasons, but by June 1993 Johnson's efforts to centralize intertheater medical regulation of patients under USTRANSCOM control were successful. Initially this would have an unanticipated result, mitigating to a substantial degree the effects of disruption on AMC's touted seamless worldwide aeromedical evacuation system that General McPeak's organizational changes were to create.[67]

General McPeak's changes to the MAJCOM structure substantially impacted AMC and MAC and affected the aeromedical evacuation mission. He proposed to put all the shooters—fighters, bombers, and ICBMs—into an Air Combat Command (ACC), together with the necessary supporting assets—reconnaissance aircraft, C^2 platforms, and tankers—to give the ACC commander control of everything he needed to fight effectively. MAC was to become the AMC and command the bulk of the airlift resources and tankers used to refuel deploying fighters, bombers, and strategic transport aircraft. AMC would also coordinate tanker scheduling worldwide. Meanwhile, ACC could deploy its units overseas, giving a theater commander well-integrated airpower assets to employ as a whole, as had been the practice in World War II.[68]

McPeak extended the concept to the combat units themselves. During World War II, AAF combat commanders controlled all functional organizations of whatever type were assigned to their base for support of their combat mission. In McPeak's formulation, the organizational principle was "one base, one boss." After considerable discussion, some changes, and more than a bit of confusion at the new MAJCOMs, the new Air Force organization went into effect on June 1, 1992.[69] A new tanker-airlift control center (TACC) was created to provide centralized direction of

strategic airlift, including aircraft engaged in aeromedical evacuation and aerial refueling operations. The principal effect of this Air Force reorganization on MAC's aeromedical evacuation responsibilities was to fragment the once seamless, worldwide aeromedical evacuation system that AMC controlled centrally from Scott AFB.

In spite of the June changes, the core of the worldwide system remained intact until September 1, 1992, when, regardless of personal attempts by Generals Johnson and Roadman to convince General McPeak to the contrary, command of the active duty C–9A units and associated AMESs in PACOM and USEUCOM passed to the respective theater commanders.[70] A parallel reassignment had occurred on April 1, 1992, when the C–130s in the overseas theaters came under the command of the theater commanders. On September 1 the tactical aeromedical evacuation mission remained under AMC, as did the CONUS-based active duty C–130 units and their counterparts in the ARC.[71]

This arrangement was not to last. General Powell revised the unified command plan[72] in spring 1993 and created the Atlantic Command, a new joint command with responsibility for operations in the United States to which the ACC was assigned as the air component command. This reproduced in the CONUS for the first time the structure of the overseas joint commands, and the new USTRANSCOM/AMC commander, General Fogleman, proposed that it be replicated fully in the CONUS by giving the Atlantic Command's air component control of CONUS-based theater airlift forces in the same way that such forces were assigned to the theater air components of unified commands overseas.[73] This would permit AMC to focus all of its efforts on strategic airlift. Consequently, CONUS-based C–130 units, both active duty and ARC, were reassigned from AMC to ACC in July 1993 together with the tactical aeromedical evacuation mission.[74] Thus were the tactically oriented, active duty 1st AMES at Pope AFB and nearly 2,000 ANG and AFRES aeromedical evacuation personnel transferred to the ACC.[75]

The chief of staff had earlier rejected the theater command structure for tactical airlift and aeromedical evacuation used during the Gulf War. He was strongly opposed to deploying a MAC general officer as COMALF again, or of accepting a new, somewhat broader role for him as commander of mobility forces. To McPeak, the concept of deploying a general officer from outside the theater who had command responsibilities in the chain of command went contrary to his one base, one boss philosophy. Ultimately, the role of the former COMALF became that of a staff officer on the JFACC's staff carrying the title, director of mobility forces (DIRMOBFOR), although not without misgivings on the part of some airlifters.[76] As a result of this reorganization some active AMESs were redesignated. The 1st AMES (Pope AFB) became the 23d; the 2d AMES (Ramstein AB) became the 86th; the 9th AMES (Yokota AB) became the 374th; and the 57th (Scott AFB) became the 375th.

This loss of administrative command of the overseas aeromedical evacuation units did not extend to the domestic C–9A aeromedical evacuation system nor to

the active duty strategic aeromedical evacuation units that remained under the command and control of the new AMC, as did their counterparts in the ARC when they were called to active duty. In effect, the formerly seamless worldwide aeromedical evacuation system had been sundered into four aeromedical evacuation systems, and the AMC surgeon had been left with a somewhat ill-defined responsibility for "proponency" of aeromedical evacuation throughout the Air Force.[77] With command and control limited to the domestic C–9A and the strategic aeromedical evacuation system, the surgeon possessed little direct capability to compel adherence to his views on elements that composed proponency. Generals Johnson and Roadman had argued to McPeak that "effective mission execution resides in integration, in the continued drive to focus on the customer, and to provide a seamless system. Function will inevitably follow structure—*fragment the structure and the function will soon follow.*"[78]

With the theater AMESs now under COCOM of the theater commanders, the issue for AMC was whether means other than exhortation would produce any effect. Alarmed by the implications of a fragmented system for maintaining effective aeromedical evacuation support of the combatant commanders, Roadman sought to institutionalize multicommand mechanisms within which coordination of policy and standards throughout the now separate aeromedical evacuations systems might be effected. In October 1993, as the decentralization became effective, he established the Aeromedical Evacuation Readiness Committee (AERC) with five major subcommittees tasked to develop specific programs on organization, training, equipment, exercises, and inspections as a basis for ensuring that aeromedical evacuation system initiatives were standardized. To involve the commands with vested interests in aeromedical evacuation (AMC, ACC, PACAF, USAFE, AFRES, and the ANG), Roadman sought and received in January 1999 the approval of the AMC commander to establish a senior body, the Aeromedical Evacuation Executive Board (AEEB), which the AMC command surgeon would chair. Its ostensible function was to oversee the work of the AERC and established the strategic direction for the global aeromedical evacuation system. At the same time, the facts that AMC sponsored the board's creation and that the AMC surgeon chaired it emphasized AMC's designated role as aeromedical evacuation system proponent.[79]

Although such a structure might function well in theory, its success would depend on the absence of irreconcilable command interests and bureaucratic turf concerns, a willingness to cooperate, and even compatibility among the key operatives. At least some of these problems were evident early on and were rooted in differences between the principal aeromedical evacuation players, the AMC and the ACC. Not until November 1995 was the AEEB to be convened, and then its convocation was directed by the Medical Readiness Directorate of the USAF surgeon general's office, rather than by the AMC command surgeon.[80]

In July 1994 General Roadman was reassigned from his dual positions at USTRANSCOM/AMC to the Office of the Air Force Surgeon General, and his successor as AMC command surgeon, Brig. Gen. Peter Hoffman, several months

later sought to invigorate the structure Roadman had created. He began in October 1994 by suspending AERC activities pending agreement among the system players on a clear definition of their respective roles and responsibilities. To this end, he hosted a four-day roles and responsibilities white-paper meeting at the end of November 1994 when the attendees drafted a document that articulated their consensus on these key issues. They agreed to rename the AERC the Aeromedical Evacuation Steering Group (AESG) and to rotate its chairmanship. On that basis, ACC rather than the AMC surgeon would chair the AESG's next meeting. This never happened.[81] AMC obviously felt that an ACC initiative to establish policy for AECM qualification raised fundamental questions about what AMC's responsibility for aeromedical evacuation proponency really meant. In late June, the AMC surgeon requested clarification from Headquarters Air Force on which command had lead responsibility for aeromedical evacuation. Instead of a direct reply, the director of Medical Readiness Doctrine and Planning in the surgeon general's office directed in late August that both the AESG and AEEB be convened and that each be chaired by the Air Staff. The product of the AESG meeting in early October was a new definition of proponency and the reaffirmation of the AMC surgeon's role as the Air Force agent for aeromedical evacuation system proponency, which it recommended to the AEEB for approval:

> Headquarters Air Mobility Command (AMC) is the global aeromedical evacuation (AE) advocate/proponent. As such, the Command Surgeon (AMC/SG) reports to the Commander, Air Mobility Command, and represents the USAF Surgeon General in presenting or resolving issues that impact the entire AE community. AMC/SG provides leadership through *arbitration, coordination, and consensus building among committed system elements*. Works with the AE community and other agencies to provide unity and facilitates the development of applicable joint medical doctrine [emphasis in original].[82]

The AESG also described the AMC surgeon as maintaining an intertheater aeromedical evacuation system in coordination with the CINCs, the ARC and active duty component surgeons, and the MAJCOMs. The group went on to state as existing fact what one more realistically would have to describe as its hope for how the decentralized system would function. According to the AESG, "each of the component parts' functions are smoothly integrated, and the transfer of patients within and between the component parts is accomplished without disruption to the patient or the supported CINC."[83] A more coldly realistic view of the role assigned to his command by a senior AMC medical staff officer was that "*proponency is a new 'new paradigm' euphemism for responsibility without authority*" [emphases in original].[84]

When the aeromedical evacuation executive board met in late November 1995 it went beyond the recommendation of the steering group on the proper

agent to "exercise" proponency, and it included the USTRANSCOM command surgeon and the Air Force surgeon general's Medical Readiness Directorate as additional possibilities. Presumably with the retirement in late 1994 of General McPeak as chief of staff in mind, the executive board also listed as an additional option the recentralization of the aeromedical evacuation system.

This somewhat surprising recommendation came after some months of experience with the decentralized system that, at least in the eyes of many AMC medical officers, validated General Roadman's concerns about the effect of General McPeak's decision. As one officer wrote with evident exasperation, function *had* followed form, as the AMC surgeon had warned, and little possibility existed that the now-fragmented global aeromedical evacuation system could establish anything like the former seamless worldwide system that AMC still believed to be essential.[85] The significantly greater importance in the role of the USTRANSCOM/AMC command surgeon, a result of the USTRANSCOM commander's successful resumption of the control over medical regulating, provided coherence to the worldwide aeromedical evacuation system.[86]

Conclusion

The first joint doctrine on patient evacuation and movement, Joint Pub 4–02.2, *Joint Tactics, Techniques, and Procedure for Patient Movement in Joint Operations*, was developed under the leadership of the AMC surgeon and published in 1996.[87] It reflected the Gulf War experience and resolved a number of interservice issues. It also clarified several issues that had generated friction in the past, such as access to the combat zone for patient evacuation. Perhaps most importantly, it codified USTRANSCOM's responsibility as the single manager for strategic and CONUS medical regulation of uniformed service patients. It used the broader term, patient movement, defining it "as a system that involves the coordinated use of intratheater and intertheater evacuation assets in support of patient regulating decisions made by medical personnel."[88] It also described the role of the GPMRC in the patient movement process: to provide medical regulating services including clinical validation, limited in-transit visibility, and requirements for intra- and intertheater aeromedical evacuations; to communicate patient requirements to the service components executing the evacuations; and to coordinate intertheater missions through the AMC TACC and with Theater Patient Movement Requirements Centers (TPMRCs). These centers were the result of merging some of the functions of the JMRO and the AECC, and they communicated patient movement requirements between the AECC and the service components responsible for execution of the aeromedical evacuation mission.[89]

Some of the changes in the way the Air Force conducted its mission of providing aeromedical evacuation support to U.S. forces flowed directly from the experiences of Desert Shield/Desert Storm. Other changes represented broader attempts to increase the efficacy of evacuation support by clarifying the lines of

authority and responsibility and by improving the integration of the evacuation units with the Air Force. Some changes reflected the possibilities that accompanied new technologies or the adoption of concepts that had been the subject of lengthy discussion within the aeromedical evacuation community and made possible by the atmosphere of reform that General Roadman had created within AMC. All would soon be tested by the new contingencies of the post–Gulf War era, experiences that largely shaped the aeromedical evacuation system that followed.

Chapter 11

EMERGENCE OF THE POST–GULF WAR AEROMEDICAL EVACUATION SYSTEM: NEW CONTINGENCIES

Aeromedical Evacuation in Transition: Operation Restore Hope

Institutionalizing relevant portions of the Gulf experience was going to require time as well as something more than the issuance of joint doctrine. The deployment of U.S. forces to Somalia under CENTCOM command in late 1992 provides an early example of how the now-decentralized aeromedical evacuation system might function and indicates how far the changes set in motion by AMC had progressed. The Somalia intervention also provides an extremely useful recent case study of the realities of performing the tactical aeromedical evacuation mission in an increasingly frequent type of contingency which involves the participation of U.S. forces. Somalia illustrates the emerging environment in which U.S. forces are used in coalitions not to defeat armed aggression but are used to exercise peacekeeping and to achieve other objectives, such as nation building. Actions that shaped and accentuated these trends in the evolution of aeromedical evacuation lay not only in the Desert Shield/Desert Storm experience, but in Operation Just Cause as well.

On November 29, 1992, after extensive media exposure to the widespread starvation and ongoing brutality in a civil war in Somalia, President Bush authorized the use of armed forces in Operation Restore Hope in support of UN Security Council Resolution 794. Differing from a usual UN peacekeeping operation, the mission of the U.S. forces was to provide security as forces from other UN members distributed food in central and southern Somalia.

A C–141 on the ramp at Mogadishu, Somalia, during Operation Restore Hope in 1992.

As part of the necessary medical support of the U.S. forces, the 1st Tactical AMES at Pope AFB was tasked to develop and implement an aeromedical evacuation system for both battle and nonbattle patients injured in the Somali AOR. These patients were to be moved to third- and fourth-echelon MTFs located outside as well as within the AOR. The 1st AMES medical planners responded quickly with CONOPLAN 1229, which they prepared at MacDill AFB, briefed to CENTCOM and AMC staffs on December 4, 1992, and published five days later.[1]

Presumably, this concept plan reflected relevant lessons from Desert Shield/Desert Storm that Colonel Brannon, the 1611th AMES commander, had recommended be integrated into aeromedical evacuation planning, procedures, and processes. As the Somalia crisis unfolded, rather than validating the vision embodied in his recommendations, the crisis tended to show just how difficult it was to project future requirements into another context on the basis of the Persian Gulf experience. In the event, the Bush administration's decision to deploy U.S. forces was made without much warning to the services, and it came at a time of transition with respect to aeromedical evacuation policy and doctrine.[2]

The assistant chief of nursing of the 1st AMES, Maj. Farley Howell, was ordered to the Somali capital, Mogadishu, via Rhein-Main AB with the primary task of forming an aeromedical evacuation liaison cell within the air mobility element (AME). The AME was designed to perform the intratheater airlift that a MAC ALCC had formerly provided. Usually collocated with the air component commander's air operations center, the AME complemented a tanker-airlift control element also deployed to Mogadishu, and it served as the theater extension of AMC's TACC at Scott AFB.[3]

Marines patrol Mogadishu, Somalia, during Operation Restore Hope in 1992.

This was a novel role that Howell was called upon to implement in the absence of a specific charter or guidance.[4] In the Gulf and in other, smaller contingencies, coordination between the aeromedical evacuation center and ALCC was always present, and it was generally effected through physical means. During Restore Hope, Howell was actually transferred to the operational control of the director of the AME and, when "chopped" to the AME, became a part of that organization. In addition to his assignment to the AME, Howell was designated as the aeromedical evacuation ADVON with the added responsibilities of conducting an aeromedical evacuation predeploymment site survey and actually initiating intertheater airlift operations. Aeromedical evacuation requirements were coordinated with the AME by an AECC initially located in Mogadishu.

This new concept necessitated separate organizations. Although the mission was ostensibly a humanitarian effort, the chaotic situation in Mogadishu and elsewhere throughout the country presented different security requirements. The major airfield available at Mogadishu was located on the southern, seaward side of the city, and the location and anarchic situation in the capital mandated a degree of security not generally required in the rear areas of the AOR during Desert Shield/Desert Storm. A nurse historian termed Restore Hope "a humanitarian mission under hostile conditions." More properly, it was an example of what is currently termed a military operation other than war.[5]

Pursuant to presidential authorization, the United States deployed more than 25,000 troops to Somalia; 13,000 troops from other UN member nations joined them as a United Nations task force under U.S. command.[6] More than 20,000 of the U.S. troops were later withdrawn in accordance with the commitment of newly elected President Bill Clinton's administration to reduce the U.S. military

presence and turn over the operation to full UN control by May 1993. This new UN-authorized presence was designated UNOSOM II and included some 4,000 U.S. troops, 2,000 of whom were logicians and only 1,300 were combat troops. UNOSOM II was to operate under a more expansive UN resolution that sanctioned the use of force in accordance with Chapter VII of the UN Charter to achieve the "consolidation, expansion, and maintenance of a secure environment throughout Somalia" and to disarm the warring factions as the UN Secretary General recommended.[7]

The tragic history of the failed UN efforts to pacify Somalia includes the October 1993 deaths of eighteen U.S. special forces troopers during a failed attempt to arrest Gen. Mohammed Aidid, leader of one of the principal warring factions. A look at the theater aeromedical evacuation system established during the Somali crisis indicates much about the readiness of the aeromedical evacuation system to operate in a joint context, as the after-action report by the commander of the 1st AMES reveals.[8]

Major Howell was delayed at Rhein-Main AB in Germany for some twelve days pending the deployment of U.S. Marines to secure the Mogadishu airport and other key points in the city. Accompanied only by Capt. Frank North, a flight surgeon with no field experience, who joined him at McGuire AFB and who was also assigned to the AME, Howell had neither the flight nurses, medical technicians, nor in-flight medical equipment to initiate aeromedical evacuation missions on opportune airlift, should they be required. He also lacked equipment and additional personnel to provide the AME with an interim aeromedical evacuation coordinating capability, pending the arrival of additional 1st AMES personnel.[9]

Fortunately, Howell's former commander during Desert Shield/Desert Storm, Col. Robert Brannon, was now commander of the 2d AMES stationed at Rhein-Main, and Brannon agreed to provide Howell with a limited amount of in-flight medical equipment and to detach a flight nurse and two medical technicians from his squadron to temporary duty in Mogadishu.[10]

Howell arrived in the Somali capital with his small medical retinue[11] on December 13. He immediately contacted Navy and Marine Corps medical representatives to acquaint them with the interim aeromedical evacuation capabilities. He also conducted an aeromedical evacuation site survey. Pending arrival of an Army evacuation hospital, the Navy amphibious assault ship USS *Tripoli*, visible offshore from the Mogadishu airport, provided third-echelon medical capability in the form of Navy surgeons, nurses, and sophisticated medical facilities. The *Tripoli* had a medical regulator onboard in contact with the USEUCOM JMRO, and Howell established communications with him using Marine Corps communications systems.

With these elements in hand, Howell directed an ad hoc aeromedical evacuation system until the AECC was established on December 19, when the main body of deploying personnel from his squadron arrived. His system involved flying patients by helicopter from Mogadishu to the amphibious assault vessel,

where they were to be held after triage and further treatment to stabilize their condition. Their evacuation would be coordinated with the USTRANSCOM TACC and USEUCOM JMRO, and they would be returned from the vessel by helicopter to meet the departing opportune airlift identified for their evacuation.[12]

After U.S. forces dispersed to other locations in Somalia, they were supported by C–130s including C–130 Samaritan aeromedical evacuation missions similar to those flown within the AOR during Desert Shield/Desert Storm on a twice-weekly schedule.[13] These missions picked up patients from battalion aid stations in the Somali interior and generally carried them to Mombasa, Kenya, the C–130 bed-down location. Patients flown to Mombasa were generally ambulatory. They remained overnight and were flown back to Somalia the next day for evacuation from Mogadishu on a strategic aeromedical evacuation mission, usually a C–141, although C–5s and KC–10 Extenders were also employed. Critical patients could be flown directly to Mogadishu, especially after the Army's 86th Evacuation Hospital became operational in mid-January at the airport there.[14]

Medical capabilities at Mombasa were limited to squadron medical elements and the flight surgeons who had deployed to support the aircrews assigned there. Civilian hospitals in Kenya could be accessed, and occasionally, C–141 aeromedical evacuation missions were flown from Mombasa. Flight surgeon Lt. Col. Courtney Scott based at Mombasa an extraordinary aeromedical evacuation mission recounted he had planned to move a badly injured serviceman to Germany. His plan was to provide en route critical care as a desperate expedient, but the patient died before the mission could be launched.[15] As in previous conflicts, care in the air would be provided to patients whose medical conditions dictated it, but it was not a planned aspect of the aeromedical evacuation support to Operation Restore Hope. The CONOPS developed by the 1st AMES assumed that austere conditions existed in Somalia (and, for this reason, originating hospitals would be required to prepare patients for movement) and that neither the MASF nor the evacuating aircraft would have a physician routinely present. Only basic supportive care would be available to stable patients, a stable patient defined according to AMC regulations as

> one who, in the clinical judgment of the responsible physician, can withstand a bed to bed evacuation of 6–24 hours without sustaining complications requiring invasive treatment of intervention beyond the scope of general supportive care during evacuation.[16]

These aeromedical evacuation activities were based on the system established after the 1st AMES core personnel arrived in Mogadishu on December 19, 1992. Their mission was to establish a theater aeromedical evacuation system and to include an AECC, an MASF, an AELT, and two aeromedical evacuation crews drawn from the 1st. As with the AME, delay in moving these medical units into the AOR in large part was, as in Desert Shield, the result of the higher priority that

the theater commander placed on the airlift of combat forces.[17] Crew members accompanying the main body were drawn from the ANG; one crew was qualified on C–141s, and the other, on C–130s. An aeromedical evacuation operations team (AEOT) and six aeromedical evacuation crews composed of volunteers from nine ANG and AFRES units deployed at the same time to the Cairo West airfield, which served as an aircraft refueling stop and an intermediate point in the aeromedical evacuation system.

The AEOT mission was to provide en route support to intertheater aeromedical evacuations. This meant managing a pool of medical flight crews and generally facilitating the transport of patients from the AOR to hospitals in Germany. As necessary, the AEOT dispatched flight crews to Mogadishu to support missions from the Somali capital or to replace the AECMs from Mogadishu who had provided in-flight medical care to patients en route to hospitals in Germany. Both flight and medical crews changed when the evacuating aircraft stopped to refuel at Cairo West. Limitations on the length of time medical crews were allowed to spend on duty and on the range of the C–141s mandated the stop at Cairo West. Flight time for the C–141s from Mogadishu to Cairo West exceeded five hours, exclusive of the time to refuel at Djibouti en route, which initially was standard practice. The flight from Cairo West to Germany was an additional five hours. Direct flights from Somalia to Germany required aerial refueling.[18] As with the AME, an AEOT had never before been deployed in conjunction with an AECC during a contingency operation, which generated issues within the aeromedical evacuation system. The AEOT was under the operational control of the TACC at AMC, whereas the AECC was controlled by the DIRMOBFOR who had assumed the role performed during Desert Shield/Desert Storm by the COMALF.[19] Unlike the AEOT, the AECC worked for the theater commander's JFACC. This split in the command and control of the aeromedical evacuation system (the product of General McPeak's desire to eliminate the presence in an AOR of a general officer from outside the theater) contributed to the unresolved conflict between the AEOT and the AECC over which controlled the strategic aeromedical evacuation crews deployed at Cairo West and Mogadishu and, consequently, which had the authority to assign crews to missions.[20] As Brannon had discovered during Desert Shield, an underlying factor was the self-perceived difference between tactical and strategic medical flight crew members whose mission flexibility was initially limited during the Persian Gulf War.[21]

While the initial deployment of troops and equipment to Somalia was underway, rather than interrupt the planned airlift flow in support of the deployment originating at McGuire AFB, transiting Cairo West, and ending in Mogadishu, retrograde aeromedical evacuation missions from Somalia by C–141s or other strategic airlift generally delivered their patients to Cairo West. Patients reentering the airlift stream transiting to McGuire from Cairo West came from an ATH deployed there. The ATH at Cairo West held them until either opportune airlift or Colonel Brannon's C–9s from Germany became available to reload them and continue

their evacuation to USEUCOM hospitals.[22] After the initial deployment was completed, C–141s evacuating patients from Somalia on retrograde missions generally refueled at Cairo West before continuing to Germany.[23]

In addition to these deployments, on December 19 a modified AELT deployed to Rhein-Main AB. Consisting of three radio operators, it provided a communications link between the evacuation elements in the AOR and Germany until reliable telephone communications to the 2d AMES and the USEUCOM JMRO could be established. Once this was achieved, AELT personnel redeployed to the United States. When the aeromedical evacuation system was turned over to ARC personnel in late March, the only active duty airman retained at Cairo West was a radio operator from the 1st AMES.[24]

Communications for the aeromedical evacuation system to be deployed in support of Restore Hope had been an immediate concern for the AMC surgeon. He clearly viewed the Somali operation as an opportunity to field-test patient in-transit visibility. On December 12, before the main body of aeromedical evacuation personnel from the 1st arrived, General Roadman informed the AMC commander that he had undertaken an initiative to deploy augmenting communications equipment to the AOR to provide a high-speed data capability for the standard voice-only Pacer Bounce HF radios that the aeromedical evacuation units had taken to the field.[25] This equipment included modems and personal computer notebooks that the command surgeon said would permit three key objectives: first, automate the aeromedical evacuation airlift request, the aeromedical evacuation aircraft arrival message, and the aircraft departure message, and messages that track crews and equipment by location and type of asset; second, provide robust and redundant communications to support data transfer between aeromedical evacuation forces and C^2 centers; and third, provide supporting backup connectivity to the medical regulators at CENTCOM and USEUCOM. In the event, HF communications proved to be generally unreliable; only the eventual deployment of a leased commercial International Maritime Satellite Network (INMARSAT) terminal and access to the DoD tactical satellites provided communications that successfully linked the elements of the system on a reliable basis during Restore Hope.[26]

Memories of the problems related to aeromedical evacuation during the Gulf War were fresh enough to raise other concerns. One was the shortage of equipment needed to reconfigure C–141s for aeromedical missions. This deficiency had occasionally been discovered during Desert Shield when aircraft away from their home stations on tactical operations had suddenly been called upon to conduct patient evacuation. Items such as stress cables, litter brackets, and oxygen manifolds were supposedly part of each aircraft's standard onboard equipment at all times, but even still-sealed kits occasionally were found to lack necessary items. Similar shortages plagued the initial phase of Just Cause three years earlier.[27] On December 4, Headquarters Twenty-first Air Force at McGuire AFB, the CONUS departure point for aircraft carrying troops and equipment to Somalia, directed a

message to AMC headquarters, the TACC, each of AMC's strategic airlift wings, AFRES headquarters, and the ANG Readiness Center requesting that each aircraft be inspected before departing its home base to ensure that all equipment required to reconfigure it for aeromedical evacuation was onboard.[28]

In Mogadishu, based on the need to simplify the coordination of patient transfers, the AECC was collocated with the AME on the grounds of the former U.S. embassy, roughly three miles from the airfield and within the city proper. Also positioned at the embassy, Alpha company of the Marine Corps' 1st Medical Battalion treated outpatients and inpatients who required stabilization before being evacuated. After the first elements of the Army's 86th Evacuation Hospital arrived in Mogadishu in early January, the 86th became the de facto primary inpatient treatment facility in the theater. Located at Mogadishu IAP, the 86th was initially served by the MASF and four members of the AELT when patients from it, Alpha company, or the *Tripoli* required aeromedical evacuation to Germany. To facilitate the coordination of patient evacuation from the *Tripoli*, the two remaining members of the AELT from the 1st AMES were deployed to the ship. All told, the 1st deployed 100 personnel to Somalia and three to Germany. The first intertheater aeromedical evacuation mission was flown to Ramstein on December 16, 1992, with a patient load of one ambulatory and one litter patient supported by the normal medical flight crew.[29] As the 86th became fully operational during January, the AECC began to evaluate the presence of an MASF at the airport as redundant. The AECC reported to the TACC at Scott AFB that it might be possible to redeploy the squadron to Pope AFB by the middle of the month. Given the desire to limit further U.S. involvement once the UN assumed responsibility, returning the 1st AMES to Pope AFB and manning the system with ARC personnel seemed prudent in view of pending crises, notably in Yugoslavia.[30]

Personnel from the 1st had been evaluating potential air routes for evacuating patients to the European MTFs. The relative absence of en route medical facilities and the distance to Europe suggested that patients' medical conditions could be adversely affected. Given the initial requirement for aeromedical aircraft to transit Djibouti for refueling, Major Howell and other personnel flew to that former French colony in late December.[31] Their purpose was to evaluate the suitability of its medical facilities to receive U.S. patients if an aircraft experienced mechanical difficulties and had to temporarily offload patients being evacuated to Cairo West. Maj. John Felins had separately surveyed Addis Ababa in Ethiopia as another possible refueling point for the same reason. Although facilities at the French colony proved to be quite acceptable, the lack of holding capabilities at Addis Ababa ruled it out as a refueling point for retrograde evacuation missions from Mogadishu.[32]

The medical context of the deployment for which all this medical support had been established changed sharply soon after the forces were in place. The predeployment casualty estimates for Restore Hope were 20 percent per week, which CENTCOM medical planners had developed partially based on the casualty rate experienced during the Persian Gulf War. In Somalia, U.S. casualties were expect-

ed to result predominantly from extremely adverse epidemiological conditions and psychological trauma induced by observing the effects of famine, particularly on Somali children. Only a very small component of these estimates was for combat injuries incurred as a result of conflict with armed Somali civilians. The CENTCOM estimates proved far too high, and with pressure building to minimize the U.S. presence, in late December the air component commander directed that all elements review their requirements and redeploy nonessential personnel to the United States.[33]

This was in keeping with the promise by the Bush administration that U.S. forces would be withdrawn within a few months, and it also fit the perspectives of the incoming Clinton administration which took office in January 1993. The Clinton administration sought to use the Somali civil war as a model for reducing unilateral U.S. deployments in favor of more aggressive UN actions to resolve world crises. In the Clinton administration's paradigm, the United States would support a more aggressive UN-led multilateral approach that went beyond traditional peacekeeping but would provide neither the bulk of the forces nor, necessarily, the on-scene leadership.

As early as January 9, after the AECC had evaluated the continuing aeromedical evacuation requirement with the Air Force commander and the JTF, AMC, and CENTCOM surgeons, AMC headquarters directed the AECC to plan for partially redeploying the 1st AMES to the United States not later than January 23. This also fit the expectations of the AMC commander. Twenty-nine personnel from the 1st left Mogadishu on January 28, returning with their equipment to the CONUS. The continuing drawdown of U.S. forces was paralleled by further withdrawal of aeromedical evacuation elements and the reallocation within the AOR of those that remained. In late February, more aeromedical evacuation personnel were redeployed to the CONUS when the AECC moved from the U.S. embassy to the Mogadishu IAP, where all aeromedical evacuation operations were consolidated. Two weeks later, on March 10, on Howell's recommendation, the AECC was transferred to Cairo West, hub of the airlift support for U.S. forces in Somalia, and the AEOT and AECC merged.[34] Reminiscent of Desert Shield, a provisional unit, the 1610th Airlift Support Group (Provisional), was established to provide an organizational structure for the ARC volunteers who were to man the system after the UN assumed responsibility for Somalia. The force rotation policy was originally envisioned as sixty days, but actual tour lengths varied.[35]

The AELT remaining at Mogadishu IAP after the AECC moved to Cairo West was composed of a flight nurse, a Medical Service Corps officer, and two radio operators who worked directly with the Army's 86th Evacuation Hospital within the airport compound.[36] With one or two exceptions, the remaining active duty personnel from the 1st AMES, including Major Howell, redeployed from the AOR on March 19, after turning over the system to the ARC volunteers, who continued to operate it until U.S. forces withdrew as the UN disengaged from Somalia in May 1994.[37]

USAF workers unload bags of flour during Operation Restore Hope.

In April 1993, after the ARC took over, the 86th relocated from Mogadishu IAP to the embassy compound in the city. Redundant during the 86th's presence on the airfield, the MASF personnel were allocated other tasks or returned to the CONUS, but the MASF tentage and equipment were retained as the basis for a patient-holding capability. The CENTCOM surgeon requested the reactivation of the MASF because of the 86th's move, but this does not seem to have been done on a permanent basis until Col. Robert Ditch, who had served on the CENTAF surgeon's staff during Desert Shield/Desert Storm in a unique assignment as an advisor on aeromedical evacuation, requested it.[38]

Subsequently, until June, when vehicles began to be fired upon, patients needing aeromedical evacuation were taken to the airport by ground transport for evacuation in Air Force opportune airlift. After June, evacuees were moved by medevac helicopter. In both cases, regularly scheduled, channel missions directed by TACC evacuated patients from Mogadishu each Monday on a retrograde mission. When necessary, as when Pakistani troops suffered heavy casualties from an unexpected attack by Somali gunmen in June 1993 or when the U.S. Rangers were ambushed in October, the AELT coordinated emergency evacuation missions with the AECC, with a heads-up directly to the TACC. Later, the AECC was once again moved, this time back to Mogadishu from Cairo West at the request of Lt. Col. Loren Flossman, who arrived in the AOR in November 1993 to become AECC chief.[39]

Restore Hope ended officially on May 4, 1993, when the United States turned over command to the UN force commander for UNOSOM II, Lt. Gen. Cevik Bir, a Turkish general. During the three months that the 1st AMES had operated the aeromedical evacuation system, 266 U.S. patients had been moved intertheater—

106 on litters and 160 ambulatory—and 38 had been moved intratheater—19 on litters and 19 ambulatory. From May to December 1993, during the period of UN control, the Air Force aeromedical evacuation system carried 476 U.S. patients and moved 123 coalition patients intratheater and 167 coalition patients intertheater for UNOSOM. Army medevac elements moved 1,351 U.S. patients intratheater and 346 coalition patients for UNOSOM. The Air Force transported 15 Somalis, and the U.S. Army moved 153. For the entire period of U.S. involvement, including humanitarian airlift before the initiation of Restore Hope and during the succeeding UNOSOM II, for which U.S. support was codenamed Operation Continued Hope, some 850 patients were aeromedically evacuated on 125 missions.[40]

What does an analysis of these operations reveal about how much aeromedical evacuation had changed since the Gulf War experience? Primarily, the Somali crisis revealed the aeromedical evacuation system to be still in transition. Command and control of aeromedical evacuation forces in the AOR had been modified in accordance with General McPeak's vision of a clearer line of authority. A DIRMOBFOR with reduced command authority replaced the COMALF. This appeared to work reasonably smoothly during Restore Hope, but as Desert Shield/Desert Storm showed, the personal chemistry among the principals contributed positively to make the new organization work. Because AMC deployed the strategic and tactical airlift aircraft and tankers that were the only Air Force aircraft directly supporting Restore Hope, the commander of AMC's 437th Airlift Wing based at Charleston AFB, Brig. Gen. Thomas Mikolacjik, was designated the joint Air Force commander. To be the DIRMOBFOR he personally selected Col. Walter Evans, another airlifter and an old friend who commanded AMC's 1701st Mobility Squadron at McGuire. Rounding out the aeromedical evacuation command structure, the AECC OIC served as director of aeromedical evacuation forces.[41]

Prior personal relationships factored significantly in the smooth operation of the aeromedical evacuation system, which continued to function with ARC personnel directing it during the remaining months of the UN's Somalia operation. Colonel Flossman, commander of the AFRES 142d AMES based at Wilmington, Delaware, who deployed to direct the AECC in late 1993, had worked as Colonel Brannon's chief of staff during Desert Storm. Capt. Susan Konczal, who directed the AELT in Mogadishu from June 16, 1993, until early December, overlapping Colonel Flossman's tenure as AECC chief, had served as Brannon's administrative chief in the 1611th AMES during the Gulf War. A significant number of other ARC personnel in charge of aeromedical evacuation system elements throughout the UN operation in Somalia had served together less than two years earlier in Desert Shield/Desert Storm.[42] Notably, although not a physician, Colonel Ditch served as the CMO for the UN Somalia operation throughout UNOSOM II. As CMO he had responsibility for, among other things, the coalition intertheater aeromedical evacuation as well as the intratheater medevac of patients. Although

intratheater medevac was usually performed in joint operations by the respective U.S. service, Ditch had to deal with national contingents in UNOSOM II to secure the required capability.[43]

Restore Hope does not appear to have stretched AMC's resources for aeromedical evacuation—after-action reports suggest that the aeromedical evacuation system was run on a shoestring until the Ranger episode in October—but this was not true of AMC's airlift capabilities. These were taxed so severely during the deployment that AMC headquarters twice had to raise the maximum number of hours that AMC flight crews were allowed to fly each month and to increase the maximum crew duty day from sixteen to eighteen hours.[44] Looming also was an emerging crisis in Yugoslavia. The operation of the aeromedical evacuation system during Restore Hope revealed a number of concerns, which included several that were seen during the Persian Gulf War, but a new one arose with the potential to have major implications.

Whether the new organizational arrangements in the aeromedical evacuation system would function as well if the joint Air Force commander in a future, more serious contingency had a different operational background remained to be seen. The distribution of authority between the AECC and AEOT in the aeromedical system would obviously need to be clarified if the usefulness of the AEOT was to be preserved, or at least further tested and validated. Because both elements were controlled by AMC, doctrinal change provided a straightforward remedy.[45] The value of including an aeromedical evacuation cell in the other new organizational element, the AME, also needed to be evaluated, as did the contribution of the AME itself to increasing the effectiveness of the intratheater airlift.

A different kind of organizational situation that emerged during UNOSOM II appeared to have doctrinal and resource implications for aeromedical evacuation in future contingencies involving UN or other supranational authorities. This was the unofficial exercise of a kind of tactical command over the elements of the U.S. TAES in Mogadishu by a UN official, in this case, Colonel Ditch.[46]

Although not formally under UN control, USAF aeromedical evacuation personnel had consistently responded voluntarily to Ditch's requests for both intra- and intertheater patient evacuation of non-U.S. coalition personnel. This support lay outside the formal responsibility of the United States and included providing medical flight crews to act as AECMs on two Italian helicopters that stood alert during or prior to mass casualty incidents, and on a C–141 that evacuated wounded Pakistanis to Islamabad after the June 1992 attack on a UN contingent by Aidid's forces.[47]

AECMs published a UNOSOM medevac configurations/operations guide outlining how to configure and use any type of fixed- or rotary-wing aircraft that UNOSOM II had available for use in medical evacuation. USAF evacuation personnel also voluntarily established training teams to prepare personnel of the Indian medical contingent to perform in-flight medical duties in an effort to assist the CMO when too few trained medical flight crews were available. U.S. Army

medevac helicopter personnel also provided intratheater patient movement at the CMO's request.[48] The UN never provided medical flight crews to the UNOSOM operations, which forced Ditch to rely on aeromedical capability brought to Somalia by the national contingents. Though several nations provided medical personnel, their numbers were very small, and the bulk of patient movement responsibility fell upon the United States.[49] Ditch estimated that USAF and U.S. Army medical crews flew 70 percent of UNOSOM II intra- and intertheater missions. Other nations evacuated patients from their own deployed contingents, but only U.S. aeromedical forces were willing to accept patients from other nations.[50]

When reading the UN CMO's after-action report, it becomes readily apparent that the issue of providing aeromedical evacuation in support of peacekeeping operations deserves serious consideration in light of this somewhat ambiguous precedent. UN headquarters had no plans for providing intra- or intertheater aeromedical evacuation capability before it initiated UNOSOM II, and apparently no substantive medical planning had been done at all. UN headquarters asked the United States to provide the theater surgeon/medical director (referred to in UN parlance as the CMO), and Ditch volunteered in response to an Air Force advertisement. He expected to be a medical planner for a military theater surgeon; instead he found he was the CMO and had not only to establish a staff but also to design, develop, and manage a UNOSOM II health care delivery system.[51]

What made the Somalia experience potentially more salient was the fact that, beginning in late 1991 and continuing throughout 1992, the CJCS, General Powell, had given impetus to high-level studies examining just what role U.S. forces might play in UN peace operations.[52] Medical aspects of such operations were not considered. Ditch was quite direct in his recommendations regarding aeromedical evacuation in his end-of-tour report. He pointed to the need for "responsive aeromedical evacuation coverage" for future operations like UNOSOM II to include aircraft, trained and equipped aeromedical evacuation crews, and "good" command, control, and communications procedures and equipment. Operation Restore Hope marked the first time aeromedical evacuation support was required for U.S. troops directly engaged in peace operations under the auspices of international institutions like the UN or NATO, a situation likely to be repeated.[53]

Operation Restore Hope also marked the first test of USTRANSCOM's new authority to regulate and coordinate airlift for strategic aeromedical evacuation through the aeromedical evacuation cell in the TACC. TACC controlled the airlift, including allocation for patient movement, but the USEUCOM JMRO still regulated patients evacuated to Germany because the GPMRC had not yet been established. (Only in June 1994 did the GPMRC become operational at Scott AFB.[54]) The AEOT–AECC friction was an issue with implications for patient movements within the TAES that obviously needed resolution, but considering strategic aeromedical evacuation, AMC's medical regulation of patients originating in Somalia through hospitals in USEUCOM to the CONUS appears to have worked well.

The physical presence of aeromedical evacuation personnel in TACC greatly facilitated the smooth assignment of patient evacuation missions. This was true even though Restore Hope initially experienced a few problems when the TACC did not receive timely flight-following information. According to observers, this made TACC unaware on several occasions that there was actually a C–141 on the ground at Mogadishu which the AECC had proposed to use for aeromedical evacuation.[55]

The presence of the aeromedical evacuation cell in the TACC proved particularly valuable during UNOSOM II. After the AECC moved to Cairo West at the end of March 1993, primary communications among elements in the aeromedical evacuation system became dependent, at least formally, on the Pacer Bounce HF radios. The sometimes less-than-responsive communications between the AECC at Cairo West and the AELT in Mogadishu, combined with the high data demands of the peacetime system, helped inject delays into the process of securing the evacuation of patients from the Somali capital. However, when the severely injured Ranger casualties needed emergency medical evacuation after their ill-fated attempt to seize General Aidid in October 1993, the OIC directing the AELT at Mogadishu IAP was able to alert Col. Sarah Wright directly from Mogadishu using the Defense Switched Network (DSN). Colonel Wright, the first flight nurse to head the aeromedical evacuation cell in the TACC, had been personally selected by General Roadman to fill this position. Even though Colonel Chester, the 1st AMES commander, had encountered difficulties with the DSN during Restore Hope, Colonel Wright has indicated that communications with Mogadishu were always better than they were with Cairo West.[57] Wright's awareness of the situation at Mogadishu facilitated the rapidity with which the Ranger casualties were evacuated. Fortuitously, the regularly scheduled Monday C–141 aeromedical evacuation flight was already scheduled for October 4, and it was quickly joined by other aircraft fed into the evacuation flow.[57]

Although medical regulating at least nominally directed by USTRANSCOM generally functioned well during the Somali crisis, there was broad dissatisfaction with the communications that supported the information flow needed to move patients. Contemporary reports from the field, after-action reports, and interviews with participants involved with aeromedical evacuation operations during each phase of U.S. involvement in Somalia identify deficiencies in the communications systems required for timely patient movement. The problem was less an inability to communicate point-to-point between some nodes in the system, such as between the AELT in Mogadishu and the AECC at Cairo West, or between the AECC and the TACC; it was inefficiency inherent in the system as a whole that arose from the lack of a totally reliable secure communications net connecting all nodes of the deployed evacuation system with the nodes controlling regulating and the C^2 system for aircraft providing the actual patient lift.

Even the DSN, the standard worldwide DoD communications system, was inadequate at times. Colonel Chester, the 1st AMES commander, noted in his

after-action report that the DSN had proved at best unreliable during the operation, and he clearly favored INMARSAT, its major advantage being its ability to transmit data by facsimile to any receiving machine worldwide and to provide the TAES with a direct link to any CONUS-based aeromedical evacuation component having a telephone line. However, INMARSAT terminals belonged to the Air Force Combat Camera Team in Mogadishu, and INMARSAT is a commercial system that the Air Force had to lease at considerable expense. Chester reported that during several critical weeks of the operation, INMARSAT was the only available means to communicate other than by the tactical UHF satellite (SATCOM) communications system.[58]

SATCOM terminals had been deployed to the AOR with the 1st AMES and placed at key nodes in the aeromedical evacuation system to provide redundancy and enhanced reliability. In light of Colonel Chester's comment, when the 1st AMES redeployed to Pope AFB in late March, the UHF SATCOM terminals returned with him to the CONUS. Because SATCOM was not standardized for aeromedical evacuation communications, ARC aeromedical evacuation units had no terminals and relied instead on the Pacer Bounce HF radios for communications. Consequently, neither the AELT nor the MASF at Mogadishu IAP was equipped during UNOSOM II with the terminals whose reliability the 1st AMES commander had lauded.[59]

In Somalia, AMC operations also marked the first significant use of KC–135 and KC–10 tanker aircraft for retrograde strategic aeromedical evacuation normally performed by C–141s, or occasionally by a C–5. The C–141s developed structural problems that restricted their performance, grounding them for required inspections and forcing other aircraft to be considered for strategic evacuation.[60] The KC–10 was utilized for patient evacuation, but not without some hesitation on the part of the aeromedical personnel in the AOR. On January 28, 1992, two critical litter patients were evacuated for the first time on a KC–10 from Mogadishu to Germany. The decision to effect their evacuation was three hours in the making because the evacuation personnel were unfamiliar with the equipment and procedures for this aircraft. These two patients arrived in Germany an estimated twenty-four hours earlier than they would have if another form of airlift had been used.

Success in this mission led AMC's Air Mobility Warfare Center to recommend that all aeromedical evacuation crews be given immediate familiarization and emergency egress training. Such classes were in fact held at Cairo West, and several experiments on loading litter patients on C–5s were conducted there.[61] As a result, one of the functions of the TACC aeromedical evacuation cell became to validate that the type of aircraft available to provide the required patient lift was suitable in terms of the patient's medical condition. Ambulatory patients could be carried safely on virtually any cargo aircraft, but litter patients had to be evaluated against the type of airlift available.[62]

Other aspects of the aeromedical evacuation system were more in accord with pre–Persian Gulf War policies. The AMC CONOPS for Operation Restore Hope

affirmed the traditional Air Force prohibition against carrying other than stable patients. In contrast to the practice initiated during Desert Shield/Desert Storm of routinely putting flight surgeons on aeromedical evacuation missions, the CONOPS specifically ruled out this practice. The policy of not providing Air Force physicians to augment the regular flight nurse/medical technician team on standard evacuation missions was formally observed throughout Operation Continue Hope. In a number of emergencies, attendants did accompany patients whose stability was questionable. As in Operation Just Cause, when for the first time stabilized rather than fully stable patients were deliberately aeromedically evacuated, the evacuation system was adapted to the need at the moment. One such adaptation was to reduce the size of the medical flight crew from the standard two flight nurses and three medical technicians to one nurse and one or two technicians. This practice was followed during most of the period when the routine Monday flights from Mogadishu were generally adequate.[63] The governing medical directives issued by Colonel Ditch for UN forces actually identified a theater evacuation policy. In May he specified a policy of seven days, and at the end of the year he extended it to fifteen days. These were effectively only recommendations because the nations providing the force contingents were formally responsible for evacuating their own patients. The combat support hospitals in Mogadishu that the United States successively deployed during UNOSOM II to support its logisticians and the residual combat force—the quick reaction force—normally held patients for a maximum of seventy-two hours. This was obviously a flexible policy because, unless a patient's condition dictated a more critical need, aeromedical evacuation was conducted on regular Monday missions from Mogadishu.[64]

When medical attendants were needed to accompany less than fully stable patients, the originating MTF was tasked to provide them, and medical personnel were drawn from the Army hospital in Mogadishu on several occasions for this purpose. Because the hospital staff was relatively small, this Air Force policy, which did not please the Army, was unsustainable when casualty numbers were large, and attendants were found where possible. For example, an Air Force flight surgeon was dispatched as an attendant on the initial C–141 that evacuated casualties of the fight between the Rangers and Somalis on October 3, even though he had just arrived to relieve his predecessor in the MASF. Also, a Navy flight surgeon based in Mombasa served as the attendant on the second flight with Ranger patients that departed in midafternoon on October 5.[65] In the aftermath, the director of aeromedical evacuation forces, Lt. Col. Eileen Hadbavny, requested that additional flight surgeons be dispatched to Mogadishu to preclude having to call upon the Army's 46th Combat Support Hospital in another mass casualty situation to provide attendants for evacuees on ventilators or those who might otherwise require intervention during the nonstop flight to Ramstein.[66]

Some issues that first appeared in Desert Shield also appeared during the initial days of Operation Restore Hope. Colonel Chester noted in his after-action report that Army physicians who were deployed to locations in the Somali hinter-

land were not initially aware how to obtain evacuation support. As they had discovered in the Saudi desert, aeromedical personnel in Somalia found that maintaining vehicles and aerospace ground equipment (AGE), such as portable power units, was a continuing problem during the 1st's ninety-day deployment. It was often difficult to obtain maintenance support, and even AGE and communications technicians who were deployed with the AECC to enhance maintenance capability were hampered by a lack of tools, technical data, and spare parts. In an echo of Brannon's after-action report on Desert Shield/Desert Storm, Chester also noted that the AGE equipment the aeromedical evacuation personnel brought to Somalia was dissimilar from that of the host units, which consequently could provide little or no assistance. Difficulties were also noted with the volume of patient information that the aeromedical evacuation system managers required. It was a volume that, in the view of the 1st AMES commander, constituted "an unnecessary burden to aeromedical evacuation elements operating under austere conditions and often very tight time constraints," especially because the same data were available at the USEUCOM JMRO.[67]

During Operation Continue Hope, another undesirable element characteristic of Desert Shield/Desert Storm appeared. Pallets of medical supplies arrived at Cairo West without inventory lists; some were stored in the open under deteriorating covers and were subject to the desert sun. Other equipment found to be serviceable required recalibration before it could be used. While the ATH at Cairo West could recalibrate certain equipment, other ATHs required equipment that was only available—but not accessible as it turned out—in Turkey. Thus, the equipment was effectively useless.[68]

A unique case in Somalia involving the intersection of Special Operations Command (SOCOM) operations with the Air Force aeromedical evacuation system had implications for the future. In a situation suggestive of Operation Just Cause, the MASF at Mogadishu IAP was co-opted as a JCCP by the joint special operations task force (JSOTF) of Rangers and Delta Force soldiers sent to seize the Somali warlord Mohammed Aidid. In late August 1993, shortly after the arrival of Army Rangers and other personnel from Fort Bragg, the JSOTF surgeon, Lt. Col. Philip Volpe, approached Major Konczal, the AELT OIC at Mogadishu IAP, with a contingent request for medical support.[69] Volpe asked Konczal, a Medical Service Corps officer who had herself recently arrived for a voluntary tour of duty from her reserve unit, to allow the MASF to function as a joint casualty collection point if casualties were suffered during the operation for which the SOCOM forces had been dispatched.[70] The MASF tent was located just inside the airport entrance and was staffed with Air Force flight nurses and medical technicians drawn from the ARC, a number of whom had substantial backgrounds in ATLS and advanced cardiac life support. Two active duty personnel, Dr. John McNamara, a flight surgeon with a background as an Army special forces doctor, and an independent medical technician, Sgt. Bill Thomaston, with experience as a surgical technician, were also assigned to the MASF.[71]

The MASF was also only approximately 200 yards from the JSOTF command post located in the hangar in which the 400 or so Rangers and Delta Force troopers were billeted. The living compound for the Air Force medical personnel was located nearby, on the other side of the MASF from the SOTF hangar. McNamara's prior service as a special forces medic was undoubtedly also a factor in Volpe's request (he knew McNamara well), but most important to the surgeon for the Ranger task force, Maj. Rob Marsh, was that the MASF was located less than a mile from where the attempted abduction of Mohammed Aidid would occur.[72]

Marsh and Volpe divided the responsibility for the medical support of the Rangers: Marsh had tactical responsibility for providing first aid and immediate emergency treatment by forward medics, evacuating casualties to the casualty collection point (the MASF tent), and triage and emergency treatment; Volpe was responsible for the medevac of patients from the MASF/JCCP (or later the Pakistani-held stadium) to the 46th Combat Support Hospital and for strategic evacuation from Somalia to Germany or to the CONUS. In the medical hierarchy, Volpe was Marsh's superior.[73]

The JSOTF surgeon predicted to Major Konczal that it might be necessary to use the MASF as a JCCP "only if a helicopter went down," an event he indicated he believed would be relatively unlikely.[74] Well aware of the limited medical capabilities available in the immediate area and responsive to the pressure, implicit externally and generated internally by her wish to be supportive should wounded Americans might require medical help, the AELT OIC agreed, without consulting her chain of command.[75] Major Marsh, the Ranger task force surgeon, then discussed with the MASF OIC, lst Lt. Kay Rast, ANG, how he wanted the casualty flow established, among other clinical details of the MASF's new role.[76] In anticipation, McNamara and the MASF staff cadged equipment wherever they could, in preparation for treating patients suffering trauma.[77] Meanwhile, the Rangers trained on the airfield and conducted practice sorties into Mogadishu, in one of which they were able to seize of Osman Atto, an important Aidid lieutenant.[78] Several joint drills were set up to prepare the personnel scheduled to be involved in the JCCP as they waited to launch the mission to seize Aidid. During these drills a series of minor casualties occurred that served to provide realistic training. In a later description of this joint training, Marsh said willing the cooperation and clinical skill of Air Force personnel at the airport were instrumental in the successful treatment of the Ranger and Delta Force casualties, particularly for the low death rate among them.[79] He volunteered that the role of the Air Force personnel "has not been fully appreciated...for how important they were to the success of our operation."[80]

Although the Rangers[81] operated under a purely U.S. command structure, Colonel Volpe, as JSOTF surgeon, also established a good but wholly unofficial working relationship with the UNOSOM II CMO, Colonel Ditch. It seems clear that Volpe was seeking to ensure that all available medical support could be mar-

shaled in support of the Rangers and Delta Force personnel if the secret operation went awry. Although he did not tell Ditch what their mission was, Volpe agreed to let Ditch know when it was about to begin by passing a code word by radio. For this purpose, Ditch provided Volpe with a handheld radio with three channels unique to himself.[82] Although the MASF had already been used for such a purpose on a number of occasions after the assault on the Pakistanis in June, the out-of-doctrine use of the MASF by SOCOM forces was now a commitment without involving any Air Force member, other than a relatively junior Air Force medical officer, in the decision.[83] The role that Air Force aeromedical evacuation personnel played in providing medical support to the Rangers undoubtedly contributed to muting if not eliminating potential doctrinal concerns. Each aeromedical evacuation staff member received a Joint Forces Commendation Medal personally from the JSOTF commander, Gen. William F Garrison, before the Rangers left Mogadishu.[84]

By contrast, in the planning for Operation Just Cause, the 1989 mission in Panama in late 1989 to seize Manuel Noriega, the role of the Air Force aeromedical evacuation system had been carefully defined beforehand. Planning had occurred over an extended period and involved the then-commander of the 1st AMES, Colonel Brannon, the USSOUTHCOM senior medical staff officer, Col. Felix Meyer (coincidentally, the 1st's former commander), and representatives of the SOCOM medical units that spearheaded the invasion. Their planning had been extremely close hold, and the operation had been sanctioned at the highest levels of the U.S. government.

The Rangers began their mission into Mogadishu at midafternoon on Sunday, October 3, and confronted trouble almost immediately. Two Blackhawk helicopters were shot down, and Rangers were soon pinned down, under siege, where they would remain into the early morning.[85] The first Ranger casualties, many badly wounded, began to arrive back at the airfield within two hours. There, flight nurses and medical technicians performed triage on the wounded in the open, near the MASF. Patients requiring emergency surgery were moved inside to what in effect had become a battalion aid station, a second-echelon MTF where two treatment stations had been established. One station was manned by Colonel McNamara, the Air Force flight surgeon. He was assisted by the flight nurse who was the MASF OIC, Lt. Col. Sylvia Johnson, and the independent medical technician, TSgt. Bill Thomaston. The other station was manned by two Army medical officers from the JSOTF, provided by Dr. Marsh. One was a physician's assistant, and the other, Lt. Col. Adams, was the Army flight surgeon for the 160th Special Operations Aviation detachment. Their assistant was an Air Force flight nurse assigned to the MASF. While the two Army medical officers were periodically called out for activities with their unit, McNamara and other Air Force aeromedical evacuation personnel continued work with the casualties until the flow slowed and essentially ceased around eleven in the evening.[86]

After receiving care at the MASF/JCCP, patients were flown by helicopter from Mogadishu IAP to the combat support hospital at the embassy compound for

Casualties being evacuated from a downed Blackhawk in October, 1993.

further care. When the requested patient airlift became available soon after daylight the next day, the men were returned to the airfield by helicopter to be aeromedically evacuated by C–141s. During the initial influx of casualties, Dr. Marsh, the Ranger force surgeon, moved between the MASF and the JSOTF operations center at the airport, coordinating the medical effort and keeping the MASF personnel informed of the situation as it changed. He later flew to the stadium where the survivors of those pinned down in the city were taken. Most of those rescued early on Monday were taken some five miles away to the Pakistani base in the city and were later medically evacuated to the combat support hospital. Some were brought to the airport where they were triaged and treated in the MASF/JCCP.[87] Of some 110 casualties suffered during the failed attempt to capture Aidid, 75 percent underwent triage by Air Force personnel at the airport and then received emergency surgery or other treatment in the MASF/JCCP.[88]

Before being evacuated from Mogadishu on Monday, patients were processed for aeromedical evacuation. Because so many were arriving by medevac from the 46th Combat Support Hospital, both the MASF and another nearby building were used. To speed the loading of the aircraft, a few men were taken directly to the aircraft if they appeared to be sufficiently stable. All had been validated for evacuation by air by the flight surgeon, Dr. McNamara, and by the flight clinical coordinator, Capt. Susan Martello, assistant OIC of the MASF, both of whom had been flown by helicopter to the 46th Combat Support Hospital early that morning.[89] The TACC and the airlift system proved equally responsive to the challenge. The first C–141 arrived at Mogadishu IAP to evacuate the wounded at daybreak, roughly fourteen hours after the first casualties began to arrive there.[90] A C–5 carrying medical personnel and equipment drawn from the ATH at Cairo

West that arrived several hours after the C–141 was directed not to land because of sporadic ground fire. It returned to Cairo West, leaving patient care essentially to those already on the ground in Mogadishu.[91]

Accompanied by Lt. Col. Lewis Bartles, a flight surgeon who had just arrived on the C–141, twenty-three litter and six ambulatory patients were flown directly to Ramstein AB. The nine-hour flight without a refueling stop at Cairo West was made after it was agreed that the Ranger casualties required treatment beyond the capabilities of the Cairo West ATH.[92] The 46th Combat Support Hospital had medically regulated the evacuees, and AELT and MASF personnel at Mogadishu airport made parallel efforts to provide information to Cairo West that could be relayed to the USEUCOM JMRO. Confusion at Ramstein and at the Landstuhl Army hospital about the first load of Ranger casualties occurred because sparse patient information was passed to Germany. The information seems to have been generated in a contingency mode, in which only the number of patients was transmitted and neither a name nor the patient's specific medical condition was supplied. Whatever the reason, the lack of such information certainly accorded with the SOCOM's general reluctance to identify its people publicly.[93]

Curiously, neither of two quite detailed popular accounts of the events of that that day mentions any contributions by the Air Force aeromedical evacuation personnel at Mogadishu.[94] One published in 1994 and coauthored by a civilian doctor treats the presence of Air Force flight nurses dismissively (and erroneously) in a brief paragraph: "The Air Force had some reserve nurses rotating through their annual training assignments. They were spending much of their time comforting the less severely wounded."[95]

The unexpected role that the Mogadishu MASF played in the Ranger episode generated discussion within the aeromedical evacuation community at AMC, but it apparently had little formal effect on the ongoing evolution of the system.[96] It is notable that two flight surgeons at Mogadishu, with the concurrence of the JSOTF surgeon, Dr. Volpe, and the support of the director of aeromedical evacuation Forces, Colonel Hadbavny, sought to regularize the role of the MASF as a JCCP by requesting deployment of additional physicians trained in acute care.[97]

Although intended to address the possibility of another mass casualty situation, this deviation from AMC aeromedical evacuation policy and the expanded MASF role raised questions regarding applicability to future contingencies. Interestingly, the 44th Medical Brigade commander during the Gulf War recalled that he thought the evacuation system in the desert would function similarly to what he had experienced at Howard AFB in Just Cause[98] when SOCOM medical personnel and Air Force aeromedical evacuation personnel had essentially been integrated to provide triage and emergency medical treatment.

In both the Panama and the Mogadishu situations, stabilized rather than clinically stable patients were quickly transported to fourth-echelon MTFs by aeromedical evacuation. The Mogadishu episode may well have been the precedent for the presence of SOCOM representatives in the TACC that Colonel Wright

reports during her tenure in TACC, when AMC provided airlift support to special operations task forces. Certainly, the unplanned (at least by the Air Force) integration of Air Force medical capability in the form of the MASF and the assignment of aeromedical evacuation personnel into the Mogadishu events of October 1993 presaged the increasing jointness of medical support provided to deployed U.S. forces. This was to be more formally structured into later contingencies, particularly in Operation Uphold Democracy/Maintain Democracy, the deployment of U.S. forces to Haiti, in which the Howard precedent would in fact be raised.[99]

Aeromedical Evacuation Becomes More User Friendly: Operation Uphold Democracy

U.S. involvement in Haiti arose from a political crisis occasioned when the first freely elected president in Haitian history, Jean-Bertrand Aristide, was deposed by the military in September 1991. Following the turmoil, a UN sanction was obtained authorizing the use of all necessary means to restore Aristide to power.[100] U.S. forces made a generally peaceful entry into Haiti on September 19, 1994, avoiding a forced entry that had already been set in motion and led by SOCOM forces. Although no longer needed to force an entry, the JSOTF remained at its base of operations at Guantanamo Bay, Cuba, longer than planned to support other missions, and it retained operational control of the MASF and the aeromedical evacuation personnel also deployed there.[101]

Upon Aristide's return to Haiti on October 15, U.S. forces immediately began withdrawing from a strength of 16,000 in late October to 9,000 by November 30. By January, the United States had turned over command of the Haiti operation officially to the UN, and residual U.S. troops were being provided aeromedical evacuation services by TACC on a peacetime schedule using both C–9As and retrograde C–141 missions.[102]

Until that happened, patient evacuation was provided by a TAES that incorporated elements and policies differing rather sharply from the familiar aeromedical evacuation doctrine promulgated by the AMC and its predecessor, MAC. The system also differed notably from the TAES that AMC's 1st AMES had deployed less than two years earlier during Operation Restore Hope in support of U.S. forces in Somalia. However, the Somalia operation had evolved in ways that compelled significant deviations from AMC policies regarding aeromedical evacuation, which created the question, was Somalia a preview of the kinds of contingencies that U.S. forces would be called upon to support in the future? If so, how should the TAES be structured? Were the changes set in motion by analyses of Desert Shield/Desert Storm relevant to the way the Air Force should plan to conduct aeromedical evacuation in future contingencies? If it could be said, as one of the authors of Colonel Brannon's after-action report on Desert Shield/Desert Storm did say several years later, that they had been wrong about the type of future contingency the United States would have to support with

aeromedical evacuation, then perhaps the operation in Haiti might be considerably closer to the correct model. Future contingencies requiring aeromedical evacuation support will provide some answers to these questions, but a more detailed description of the TAES that supported U.S. forces in Haiti can provide some suggestive insights.

At first glance, the pattern of U.S. involvement in Haiti seems quite similar to that pursued in Somalia. In both cases, once the decision to intervene had been made, based at least in part on humanitarian considerations, large-scale U.S. forces prepared to engage in combat deployed rapidly. Although the units deployed to Somalia did not anticipate organized resistance and encountered none, they had been authorized to use force under Chapter VII of the UN Charter to enforce a Security Council resolution. In Haiti, anticipating resistance from the Haitian military from the start, the United States originally planned an assault to seize key objectives and suppress opposition before it deployed the bulk of its forces. In Somalia and in Haiti, plans called for the U.S. presence to be reduced after the initial operations and for the mission to be ultimately turned over to a UN-sponsored multinational force that would have certain nation-building responsibilities. Whatever apparent similarities existed between the two courses of U.S. involvement, more significant were the differences in the amount of resources devoted to aeromedical evacuation and in the structure of the system itself. In support of Operation Uphold Democracy, as the operation was initially codenamed, the further evolution of aeromedical evacuation in the USAF and the level of cooperation with its major customer, the U.S. Army, for this support were significant.

In late April 1994, the 1st AMES, now assigned to the ACC, was requested to participate in a joint exercise, Exercise Knightly Rogue. A FAST from the 44th Medical Brigade and a joint medical augmentation unit with medical elements of SOCOM were to participate. The SOCOM surgeon directing the exercise was Colonel Volpe, who until six months before had served as the JSOTF surgeon for the Ranger deployment to Mogadishu. Although not formally identified as such, the exercise was a tacit rehearsal for deployment of a TAES to support a JSOTF that would spearhead an invasion of Haiti. As reflected in the comments and recommendations in the 23d AMES[103] commander's unclassified after-action report and verified by participants from the 1st AMES, the scenario and requirements generated by the user, Colonel Volpe, and the SOCOM medical elements echoed the use of the MASF as a JCCP during Operation Continue Hope, but they much more closely resembled the system established at Howard AFB in Panama for Operation Just Cause.[104]

Knightly Rogue reflected contingency planning that had begun quietly on a very close-hold basis for a possible invasion of Haiti. The final CONOPS that the planning group developed for the required aeromedical evacuation support of the JSOTF that actually intervened in Haiti in September 1994 incorporated the lessons and requirements of Exercise Knightly Rogue as well as well other elements interjected when the CONOPS was finalized.[105]

Essentially, two TAESs deployed to support Haiti operations, although the system was conceived as a whole by the same small group of medical planners who designed it over the course of several months preceding Knightly Rogue. The planners were drawn from ACC, Twelfth Air Force, the 23d AMES, Joint Special Operations Command, and the 18th Airborne Corp's 44th Medical Brigade under the leadership of ACC Chief of Medical Programs and Resources Col. James D. Reay.[106] One of the dual systems, based upon Knightly Rogue, supported Combined Joint Task Force (CJTF) 180 whose core was a JSOTF assigned to spearhead an invasion and to suppress resistance prior to the deployment of the occupation/stabilization force, CJTF 190.

The JSOTF chain of evacuation for casualties led from the objective area in Haiti, where emergency treatment was provided by special forces medics, to transport via JSOTF helicopters to the USS *America* in the waters off Cuba. Onboard the aircraft carrier, patients received surgical resuscitation from Air Force surgical teams and were then medically evacuated to Guantanamo where another Air Force surgical team stood ready to provide additional surgery if necessary. Patients were then transferred to the MASF which, in addition to its doctrinal role as a holding facility for patients awaiting evacuation (as in Mogadishu), now had the additional function of serving as a JCCP.[107]

Evacuated patients were flown to one of three Navy hospitals at Jacksonville, Florida, Charleston, South Carolina, or Portsmouth, Virginia, by C–130s previously deployed to Guantanamo and dedicated to the aeromedical evacuation support of the JSOTF. Four aeromedical evacuation crews also staged at Guantanamo to provide en route medical care for stable patients. The ACC provided medical augmentees to move stabilized patients. Flight surgeons had routinely augmented aeromedical evacuation missions for the first time during Desert Shield/Desert Storm. Now, for the first time in a contingency, three teams of physicians and specialists, designated as critical care air transport teams (CCATTs) and tailored to the medical requirements of moving patients with various combat-generated injuries, deployed to Guantanamo. Their presence eliminated one long-standing irritant between the Air Force and the other services, particularly, the Army: the AMC policy of requiring the respective service hospitals to provide attendants for the evacuation of their patients who needed more than nursing care in the air.[108] Another first for the TAES supporting the JSOTF was that all aeromedical evacuation personnel were chopped to the special forces for this part of the operation; they were not controlled by the AECC. Practically speaking, this had the effect of creating two separate TAESs as long as the JSOTF surgeon retained operational control.[109] In either case, a premium was placed upon timely evacuation because the commander of the Atlantic Command, the supported CINC for the Haiti operations, had established an evacuation policy for combat casualties of one day because of the austere medical capabilities in the AOR.[110]

The second TAES supported CJTF 190, which was composed of conventional combat and support forces built around elements of the 18th Airborne Corps

and the 10th Mountain Division, the same organization that had provided the quick reaction force in Mogadishu during UNOSOM II. The ACC also provided medical augmentation for evacuating patients from CJTF 190, if needed, similar to that provided for the JSOTF at Guantanamo. For this purpose, ACC deployed ten flight surgeons, two general surgeons, one respiratory anesthesiologist, and three CCATTs to Port-au-Prince, Haiti, where patient evacuation for the conventional forces originated.

In addition to its planned role as a occupation/stabilization force, CJTF 190 had also been envisioned as an alternative to the special operations units to deploy and secure the island if a peaceful entry became possible. Planning for the two CJTFs had been separate for security reasons, and the very late change of plan created a certain degree of overlap and confusion during the transition from CJTF 180 to CJTF 190 when the now peaceful invasion actually occurred. Shortly after the troop deployment began, some 21,000 U.S. military personnel were in Haiti. During the transition to CJTF 190, some of the pressure on the TAES was relieved when Atlantic Command increased the theater evacuation policy for the routine movement of patients to three days, and later to five days under CJTF 190 and the succeeding multinational force.

The TAES had been designed to operate with the assumption of a forced entry. Some aeromedical evacuation resources had to be redistributed to accommodate the new reality, but the change was accomplished with no adverse effect. Changes in evacuation policy had relieved some of the pressure on the TAES, but aeromedical evacuation remained a critical element in the medical support of the large number of forces entering Haiti because so few medical facilities were available. Aeromedical evacuation of the conventional force patients continued essentially as planned.

Patients from CJTF 190 were stabilized by a FAST from the 5th MASH, and then Army medevac helicopters flew them to the USNS *Comfort*, the veteran of the Persian Gulf War, for definitive treatment and to await aeromedical evacuation. Preplanned C–130 missions had been scheduled to depart MacDill AFB for Port-au-Prince shortly after the U.S. entry, and general surgeons and flight surgeons at Pope AFB had been placed on alert status to fly to Haiti with standard medical flight crews to provide in-flight medical care should patients evacuated from Port-au-Prince require it. Patient movement was accomplished using a combination of opportune and retrograde airlift or by calling in one of the dedicated aeromedical evacuation aircraft when a patient's condition merited urgent evacuation. On September 23, the first aeromedical evacuation mission flown from Haiti carried eight litter patients, one classified as urgent, from Port-au-Prince to Jacksonville Naval Station, Florida. Keesler AFB, Mississippi, was also used for urgent evacuees, but the primary destination for routine patients was Andrews AFB, Maryland. Planning called for U.S. medical facilities at Port-au-Prince to be bolstered by a combat support hospital soon after the U.S. deployments began.[111]

To ensure that the aeromedical evacuation system ran as smoothly as possible, AELTs were deployed widely to support the conventional forces of CJTF 190.

Teams were sent to Roosevelt Roads Naval Hospital, Puerto Rico; the amphibious assault vessel, USS *Wasp*; the USNS *Comfort*; and a central location at the Port-au-Prince airport.[112] The AELT deployed at Port-au-Prince coordinated the required patient lift that carried patients to an appropriate CONUS MTF.

As the planned invasion transitioned into a permissive entry, the Port-au-Prince AELT was replaced by a MASF. On September 28, the 28th Combat Support Hospital from the 44th Medical Brigade deployed to Port-au-Prince to provide a third-echelon MTF, and it began operations four days later. Both the USNS *Comfort* and the FAST from the 5th MASH were redeployed to the CONUS. The role of the 23d AMES was also terminated in early October when it received another tasking to support a developing contingency in southwest Asia, and it turned over the operation of the aeromedical evacuation system in the Haitian AOR to an AFRES unit, the 610th AMES. The 610th managed the drawdown of the system as U.S. forces began to leave gradually in mid-October. Between September 18 and December 12, 1994, a total of 118 litter and 207 ambulatory patients were aeromedically evacuated via the TAES.[113]

Unlike Operation Restore Hope, where few changes of any significance had been structured into the supporting aeromedical evacuation system, the Haiti TAES featured some novel elements. During the 23d AMES period of control, the AECC that directed the TAES was located at Pope AFB together with an AME. As an experimental measure prior to the initiation of Uphold Democracy, the AECC was joined by personnel from the recently established GPMRC to establish a TPMRC that controlled the medical regulating of patients and, working with the TACC at Scott AFB, patient movement.[114]

In another manifestation of AMC's new role in medical regulating, deployable medical regulating teams equipped with leased IMARSAT terminals accompanied each AELT and the MASF/JCCP at Guantanamo Bay, Cuba. The teams communicated patients to be evacuated to GPMRC representatives at the AECC/TPMRC, who then regulated them to one of the three preplanned MTFs in the CONUS. The teams manually entered the data into the DMRIS so that the receiving facilities and the GPMRC had immediate access to patient information, including data to provide in-transit visibility to the TRAC^{2}ES.[115] The experimental program for maintaining in-transit visibility of patients moving in the system was paralleled by a program tracking patient movement items using another manual prototype of a capability planned for TRAC^{2}ES, once it was fully developed and deployed. Related to this effort to ensure that patient movement items were available where and when needed, the 23d deployed ventilators in large numbers to Port-au-Prince to preclude any sending MTF (a FAST, the USNS *Comfort*, and later, the 28th Combat Support Hospital) from leaving itself short of such equipment when it presented a patient for evacuation.[116]

AEOTs were deployed at bases where AECMs were staged, and in contrast to initial phases of the intervention in Somalia, no friction between the AECC and any of the operations teams in the Haitian AOR is noted. Although no significant

combat casualties marked the operation, the TAES moved 118 litter and 207 ambulatory patients.

Communication among the various elements of the TAES was effective. In addition to the standard Pacer Bounce HF system, the components employed SATCOM and leased INMARSAT equipment, whose use Colonel Chester had praised highly. Unique to Operation Uphold Democracy was the 23d AMES's development and publication of comprehensive flight crew guidelines outlining in detail (and with diagrams) airfield landing locations, procedures, offload messages, and aeromedical evacuation kit inventories.[117]

In spite of an apparent record of success—Brig. Gen. James Peake, the JTF surgeon, went on record after the operation saying "if you [aeromedical evacuation people] had any problems, it wasn't evident"—some problems with the TAES operations were reported.[118] Forty-four entries in the Joint Universal Lessons Learned System described problems and issues related to aeromedical evacuation that were raised during Operation Uphold Democracy/Maintain Democracy. Some were familiar, such as the issue of a flight surgeon or a CCATT physician's authority vis-à-vis that of an MCD, or the lack of adequate training for some of the ARC personnel in contingency operations; yet some were new, such as determining the best procedures for the TPMRC and deployable medical regulating teams to follow or, with reference to the aeromedical evacuation arrangements for the JSOTF at Guantanamo, determining how to conduct tactical aeromedical evacuation when significant parts of the system for evacuation were chopped to another agency.[119] The management of the TAES seems to have been effective and flexible enough to meet quite successfully the challenges posed by the shift in the character of the U.S. entry into Haiti. The director of medical readiness at ACC, the command that now had responsibility for tactical aeromedical evacuation, retrospectively stated that the responsiveness of the aeromedical evacuation system was the most significant aspect of the way the TAES functioned during Operation Uphold Democracy.[120] The integrated personnel resources deployed from the 23d AMES and the ARC in response to the 23d's tasking were also adequate to the mission and reflected imagination and creativity on the part of the planners who developed the CONOPS for the aeromedical evacuation support of the Haiti operations.

The record of aeromedical evacuation support for these operations makes one thing abundantly clear: the TAES for Operation Uphold Democracy was structured and operated in ways that differed markedly from the policies promulgated by AMC and its predecessor MAC when they controlled the worldwide aeromedical evacuation system. AMC remained the Air Force proponent for aeromedical evacuation after the decentralization of the worldwide system, but ACC now controlled both the C–130 tactical airlift and aeromedical evacuation units in the active force and in the ARC. With the units had come ACC responsibility for the tactical aeromedical evacuation mission and new ACC units, particularly the active duty 23d AMES at Pope AFB with its unique and very rich experience in tactical aeromedical evacuation planning and operations.

The 23d's past close association with the 18th Airborne Corps and Army special operations units—in Grenada, Panama, the Persian Gulf, and Operation Restore Hope—conditioned it toward close cooperation with the Army. Additionally, as a very experienced AMC medical planner has pointed out, there was an inherent management factor. Without AMC's scope of responsibility for aeromedical evacuation, which until mid-1994 encompassed three different systems—the strategic system, the domestic system, and the tactical system, all of which utilized different aircraft for evacuation—ACC's approach to the tactical mission likely had a somewhat sharper focus and a greater energy.[121]

Certainly, ACC's medical planners took a somewhat more responsive approach to user requirements than AMC policies would have permitted. One result was an ACC program to improve casualty care by more firmly establishing an effective interface between the deployed Army health services support system, including medevac helicopters and second- and third-echelon MTFs, and the Air Force's fixed-wing aeromedical evacuation system. This ACC program, stimulated in large part by discussions between Colonel Reay and the 18th Airborne Corps command surgeon, General Peake, put both active duty and ARC personnel into exercises with Army medical units at the Joint Readiness Training Center at Fort Polk, Louisiana. ACC pushed this program quite intensively, having some 382 active duty and reserve aeromedical evacuation and medical personnel participate in three joint readiness exercises in September 1995, October 1995, and January 1996.[122]

All these factors helped determine the thrust of ACC planning for the projected intervention in Haiti. Colonel Reay, who as ACC chief of Medical Programs and Resources is generally credited with providing the guidance and backing to the relatively junior planners who actually wrote the aeromedical evacuation CONOPS, was strongly oriented toward meeting the support requirements of customers, particularly the Army units at Fort Bragg, with whom the 23d conducted many joint exercises and which tended to view AMC as unresponsive in this regard.[123] Another factor tending to differentiate perceptions of the tactical aeromedical evacuation mission between AMC and ACC is the fact that when ACC deploys combat or support forces, including aeromedical evacuation units, they chop to a theater commander, whereas USTRANSCOM's TACC continues to exercise control over AMC's strategic aeromedical evacuation missions in contingencies. Reay's orientation toward satisfying the customer was not unique in ACC. In February 1995 ACC Surgeon Brig. Gen. Thomas Gensler published a generic ACC CONOPS for theater aeromedical evacuation whose core concept was tailoring aeromedical evacuation forces to meet operational requirements.[124]

An interesting minor factor that contributed to the responsiveness with which the ACC medical planners permeated the CONOPS for the Haiti TAES was one that derived in part from recent history but had deeper roots in the long-standing issue of whose responsibility it was to provide attendants for the air evacuation of unstable patients. The issue became visible during the Persian Gulf War, but it was

muted in the aftermath by two facts: first, the Air Force flight surgeons had been available to augment the standard aeromedical evacuation flight crews; second, and more significantly, the number of patients who actually required aeromedical evacuation was relatively small. The issue had become acute in Somalia because the small staffs of the Army combat support hospitals providing medical support to the residual U.S. force made losing any medical personnel risky. The security situation had been uncertain for U.S. and UN personnel since the Somali attack on Pakistani troops in early June, and U.S. installations at the Mogadishu IAP had been periodically subjected to incoming fire of various sorts for weeks before the Rangers attempted to seize Mohammed Aidid. In fact, at the time of the failed Ranger raid of October 3, two members of the 46th Combat Support Hospital medical staff were still in Germany awaiting transportation back to Mogadishu after having accompanied patients from the support hospital on an aeromedical evacuation to Ramstein.[125]

As Operation Continue Hope in Somalia was terminating, the Army's unhappiness with the way the Air Force conducted aeromedical evacuation in contingencies became evident rather dramatically at a Fort Bragg conference that the 44th Medical Brigade sponsored in April 1994. Colonel Bloomquist from the AMC surgeon's staff briefed the attendees on the evacuation support the Air Force provided in Somalia. In attendance from the Air Force was one of the medical planners of the (still) 1st AMES from Pope AFB, Maj. James Lorraine, most of whose squadron mates were participating in Exercise Knightly Rogue. What some of the Army attendees objected to particularly, and apparently rather vociferously, was the Air Force policy that required MTFs to provide attendants for patients that MCDs deemed would require possible medical intervention beyond the capabilities of the standard Air Force medical flight crew.[126] Underlying the criticism were the basic differences between the Army and Air Force on what clinical conditions should be acceptable for aeromedical evacuation, or what should disqualify certain patients pending a greater recovery. At issue was the ongoing argument over the degree of clinical stability that constituted a *stable* versus a *stabilized* patient, the latter requiring an attendant according to Air Force policy. Beyond the clashing of clinical judgments (and possibly egos), the issue was made all the more pointed for the Army medics because of the continuing drawdown of forward Army medical capabilities.

According to Major Lorraine, the criticisms leveled at the Air Force were so agitating that, when he was tasked to help develop the CONOPS for the Haiti operation, he determined he would seek to ensure that the Army would have no reason to complain. This was a contributing factor to the development of a CONOPS because its authors were already working actively to meet the requirements of their prime customer for aeromedical evacuation support in operations into Haiti. In addition to the fulsome support previously described—the use of dedicated aircraft for aeromedical evacuation, the deployment of flight surgeons and CCATTs to augment standard medical flight crews, the forward deployment

of ventilators, and the tracking system for other patient movement items—there was also a specific commitment of aircraft (C–21s) to provide the means to return CCATTs to the points from which stabilized patients were to be evacuated to the CONUS.[127] Perhaps the most striking change from customary AMC policy and practice regarding patient movement was the abrogation of the authority of an MCD to decide when a patient was not clinically suitable for aeromedical evacuation. Instead, the OIC at each AELT was made the final authority on patient movement, with the injunction that if a physician proffered a patient for evacuation, the patient was to be accepted without question and the standard medical flight crew was to be augmented as necessary to provide care during the evacuation flight.[128] In a later remark that reflected both his reaction to the Army criticism of the way in which the Air Force conducted aeromedical evacuation operations in Somalia and the configuration of the TAES that was deployed for Operation Uphold Democracy, Major Lorraine said, "For Haiti we went in 'heavy' ... and [Lt. Col.] Phil Volpe got his own aeromedical evacuation system."[129]

From a more analytical perspective, the way in which the TAES was structured and aeromedical evacuation was conducted during Operation Uphold Democracy was clearly another and particularly significant step in the evolution of the Air Force's willingness and capability to carry stabilized patients, which was something that MAC and subsequent AMC policy had sought to restrict. Notably, the Haiti CONOPS and actual TAES took a major step toward answering the challenge posed by Colonel Carleton in 1991 that "we as a service need to decide who our customer is, make this basic doctrinal decision, then organize, train, and equip." The customer during the Haiti operations, the U.S. Army, certainly got what it wanted. In addition to the comment of the JTF surgeon just quoted, SOCOM Commanding General Gen. Wayne A. Downing is on record as having commented that Operation Uphold Democracy was "the first time in his entire service career he had ever seen all the medical pieces in all the right places at the right time."[130] The Army clearly had reason to believe that the Air Force had finally accepted the Army's position that whoever it asked the Air Force to evacuate should be moved whenever the Army made the request.

Whether this in fact would become Air Force aeromedical evacuation doctrine remained to be seen. What the Army had witnessed was a difference in doctrine and policy, a result primarily from the transfer of AMC's tactical airlift and tactical aeromedical evacuation units to the tactically oriented ACC. In effect, this mid-1994 transfer marked a reversion to the formal organizational dichotomy between the strategic and tactical aeromedical evacuation systems that had existed throughout the Vietnam War until all airlift was consolidated under MAC in the 1970s.

Chapter 12

EPILOGUE: EMERGING CRITICAL ISSUES FOR REENGINEERING THE AEROMEDICAL EVACUATION SYSTEM

Any fair evaluation of how well an aeromedical evacuation system performs in a given contingency must consider what kind of operations the system was designed to support, what resources were allocated to it, and what external factors were considered when framing its structure. After the collapse of the Soviet Union and the changes in the U.S. presidential administrations, successive DoD-directed bottom-up reviews (BURs) were conducted to determine the overall size and capabilities that the defense establishment would need to meet major national security challenges in a non–Cold War world. Worst-case exercises sought to address two simultaneous major contingencies in different parts of the world. Mobility requirement studies (MRSs) then sized the strategic airlift fleet against airlift requirements to support these scenarios.[1] Whatever data for deriving aeromedical evacuation requirements the BUR provided to the related MRSs, it seems that actual contingencies like Somalia and Haiti fell beyond the models.[2]

As Colonel Howell noted, the Persian Gulf War has not proved to be the model for subsequent contingencies involving U.S. forces that Brannon and his staff had predicted. Defining future aeromedical evacuation requirements and reengineering the aeromedical evacuation system in light of the lessons of the Gulf War has proved to be only partially relevant to subsequent later actual need. Somalia, Haiti, and contingencies in the Balkans have proved more relevant in scale. The small footprint of the Army's forward deployed medical capability in contingencies since Desert Storm has also tended to drive evacuation policy and impose a need to evacuate less stable patients than previously thought appropriate.

In the post–Gulf War era, when he became USTRANSCOM/AMC command surgeon, General Roadman initiated strategic planning efforts focused on the

aeromedical evacuation system. Conceptually, these have now rightly been tied to the BUR, its successive iterations, and related MRSs, and they have formed the basis for several documents laying out what the future structure and capability of the aeromedical evacuation system should be.[3] Significant developments beyond direct national security challenges facing the United States now assume ever-increasing importance with respect to the future aeromedical evacuation system.

Diminishing Airlift Capability for Aeromedical Evacuation

As the 1990s progressed, perhaps the most fundamental problem affecting the ability of AMC to fulfill its strategic aeromedical evacuation mission was the declining number of aircraft in its inventory usable for strategic aeromedical evacuation. Structural problems in the workhorse C–141 fleet had already affected deployment of the original contingent of U.S. troops to Somalia during Operation Restore Hope, and proposals to use a service-life extension program to extend the serviceability of the older C–141s had proved too costly.[4] The decline in the availability of aircraft capable of carrying up to 103 litter patients on dedicated, scheduled, or retrograde missions created a dilemma that has yet to be fully resolved.

A new strategic airlift aircraft, the C–17 Globemaster III, was intended to replace the airlift capability lost when the C–141s left the inventory, but its procurement was slowed in the late 1990s because of problems in development. From the point of view of performance, the C–17 is more capable than the C–141 in its ability to carry outsized loads and to land at forward, unimproved airstrips. Because the Globemasters were scheduled to replace the C–141s on a less than one-for-one basis, fewer would be available for intertheater airlift of troops and equipment or for aeromedical evacuation. In any major crisis requiring the intensive use of strategic airlift, taking C–17s out of the stream for even retrograde aeromedical evacuation missions would present a problem.

In this regard, General Tenoso's inability to keep the C–130s that he had intended to reserve for aeromedical evacuation during Desert Storm from being used for operational requirements is suggestive, particularly given the brief combat in which CENTCOM forces were engaged. Moreover, the total litter-carrying capability in the strategic airlift fleet was going to be further reduced because C–17 litter stanchions could accomodate only 36 litters, roughly one-third of the C–141's maximum capability.

The C–141 did not have the only airframe problem that affected the Air Force's capability to perform its aeromedical evacuation mission. The continuing utility of dedicated C–9s for domestic and routine intratheater aeromedical evacuation missions also came into question in the middle of the decade. Their airframes were aging; some were nearly thirty years old. Although projected to be airworthy until 2010, new and potentially costly requirements would be required to keep the C–9s mission-ready. Should the Air Force wish to continue operating

them for any purpose, new navigation equipment would be needed to meet the reduced separation standards planned by the International Civil Aviation Organization and the FAA. Furthermore, the C–9 logistics base was shrinking, and new noise restrictions would require either the expensive option to re-engine the aircraft or install hush kits, even though these had not yet been certified as acceptable by the authorities. In 1999, the Secretary of State traveling on a C–9 converted for officials' use had been refused landing at Brussels Zaventem Airport because of its noise level.[5]

Potential solutions to both C–9 problems involved expenditures in an era of tight Air Force budgets when the service would give higher priority to developing new fighter aircraft, purchasing more C–17s, or re-engining the C–5 fleet to increase its low reliability rate.[6] A C–9 study completed in 1998 laid out potential solutions among which the optimum appeared to be procuring the Boeing 757 as a dedicated replacement, a difficult requirement to sell to the Air Force chief of staff, given competing budgetary priorities.[7]

Whether to extend the viability of the C–9 fleet was complicated by the reduced requirement for domestic aeromedical evacuation implicit in the organization of TRICARE, the new military health care system that went into effect in mid-1998. TRICARE provides health care to active duty military personnel and other eligible individuals regionally in geographically determined areas. Designed to be medically self-sufficient, each region would offer a broad range of medical specialties that would essentially eliminate or at least markedly reduce the need to move patients among MTFs.

The rationale for the domestic aeromedical evacuation system itself had already been questioned implicitly in 1995 in a joint evaluation by the DoD IG and the Air Force Auditor General. The DoD IG review focused primarily on whether the system was effectively meeting training requirements for its wartime mission while providing cost-effective medical support in the process. The audit concluded that DoD was performing unnecessary aeromedical evacuations and that C–9As were being flown in excess of mission training requirements. Of 1,177 patients sampled between January and June 1993, the audit claimed that 983 could have been treated locally and that only 79 patients were transported cost-effectively. It examined 425 USAF MTFs that used aeromedical evacuation to transport 424 outpatients to referral MTFs for routine medical care at a cost of $3,690 per patient. The agency's analysis showed that comparable care could have been purchased at local civilian sources for an average cost of $105 per patient. On this basis, the agency calculated that the Air Force had spent approximately $29.8 million more than necessary in FY 1993 because it could have secured the same outpatient health care from local civilian sources. The agency report concluded, "the aeromedical evacuation system was not an economical method for obtaining medical care for outpatients requiring treatment at alternate sites."[8] It also noted pointedly that C–9 aeromedical crews received only limited training because most patients were ambulatory and did not require intensive medical care en route.[9]

The report recommended that the C–9 flying-hour program be essentially halved from 17,211 to 8,550 hours, which it believed would still meet training requirements for the C–9A's wartime mission. That mission had changed from deploying the C–9s with their associated flight and medical crews overseas in support of NATO to remaining within the CONUS during contingencies.[10] Although rebuttals by the AMC command surgeon were eventually successful in adopting a less stringent reduction—11,925 flying hours in FY 1997, 10,881 flying hours in FY 1998, and 9,647 flying hours in FY 1999 and beyond—the C–9 program has continued to come under attack.[11]

In 1998, the Office of the Secretary of Defense Program and Evaluation staff attempted to eliminate the C–9A program entirely, but it was unsuccessful as a result of the vigorous personal intervention of AMC Commander Gen. Walter Kross who cited DoD reports stating that visible medical assets constituted the single most important morale factor to combat troops, and that the C–9A constituted a major element of that visible presence. He also noted that the post–Gulf War doctrine of accepting stabilized rather than stable patients for evacuation required more aeromedical evacuation missions with more onboard specialized medical equipment. With only limited intratheater airlift available to the warfighting CINCs, Kross argued that the additional loss of C–9As was especially worrisome. His concern with intratheater airlift had immediacy because the C–130 flying units and their associated tactical AMESs had reverted from ACC to AMC control in mid-1997, and the reversion included the single active duty AMES dedicated to tactical aeromedical evacuation. The former 1st AMES based at Pope AFB, North Carolina, that had gone into action as the 23d AMES in Haiti had now become the 43d.[12]

Addressing the Strategic Airlift Shortfall

To help fill the gap in AMC's strategic airlift capability caused by the loss of C–141s, precedents from Operation Restore Hope offered at least a partial solution. Some C–141B aircraft with low flight times on their airframes were distributed to ANG and AFRES squadrons and were to be upgraded with new avionics to C models.[13] General Fogleman's directions to TACC that the cargo- and passenger-carrying capabilities of the KC–10s and KC–135s be utilized during the Somalia deployments proved a successful expedient. The use of these aircraft provided not only a substantial part of the necessary airlift capability, the additional aircraft could also be used for retrograde aeromedical evacuation missions, albeit with some limitations. Neither the KC–10 or KC–135 nor the C–5 was equipped with litter stanchions; stanchions installed in the original C–135s used by MAC in the early 1960s for aeromedical evacuation missions were removed in various depot reworkings. More importantly, neither the KC–10 nor the KC–135 had oxygen systems configured to provide patient support, and in the case of the KC–135, the aircraft-generated power was incompatible with the airborne medical equipment.

The ARC still had many KC–135 tanker units that were used for emergency patient evacuations, and the activation of the aeromedical evacuation segment of the CRAF could provide additional strategic evacuation capability, though the CRAF option was not a viable solution for peacetime operations. Supported by the AMC commander and the surgeon general, and pressed by the readiness-focused Carleton—who by 1998 was a lieutenant general and commander of the Air Force flagship medical center, Wilford Hall, at San Antonio—AMC seriously studied the use of KC–135s to provide a peacetime supplement to AMC's residual strategic aeromedical evacuation capability.[14]

Another possibility for resolving the peacetime shortfall of intertheater aeromedical evacuation would be to acquire a new airframe like the Boeing 757-300, modified for aeromedical evacuation. This was identified as the preferred alternative to keeping and upgrading the C–9As, which the study concluded was the least preferable option.[15] The greater range and newer engine and navigation technology incorporated in the 757 would enable it to perform not only intratheater but also intertheater airlift. The acquisition could be stultified by competing priorities for aircraft acquisition and by a resurgent Air Force resistance to buying single-purpose aircraft. Such an issue had surfaced initially in the early 1930s when the Army surgeon general refused to buy additional dedicated air ambulances, and the Air Force was generally disinclined to buy a single-purpose transport aircraft. The C–131 and C–9 acquisitions really represent aberrations in Air Force procurement policy.

In the much tighter budgetary world of the post–Cold War era, and in view of a challenged peacetime domestic aeromedical evacuation mission, prospects for a new jet aircraft dedicated to aeromedical evacuation were cloudy at best. Other factors that arose in the late 1990s were the normalization of the role of critical care in the air through the establishment and funding of the CCATTs; consideration of a possible new role for telemedicine in aeromedical evacuation and the aggressive activity in a new mirror-force strategy to meld active duty and ARC aeromedical evacuation communities into a seamless entity able to function efficiently in any contingency or full-scale wartime operation; and the provision of sufficient airlift for strategic aeromedical evacuation, given the prospect of C–141s leaving the inventory and the smaller litter capability of the C–17 coupled with the issue of its greater operational value. Another factor profoundly impacting the resolution of these issues was the emergence of chemical and biological threats to U.S. forces.

The Evolution of the USTRANSCOM Command and Control and Execution System—TRAC^{2}ES

TRAC^{2}ES originated in the requirement to provide in-transit visibility for patients moving within the strategic aeromedical evacuation system controlled by MAC in the immediate post–Persian Gulf War period. While serving as USAFE

command surgeon, General Roadman oversaw the successful development of a limited in-transit visibility capability at the direction of the USAFE commander, General Oaks. In this postwar period, TRAC^{2}ES became a successful program for AMC through General Roadman's efforts and the able assistance of Navy Commander Breeden, who originally had been critical of the Air Force's aeromedical evacuation effort during the Persian Gulf War.

As of October 2000, AMC had not yet been able to deploy an operational TRAC^{2}ES due to a variety of developmental problems which involved changes in contractors and in the envisioned scope of the system. This latter change was initiated in the autumn of 1993 when an enthusiastic Government Auditing Organization report recommended that the system be extended to patients evacuated by the TAES from the combat zone and the COMZ, rather than be developed just for strategic intertheater aeromedical evacuation. Until achieving its anticipated full operational capability in 2001,[16] the entire aeromedical evacuation system was subjected to a lengthy tiger-team effort assisted by the now-retired Colonel Brannon to assess the requirements of the system to meet future challenges.[17]

A new mirror-force strategy has been put in place with apparently good results to standardize capabilities between active duty aeromedical evacuation units and those in the ARC. The lessons of the Haiti operation have now been largely incorporated by AMC medical planners, who now include personnel from the short-term ACC staff in control of tactical aeromedical evacuation. Among them, the USAF surgeon general in 2000, Lt. Gen. P. K. Carleton, has by all indications carried his emphasis on aeromedical evacuation readiness to his staff.[18] Perhaps, as always, budget priorities will determine the final shape of the aeromedical evacuation system as it faces new challenges, now including the transportation of patients suffering from the effects of biological, chemical, or possibly even nuclear warfare. The aeromedical evacuation system planners have prepared an excellent baseline from which to address these and other future challenges.

Glossary

AAF	Army Air Forces
ACTS	Air Corps Tactical School
ADVON	advanced party
AE/FS	aeromedical evacuation flight surgeons
AEAM	aeromedical airlift model
AECM	aeromedical evacuation crew member
AEEB	Aeromedical Evacuation Executive Board
AEF	American Expeditionary Force
AELTs	aeromedical evacuation liaison teams
AEOT	aeromedical evacuation operations team
AERC	Aeromedical Evacuation Readiness Committee
AESG	Aeromedical Evacuation Steering Group
AESS	aeromedical evacuation shipsets
AFMS	Armed Forces Medical Service
AFSC	Air Force Systems Command
AGE	aerospace ground equipment
AID	Agency for International Development
ALCC	air lift coordination center
AMES	Aeromedical Evacuation Squadron
AOR	area of responsibility
ARC	Air Reserve Component
ASD/HA	Assistant Secretary of Defense for Health Affairs
ASF	Army Service Forces
ASMRO	Armed Services Medical Regulating Office
ATC	Air Transport Command
ATG	Air Transport Group
ATH	air-transportable hospital
ATLS	advanced trauma life support
C2	command and control
C3I	command, control, communication, and intelligence
CBI	China-Burma-India
CCATT	critical care air transport team

CENTCOM	U.S. Central Command
CIM	Corporate Information Management
CINCPAC	Commander in Chief, Pacific Command
CINCs	commander in chief
CJCS	Chairman, Joint Chiefs of Staff
CJTF	combined joint task force
CMMS	Congressionally Mandated Mobility Study
COCOM	combatant command
COMALF	Commander, Airlift Forces
COMZ	communications zone
CONOPS	concept of operations
CRAF	Civil Reserve Air Fleet
CSF	casualty staging flight
DEPMEDS	deployable medical system
DIRMOBFOR	director of mobility forces
DMRIS	Defense Medical Regulating Information System
DNBI	disease/non-battle injuries
DoD	Department of Defense
DSN	Defense Switched Network
FAA	Federal Aviation Administration
FAST	forward-area surgical team
FEAF	Far East Air Forces
FEC	Far East Command
FSE	forward surgical element
FY	fiscal year
GAO	General Accounting Office
GHQ	general headquarters
GNA	Goldwater-Nichols Act
GPMRC	global patient movement requirements center
HF	high-frequency
ICAF	Industrial College of the Armed Forces
IG	Inspector General
INMARSAT	International Maritime Satellite Network
ITV	in-transit visibility
JALCO	Joint Airlift Control
JCCP	joint casualty collecting point
JCEWG	joint casualty evacuation working group
JCS	Joint Chiefs of Staff
JFACC	Joint Force Air Component Commander
JLCOM	Japan Logistics Command
JMRO	Joint Medical Regulation Office
JSOTF	joint special operations task force
JTF	joint task force

LOC	line of communication
LSTs	landing ship, tank
MAAG	Military Advisory Assistance Group
MAC	Military Airlift Command
MACV	U.S. Military Assistance Command, Vietnam
MAES	Medical Air Evacuation Squadrons
MAETS	Military Air Evacuation Transport Squadron
MAJCOM	major command
MASF	mobile aeromedical staging facility
MASH	Mobile Army Surgical Hospital
MATS	Military Air Transport Service
MCD	Medical Crew Director
MEDSOM	Medical Support Optical and Maintenance
MRS	mobility requirements study
MTF	medical treatment facility
NATO	North Atlantic Treaty Organization
OASD/HA	Office of the Assistant Secretary of Defense for Health Affairs
OIC	Officer-in-Charge
OPLAN	Operation Plan
ORIs	operational readiness inspections
PACAF	Pacific Air Forces
PACOM	Pacific Command
PDF	Panama Defense Force
PSRC	Presidential Selected Reserve Call-up
R&D	research and development
ROK	Republic of South Korea
RVN	Republic of Vietnam
SAC	Strategic Air Command
SACEUR	Supreme Allied Commander, Europe
SAM	School of Aviation Medicine
SATCOM	UHF satellite
SHAPE	Supreme Headquarters Allied Powers Europe
SOS	Services of Supply
SSB/HF	single-sideband high-frequency
T/O	table of organization
T/O&E	tables of organization and equipment
TACC	tanker-airlift control center
TAES	tactical aeromedical evacuation system
TAMMIS	Theater Army Military Medical Information System
TPFDD	time-phased force deployment data
TPMRC	theater patient movement requirements center
TQM	total quality management

TRAC2ES	TRANSCOM Command and Control and Execution System
UMCC	USEUCOM Medical Coordinating Committee
USAF	U.S. Air Force
USAMA	U.S. Army Materiel Agency
USAMMCE	U.S. Army Medical Support Center, Europe
USAREUR	U.S. Army Europe
USCINCEUR	Commander, U.S. European Command
USEUCOM	U.S. European Command
USNAVEUR	U.S. Navy Europe
USSOUTHCOM	U.S. Southern Command
USTRANSCOM	U.S. Transportation Command
UTC	unit type code
ZI	zone of the interior

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Notes

Chapter One

1. Eisenhower, Dwight D, *Crusade in Europe* (London: William Heinemann Limited, 1948), p. 347.

2. Mae Mills Link and Hubert A. Coleman, *Medical Support of the Army Air Forces in World War II* (Washington, D.C.: Office of the Surgeon General, USAF, 1955), p. 411.

3. *Medical Support*, p. 411. Aeromedical evacuation in World War II will be discussed in Chapter 3.

4. David M. Lam, "To Pop a Balloon: Aeromedical Evacuation in the 1870 Siege of Paris," *Aviation, Space, and Environmental Medicine* [ASEM] (Oct. 1988), pp. 988–9l. Lam's article prompted a letter from E. Evrard, former director of the medical service of the Belgian air force, in which he recounted a conversation between Armstrong and the then senior French military doctor in the early 1950s, Gen. Pierre Bergeret, for which Evrard served as interpreter. As a result of the discussion, Armstrong agreed to delete the story from future editions of his book, which by 1952 had gone through three editions, because the French physician vigorously denied that such an evacuation could have occurred. Bergeret provided supporting historical data, whereas Armstrong could provide none. ASEM (May 1989), p. 472. For Gambetta's flight, see Alistair Horne, *The Fall of Paris: The Siege and the Commune, 1870–71* (New York: St. Martin's Press, 1965), pp. 84–85. The story of the balloon evacuation from Paris still appeared in the third edition of Armstrong's book, which was published before Armstrong's encounter with Bergeret; Principles and Practice of Aviation Medicine (Baltimore: The Williams & Wilkins Company, 1952), p. 421.

5. Sternberg's selection over more senior officers of the U.S. Army medical department caused the then Capt. Walter Reed to remark that "the fossil age has passed." Quoted in Gillett, Mary C. *The Army Medical Department, 1865–1917* (Washington, D.C.: United States Army Center of Military History, 1995), p.10.

6. "The Collection and Evacuation of Sick and Wounded from Front to Base," *The Military Surgeon*, vol. XL (June 1917), pp.: 611–12. Goodwin also noted that, obviously based on British experience on the western front, an average of 70 percent of an army becomes incapacitated during the first year of a war. "The Collection and Evacuation of Sick and Wounded," p.609.

7. Mary C. Gillett, *The Army Medical Department 1775–1818* (Washington, D.C.: United States Army Center of Military History, 1982), 74–75, 84. This seminal work details medical aspects of the Revolutionary War and the nature of the health problems facing the U.S. Army, the organization and functioning of the army medical department, and its successes and failures in dealing with the problems of disease and wounds during the revolutionary and early national periods in U.S. history, both in war and in peace. Generally untreated by military historians, these topics are essential for any serious student of U.S. military history and are covered for later periods in Dr. Gillett's subsequent volumes, also published by the Center of Military History, *The Army Medical Department 1818–1865* (1987) and *The Army Medical Department 1865–1917* (1995). The volume covering 1917–1941 is currently in preparation; when completed, the series will carry the story to the eve of World War II.

8. Gillett, *Army Medical Department 1775–1818*, p. 20.

9. Quoted in Maj. James Robb Church, "Notes on the Organization of the French Sanitary Service," *The Military Surgeon* 40 (July 1917): 536. The author of the article entitled "Notes on the Infantry Attack," from which the quotation was taken, was a Major Lachebre, who asserted that the comment was still valid "today," that is, during the Great War. He asserted that the reason was

because, of all the echelons of the sanitary service only regimental litter bearers had shown no improvement since the beginning of the war, thus creating the situation "that the advanced portions of the battlefield are still the lamentable domain of the saddest of deaths, the slow death which comes from lack of care," (p. 536).

10. Archer Jones, *The Art of War in the Western World* (New York: Oxford University Press, 1987), pp. 272–73. See also the incisive introductory essay by Stanley L. Falk, in George C. Thorpe, *Pure Logistics: The Science of War Preparation* (Washington, D.C.: National Defense University Press, 1986), Introduction, xiv–xv. This is a reissue of one of the earliest attempts to treat the problems of supplying an army from a scientific perspective and was originally published in 1917 by Thorpe, a U.S. Marine Corps colonel.

11. David G. Chandler, *The Campaigns of Napoleon* (New York: The Macmillan Company, 1966), p. 366. Larrey's unintentionally prophetic term would be realized a hundred years later. The effect of the tactical situation on even the best systems was well illustrated by the fact that thousands of wounded French lay untended for more than forty-eight hours on the battlefield of Aspern-Essling during the Danube campaign against Austria, waiting for a bridge destroyed during the battle to be repaired, p. 708

12. The formation of the British Sanitary Commission is described in an anonymous historical essay, "The Geneva Red Cross Movement. European and American Influence on its Development," in a special issue of the *Army Medical Bulletin* 62 (May 1943): 7–9), which also contains the texts with explanatory notes of all the Geneva and Hague Conventions treating the issues of the treatment of wounded, sick, and prisoners of war by belligerent signatories.

13. Letterman's system was extolled by many authors who published articles in the first decades of this century *The Military Surgeon*, the journal of the Association of Military Physicians. This was true of an extraordinary series of four articles during the mid 1920s by Lt. Col. T. L. Rhoads, who pointed to the Letterman system as the "plans on which that our present organization for evacuation during combat is built." "Principles of Evacuation. II. Division Evacuation," *The Military Surgeon* 54 (Mar. 1924): 284. Rhoads makes clear that the presented "principles of evacuation" explicitly reflected War Department planning for meeting the medical requirements of future army defense planning and were based on what Rhoads termed "exhaustive post-war analysis" of medical requirements for a theater of operations drawn from U.S. experience in the Great War. Quote from "Principles of Evacuation. I. The Comprehensive Plan," *The Military Surgeon*. 54 (Feb. 1924): 133. For a discussion of the origins of the U.S. Sanitary Commission, see Anonymous, "The Geneva Red Cross Movement," pp. 9–29.

14. Gillett, *The Army Medical Department, 1818–1865*, pp. 190–93, 293–98, et passim. The texts of Letterman's directives are published in Louis C. Duncan, "Evolution of the Ambulance Corps and Field Hospital," *The Military Surgeon* 32 (Mar. 1913): 242–49.

15. James M. McPherson, *Battle Cry of Freedom: The Civil War Era* (New York: Ballantine Books, 1989), p. 485.

16. McPherson, *Battle Cry*, p. 209.

17. Maj. Raymond C. Turck, "Field Maneuvers of Divisional Sanitary Troops, Leon Springs, Texas, November, 1916," *The Military Surgeon* 40 (Jan. 1917): 156–70. According to the author, these maneuvers "were uniformly most interesting and instructive for officers and men" and marked, he believed, "a new era in the evolution of modern medico-military work" that would greatly improve "this branch." The article is illustrated by numerous photographs that picture the horse-drawn ambulances and wagons carrying the field hospital tentage and

equipment. The term "sanitary train" was dropped in the post-World War I U.S. Army reorganization in favor of "medical regiment." The maneuvers were conceived and directed by the then editor of *The Military Surgeon*, Lt. Col. Edward L. Munson, who noted that the ambulances and other components of the "train" needed to be better protected by being either marked more conspicuously with the red crosses called for by international law or camouflaged to make them as difficult as possible to be seen (pp. 157, 169–70).

18. For example, Colonel Rhoads lays down the rules for animal evacuation in the second part of his encyclopedic statement of evacuation principles described in footnote 13. See Rhoads, *Principles of Evacuation. II. Division Evacuation*, 314–17.

19. Goodwin, "The Collection and Evacuation of Sick and Wounded," 615.

20. Quoted in Tom Crouch, *The Bishop's Boys: A Life of Wilbur and Orville Wright* (New York: W. W. Norton & Company, 1989), p, 252.

21. Crouch, *The Bishop's Boys*, p. 252.

22. Robert F. Futrell, *Development of Aeromedical Evacuation in the United States Air Force, 1909–1960* (Scott AFB, Ill.: 375th Aeromedical Airlift Wing, 1977), p. 2. This is a published version of an unedited draft historical study, Number 23, by Dr. Futrell that he wrote in 1962 for the then Aerospace Studies Institute at Maxwell AFB, Ala. Even the strongly nationalistic Charles Julliot, a member of the Aero-Club and an activist in the cause of sanitary aviation, acknowledged that—even if the concept had been "born" in France—General de Mooy had been the first person to conceptualize applying aviation to military medicine. Charles Julliot, "L'Aviation Sanitaire devant le VII Congres juridique internationale de l'Aviation et la XII Conference internationale de la Croix-Rouge," *Presse Medicale* (Jan. 27, 1926): 124. "Horn," writing in 1922, asserted that the idea of using aircraft to transport wounded occurred simultaneously in 1910 to de Mooy and to a French physician referred to only as Dr. Teste. "Les Avions sanitaires dans les guerres futures," *Paris Medicale*: 365. (Unless otherwise indicated, the author translated the articles cited from the original French.)

23. Professor R. Blanchard, "L'Association des Dames françaises," *Paris Medicale* (Feb. 13, 1915): 358; "Le transport des blessés en aéroplane," *Paris Medicale* (July 1916): 53.

24. Blanchard, "Le transport des blessés en aéroplane," 53.

25. For consistency, the term air ambulance will be used interchangeably with its European analogue, sanitary aircraft, to denote a generic aircraft used to transport patients. Aeromedical evacuation will be used similarly with the European term sanitary aviation to denote the process of transportation.

26. Blanchard, "Le transport des blessés en aéroplane," 53.

27. The text of this and all other Geneva and Hague Conventions governing treatment of wounded and prisoners of war are printed in Blanchard, "Le transport des blessés en aéroplane." Articles VI through XVII of the 1906 Convention cover mobile sanitary formations, pp. 100–103.

28. Emile Reymond, "Reconnaissance des blessés sur un champ de bataille au moyen de l'aéroplane," *Paris Medicale* (May 2, 1913): 1033.

29. Maj. Médecin De Block, "Some Notes on the First International Congress of Medical Aviation," *Annales Belges de Médecine Militaire*, 82 (1929): 454. De Block was a professor at the Belgian Ecole Militaire, and in this article mentions that Marvingt had convinced him that she had, in fact, made such a proposal in 1912, by presenting him with documentary proof. In the late 1920s, Marvignt served as vice president of the international L'Amis de l'Aviation Sanitaire (The Friends of Sanitary Aviation).

30. The article, "Avions sanitaire et conventions de la Croix-Rouge," appeared in *Revue juridique internationale de la locomotion aerienne*, III (Nov. 1912): 341. Reymond refers to the 1912 Conference and Julliot's role in it in the question-and-answer period following his 1913 presentation to the reserve doctors. "Reconnaissance des blessés," 1041. One recent bibliography on aeromedical evacuation lists twenty-six entries for Julliot on sanitary aviation in journals published between 1925 and 1937, seven of which deal directly with the question of neutralization of air ambulances in war. Karen Weitze, *Aeromedical Evacuation: Annotated Bibliography* (Brooks AFB, Tex.: USAF Center for Environmental Excellence, Nov. 1994).

31. Reymond would be killed on another reconnaissance mission early in the war.

32. Blanchard, "Le transport des blessés en aéroplane," 54. Quotation from Fritz Bauer, "Experiments with Aeroplanes used by the Medical Services in War and Peacetime," *Journal of the Royal Army Medical Corps*, LII (Feb. 1920): 82.

33. Blanchard, "Le Transport des blessés en aéroplane," 54–55. Blanchard cites published accounts by two French newspaper correspondents; one apparently accompanied the French expeditionary force, and the other interviewed one of the survivors, Lt. Stefanik, in a Rome hospital in Dec. 1915.

34. Bauer, "Experiments with Aeroplanes," p. 82. The quotation is from Futrell, *The Development of Aeromedical Evacuation*, p. 2. Chassaing's cultivation of the parliamentary committees is described in *Paris Medicale* XXVI (1917): 435. Horn, "Les Avions sanitaire dans les guerres futures," 365–66. In an article by Col. Robert Picque published in translation in the May 1924 issue of *The Military Surgeon*, Chassaing supposedly was allocated the sixty Breguet two-seaters in 1916, but this is clearly an error of translation or editing. Picque was an honorary member of the U.S. Association of Military Surgeons, and, until he died in an aircraft accident in 1925, was perhaps the most vigorous French uniformed proponent of air ambulances. Prof. Lejar, "Robert Picque," and Charles Julliot, "Le professeur Picque et l'Aviation sanitaire," both in *Presse Medicale* (June 11, 1927): 748, 748–49, respectively. Picque was memorialized in *The Military Surgeon* 63, (Oct. 1929): 612–14. Also see Jean-Bernard Paillou, "Robert Picque: Pionnier de L'Aviation Sanitare" (Bordeaux, France: Universite de Bordeaux, 1970). This is Paillou's published thesis for his doctorate in medicine. I am indebted to Michel-Ivan Louit for bringing this work to my attention.

35. The article is brief but cites the Villacoublay experiments as "the first practical test of a true twentieth century means of transporting the seriously wounded to base hospitals via the air route." The aircraft is shown with red cross markings in flight and with the litter compartment open (Nov. 24, 1917, p. 385).

36. Bauer, "Experiments with Aeroplanes," 82–83. C. Legrand, "L'Aviation et le service de santé en campagne," *Archive de Médecine et de Pharmacie Militaires* 61 (1913): 538–40. Legrand enthusiastically hailed Dr. Reymond's talk to a meeting of reserve doctors and agreed with Reymond's advocacy of air ambulances for the army. In his remarks, Reymond had, in addition to describing his participation in the 1912 army maneuvers, also pointed to the value of being able to fly doctors about within the French colonies where surface transportation was very slow, thus saving time, money, and [interestingly] "escorts."

37. Julliot, "L'Aviation Sanitaire," 124.

38. Crouch, *The Bishop's Boys*, pp. 368–69, 375–78, 398–99.

39. Futrell, *Development of Aeromedical Evacuation in the USAF*, p. 2. Futrell had access to a letter, written long after the fact, from Gosman to Ernest Larue Jones, on Aug.

19, 1947, recounting what he and Rhoades had done and how it had been received.

40. Futrell, *Development of Aeromedical Evacuation in the USAF*, p, 2.

41. Lt. Col. David N. W. Grant, "Airplane Ambulance Evacuation," *The Military Surgeon* 88 (Mar. 1941): 239.

42. Col. A. W. Williams, "The Flying Ambulance," *The Military Surgeon* 92 (Apr. 1943): 445–46.

43. Williams, "The Flying Ambulance," 446.

44. *Ibid.*

45. Irving B. Holley, *Ideas and Weapons. Exploitation of the Aerial Weapon by the United States during World War I: A Study in the Relationship of Technological Advance, Military Doctrine, and the Development of Weapons* (Washington, D.C.: Office of Air Force History, 1983; reprint of the original edition published by Yale University Press in 1953), pp. 37, 149. Maurer Maurer, *Aviation in the U.S. Army, 1919–1939* (Washington, D.C.: Office of Air Force History, 1987), p. 5. Maurer describes the organizational changes in the control of U.S. Army aviation on pp. xxi–xxii. The armistice strength figures used are from Maurer; Holley uses figures of "more than 150,000 and 15,000 aircraft," but his book compares production programs in terms of numbers of squadrons exclusively. Maurer, therefore, appears somewhat more credible.

46. Link and Coleman, *Medical Support of the Army Air Forces in World War II*, p. 11. The figure of 90 percent for British casualties caused by physical defects in the first year of war was used in a lecture to a graduating class of flight surgeons at the School of Aviation Medicine sometime late in 1918 before the armistice. The same figure of 90 percent was used later by Lt. Col. C. L. Beaven in 1938 in a chronology of aviation medical events. Which figure (60 or 90 percent) is correct is in one sense immaterial because, whatever the number, it was high enough for the British army to take remedial action and the U.S. Army to embark on research to determine the most valid standards possible. Anonymous, Lecture to Graduating Flight Surgeons, Mitchel Field. n.d., Entry 94, 321.9, General, box 2, Record Group (RG) 18, National Archives (NARA) . Beaven, "Chronological Notes on Aviation Medicine," *Army Medical Bulletin* (Jan. 1940), 52; abridged reprint of an article in Flight Surgeon Topics II (Oct. 1938).

47. Armstrong, *Principles Practice of Aviation Medicine*, p. 29.

48. Link and Coleman, *Medical Support of the Army Air Forces in World War II*, p. 11–12.

49. *Ibid*., pp. 15–20.

50. Maurer, *Aviation in the U.S. Army, 1919–1939*, pp. xxi–xxii.

51. "Airplane Crashes, 1918 and 1919, in the United States Army Air Service," *Air Service Information Circular* (Aviation) IV (May 1, 1922): 1. The remaining 1,161 crashes were not included either because they were minor or because they occurred at sites too remote for flight surgeons to make an investigation. Similar gaps in the data and a lack of knowledge of how the criteria, for example, "injured," were defined, suggest that the specific numbers should be accepted with some caution. Looking at the statistics for calendar years 1917 through 1921, and 1924 through 1926, inclusive, the numerical relationships among the categories are remarkably consistent, that is, roughly the same percentages of crashes occurred during landing, the same percentage of crashes occurred more than fifteen miles from the field, and the same percentage of the total crashes resulted in fatalities in all these years. The May 1922 Circular also contains crash data for 1920 and 1921. Crash data for calendar years 1924 through 1926 is in the statistical reports on airplane crashes in the Air Service that were prepared semiannually for the chief of the Air Service by the Medical Section covering the preceding six-month periods of each calendar year; box 1, Entry 94, Decimal 319.1, RG 18,

NARA.

52. H. Graeme Anderson, *The Medical and Surgical Aspects of Aviation* (London: Oxford University Press, 1919). Anderson's introduction is dated Nov. 5, 1918.

53. Ltr, from Surgeon, Rockwell Field, to Chief Surgeon, Aviation Section, Signal Corps, Feb. 12, 1918, printed in Grant, "Airplane Ambulance Evacuation." *The Military Surgeon* 88 (March, 1941): 239. Ream was the first flight surgeon to be placed on flying status and also the first to be killed in an aircraft accident, on Aug. 24, 1918. Note to Grant article. While Ream's decision to fly medical personnel to crash sites might also suggest that information flowing back from Europe was the source of the idea, it is more probable that the availability of two-place aircraft and concern for the health of the downed fliers determined adoption of this procedure. However, British personnel learning to fly at at least one field in Texas might also have served as an information conduit regarding developments on the western front.

54. Quoted in Anonymous, "Airplane Ambulances," *The Army Medical Bulletin* 2 (Feb. 28, 1922): 42, Weitze Collection.

55. Lt. Col. Frederick R. Guilford and Captain Burton J. Soboroff, "Air Evacuation. An Historical Review," *The Journal of Aviation Medicine* 18 (Dec. 1947): 602–603. Guilford had been chief of the Air Evacuation Department, School of Aviation Medicine. However, the article contains no footnotes, and some evidence conflicts with the claim made in it that there were two successive air ambulances developed at Ellington Field based on modifications to the Curtiss JN–4s used for training. Also see Futrell, *Development of Aeromedical Evacuation in the USAF*, p. 4. Precisely when the first evacuation flight was made is not clear from the published information on the subject. The commander of Gerstner Field wrote to the director of military aeronautics, Maj. Gen. William Kenly, on July 15, 1918, that the air ambulance at Gerstner had been used continuously since "about May 1st." Guilford and Driver also disagree with Futrell on Driver's first name, "Nelson" in the article just cited, and "Wilson" according to Futrell.

56. Capt. Norvelle Wallace Sharpe, "The Ambulance Airship. A Factor Making for Improved Articulation between the Medical Department and the Flying Officer," *Annals of Surgery* 68 (Nov. 1918): 526–27.

57. The engineering sketch is on a foldout following p. 528.

58. Reference to Royal Flying Corps trainees is in Report, Post Hospital, Taliaferro Field, Hicks, Tex., to Chief Surgeon, Aviation Section, Apr. 2, 1918, in "Extracts from Reports of Flying Fields Relative to the Supply of Heavy Type of Ambulance," attached to Memo for the Surgeon General from the Chief Surgeon of the Aviation Section, Signal Corps (Lyster), subj: Improved Type of Ambulance at Flying Fields, May 18, 1918, Office of the Chief of the Air Corps, Central Decimal Files, 1917–1938, 452.1, box 1712, RG 18, NARA.

59. A pertinent example is the personal letter one young flight surgeon wrote to Col. Albert Truby, chief of the U.S. Army medical department in the early 1920s. Aware that a friend had requested his transfer by name to a nonflight surgeon's position in the Air Service at Chanute Field, Ill., the young captain pleaded to be left as a flight surgeon at El Paso, Tex. He was flattered by the name request, but he did not want to go because he was "much in love with my flight surgeon's work" and, even though he would still be in the Air Service, "it would not be in the active end of the game." He also told Truby that being in the Air Service and doing flight surgeon's work was the one reason that he had stayed in the service. Handwritten Ltr, Capt. David A. Myers, to Col. A. E. Truby, Dec. 29, 1920. Copy in possession of the author. For his work six years later, Myers was to be credited in 1938 by the future chief of the U.S. Army medical department, Lt. Col. C. L. Beaven, with establishing the principles upon

which "the art of blind flying" (flying solely by instruments) was founded by Lt. Col. William C. Ocker. Beaven, "Chronological Notes on Aviation Medicine," *The Army Medical Bulletin* (Jan. 1940): 57. Ocker had earlier been responsible for the development of the first air ambulance at Gerstner Field. One retired U.S. Army doctor with a long professional experience in the history of medicine who agreed with this characterization called this the difference between preventive and curative medicine. Interview, Dr. Robert T. Joy, Colonel, U.S. Army (Ret.), Mar. 19, 1996. Dr. Joy directed the Medical History Program of the Uniformed Services University of the Health Sciences at the time of this interview.

60. The governing regulation is quoted in a lengthy article in W. L. Sheep, "Air Medical Service. The Flight Surgeon, a New Specialist in Medicine," *Air Service Information Circular* (Aviation) (ASIC) III:237 (July 15, 1921): 4.

61. Of forty flight surgeons on duty at Air Service stations in 1921, twenty-nine were on flying status, seven were qualified pilots, and five were taking pilot training. "The Flight Surgeon," pp. 3–4.

62. The National Library of Medicine (NLM) collection is based on the Surgeon General's Library, which by the turn of the century had more medical publications than the two next largest U.S. medical libraries combined. Among its serial holdings was Scientific American, which began publication in 1845. Gillett, *The Army Medical Department, 1865–1917*, p. 27. Conference with Reference Section, NLM, Mar. 18, 1996, by the author.

63. Ltr to Maj. Gen. William L. Kenly, June 26, 1918, RG 18, Entry 166, OCAC, General Correspondence, 1917–1938, 451.8, Ambulances, box 951, NARA. The copy of Lazaro's letter in the files has the initial "A" before his last name; however, the response from Kenly was addressed to "Ladislas" which suggests the stenographer who copied the original letter made an error.

64. Maurer, *Aviation in the U.S. Army, 1919–1939*, pp. 39–40.

65. Memo, for Colonel Davis from 1st Lt. Grover O'Neill, June 28, 1918; message: Kenly to CO, Gerstner Field, July 3, 1918, Entry 168, OCAC, Correspondence, 1917–1944, Gerstner Field, 452.1, box 1712, RG 18, NARA.

66. Telegram, Maj. Isaac H. Jones to Chief Surgeon, Aviation [Lyster], May 3, 1918, in Extracts from Reports of Flying Fields Relative to Supply of Heavy Type of Ambulance. In the organizational arrangements of the time, Jones, the doctor concerned with the health and maintenance of flying personnel, worked for the post surgeon.

67. Memo from General Kenly to Col. Lyster, May 20, 1918, Entry 166, OCAC, General Correspondence, 1917–1938, 451.8, Ambulances, box 951, RG 18, NARA.

68. Memo from Maj. Maxwell Kirby to Director of Military Aeronautics, July 15, 1918, subj: Hospital Ship. Entry 166, OCAC, General Correspondence, 1917– 1938, 451.8, Ambulances, box 951, RG 18, NARA. Presumably, the "tracing" was of the blueprints used to modify the JN–4.

69. Memo from the Director of Military Aeronautics to the Commanding Officers, All Flying Fields, July 27, 1918, subj: Ambulance Planes; and Ltr, Lt. Col. F. R. Kenney to the Honorable Ladislas Lazaro, July 24, 1918. Both documents are in Entry 168, OCAC, Correspondence, 1917–1944, Ellington Field, 452.1, box 1615, RG 18, NARA.

70. Ltr, Maj. W. H. Frank to the Director of Aeronautics, Training Section, Attention: Major Millard F. Harmon, Aug. 26, 1918, subj: Airplane - Ellington Field, Entry 168, OCAC, Correspondence, 1917–1944, Ellington Field, 452.1, box 1615, RG 18, NARA. In a letter written long after the event, Maj. Gen. Harry Johnson, USAF (Ret.), who was a student pilot in Texas at the

time, related that the first air ambulance he ever saw was in the summer of 1918 when a Lieutenant Carlson was evacuated from Brenham, Tex., to the Ellington Hospital with a broken leg suffered in a crash. According to Johnson, who had also suffered a crash at Brenham the same day, but without injury, Carlson was the first patient evacuated in the converted JN–4. Ltr, General Johnson to the Public Relations Office, School of Aviation Medicine, Brooks AFB, Tex., Jan. 15, 1968, Archives, Edward H. White Memorial Museum, Brooks AFB.

71. David M. Lam, "Kelly's Hospital Ship," *Aviation, Space, and Environmental Medicine* 63 (Dec. 1992): 1115. Maj. S. M. Strong, "Aero Ambulance," *The Military Surgeon* 44 (Apr. 1919): 361. Strong's short article is illustrated with four pictures, three of which show the patient in a rather unusual litter.

72. Memo, for Chief of the Engineering Division, McCook Field, from Office of the Director of the Air Service, subj: Airplane Ambulances, Dec. 6, 1919, Entry 166, OCAC, General Correspondence, 1917–1938, 451.8, Ambulance, box 951, RG 18, NARA. The specifications are also quoted in Colonel Truby and Maj. John Dibble, "Operation of the Medical Division of the Air Service since the Signing of the Armistice," *The Military Surgeon* 47 (July 1920)

73. Futrell, *Development of Aeromedical Evacuation in the USAF*, p. 5.

74. For a brief biographical sketch of Truby, see *The Army Medical Bulletin* 33 (1935): 15–16.

75. Grant quotes Truby's statement of the future purposes of air ambulances in full in "Airplane Ambulance Evacuation," p. 241. Maj Louis H. Bauer, "Aviation Medicine. An Outline of the Progress in Research and Teaching of this subj in the United States during the Calendar Year 1921," ASIC IV:359 (Aug. 1, 1922): 19–20.

76. Quotations are from "Airplane Ambulance Evacuation," pp. 240–41. See also Futrell, *Development of Aeromedical Evacuation in the USAF*, p. 5. Grant, who several months after publication of his article would become the first air surgeon of the Army Air Forces, characterized the results of this episode as having "probably set back the development of aerial evacuation at least ten years."

77. Maurer, *Aviation in the U.S. Army*, pp. 44–46.

78. The situation is depicted graphically in some fifteen endorsements to a communication regarding a report of a flying accident sent to Maj. Gen. Mason Patrick, Chief of the Air Corps [CAC], by the army adjutant general's office [AGO] in Sept. 1925. In his endorsement back to the AGO, Patrick requested immediate consideration to providing comfortable and speedy ambulances for emergency use at flying fields and upgrading passenger cars with more-modern equipment. In terms similar to those used by his predecessor, General Kenly, seven years before, Patrick argued that surveys he conducted at thirty-eight sites, eleven of them under his jurisdiction, showed that motor transportation was inadequate. Cars were quite old, of 1918 or earlier vintage, and unreliable because of heavy previous usage. Ambulances had the speed, comfort, and riding qualities "of a truck" and were clearly unsuited for the task of timely retrieval of severely injured crash victims who were often retrieved at some distance from the post, were usually in profound shock, and were, in general, in need of prompt and careful treatment to survive. 2nd Endorsement, CAC to the AGO, Nov. 30, 1926, Entry 166, OCAC, General Correspondence, 1917–1938, 451.8, Ambulance, box 951, RG 18, NARA.

79. Futrell, *Development of Aeromedical Evacuation in the USAF*, pp. 6–7.

80. *Ibid*., p. 6. Their report was published in the ASIC. Verville had earlier supervised the modification of the DH–4s into air ambulances.

81. *Ibi*d. See Maurer, *Aviation in the U.S. Army*, pp. 177–82, for a description of the T–2 flight.

82. Dr. Robert Picque, "L'air medical service et l'aviation sanitaire aux Etats-Unis," *Archives Belges de Médecine Militaire* 78 (Feb. 1925): 60–73.

83. Meetings were held biennially, with the first official (and funded) U.S. delegation sent to the Sixth Congress at The Hague in 1931. Maj. Edgar Erskine Hume, "The International Congress of Military Medicine and Pharmacy," *The Army Medical Bulletin* 32 (July 1935): 34–38.

84. William Seaman Bainbridge, "Report on 'Congrès international de la médecine et de pharmacie militaries,' held in Brussels, Belgium, July 1921, and Meeting of the 'Comité Permanent,' held in Brussels, Belgium, February 1922," *U.S. Naval Medical Bulletin* XVII (Dec. 1922), pp. 962–63. Uzac had accompanied Colonel Picque to the San Antonio meeting of the Association of Military Surgeons and had also been active in the prewar activities of Dr. Duchaussoy and Charles Julliot concerning applying aircraft to the relief of the wounded.

85. One of the four major topics discussed was "General Principles of Evacuation of the Wounded in the Fighting Armies. Organization of such Evacuations taking into Account the Exigencies of Therapeutic Needs. Adaptation of Medical and Surgical Therapy to the Various Conditions Resulting from the Necessity of Evacuation of the Wounded." William Seaman Bainbridge, "Report on Second 'Congrès international de médecine et de pharmacie militaires' and Meetings of the 'Comité Permanent,' held in Rome, Italy, May–June 1923," *The Military Surgeon* LV (Dec. 1924): 764, et passim.

86. Maj. Dr. De Block, "Some Notes on the First International Congress of Medical Aviation," p. 458.""

87. De Block, "Some Notes," pp. 458–60. Emphasis added.

88. De Block, "Some Notes," p. 462.

89. De Block, "Some Notes," p. 462.

90. For example, Paul des Gouttes, "La question de l'immunisation des avions sanitaires et le projet de Convention internationale sur la guerre aérienne," Revue Internationale de la Croix-Rouge 12 (July 1930): 481–87. Des Gouttes and Charles Jolliot were frequent contributors on issues arising under the Geneva Convention.

91. *Monthly Bulletin of the League of Red Cross Societies* XVI (Jan. 1935): 13, 185.

92. Dr. Zeno Mataloni, "Adaptation du brancard de campagne standardisé aux avions sanitaires," *Revue Internationale de la Croix-Rouge* 12 (Nov. 1930): 945–46. General Ireland had suggested that a smaller, simpler cradle-splint device, of which he sent sketches and photographs, would be perfectly adequate for carrying litter patients on air ambulances.

93. Two French medical officers who accompanied the campaign described the problems encountered by the sanitary service in a lengthy article published in 1913. Drs. Wisseman and Renaud, "Le Service de santé in campagne au Maroc occidental Octobre 1911–Avril 1912," *Archives de Médecine et de Pharmacie Militaires* LXI (Jan. 1913), 182–228.

94. Prof. Theodore Tuffier, "Aviation and Wounded in the Desert of Sahara," translated from the French by James Robb Church, *The Military Surgeon* XL1V (May 1919): 437–41.

95. General Dr. Fritz Bauer, "Experiments with Aeroplanes used by the Medical Services in War and Peacetime," translated by Major A. D. Sterling, *Journal of the Royal Army Medical Corp*. LII (Feb. 1929): 83. Dr. Epaulard, "L'aviation sanitaire au Congrès international de Médecine et de Pharmacie militaires," *La Presse Medicale* (May 2, 1925): 580. Numerous articles in *La Presse Medicale* and *Paris Medical* during the 1920s touch upon the results obtained by sanitary aviation in the colonial areas, particularly Morocco and Syria. For example, the

latter journal reported that M. Tilmant had presented sketches and photographs of so-called aérochirs to a meeting of the Medical Society of Paris on June 13, 1924 and described the results of their use in Morocco and Syria. Aérochirs were specially equipped air ambulance aircraft that carried surgical and other medical equipment on board and were used to fly surgeons to places where their skills were needed and evacuate victims, as needed. Paris Medical, LIV (1924): 138. Their equipage is described in "Les Essais d'un Avion radio-chirurgical," *Paris Medical*, XXXII (1919), p.117.

96. Colonel J. A. Schickele, "L'aviation sanitaire sur les T.O.E. et dans l'Afrique du Nord en 1933,"] *Archives de Médecine et de Pharmacie Militaires* CL (Sept. 1934): 258.

97. P. Desfosses, "L'Aviation sanitaire au XIIe Salon de l'Aeronautique," *La Presse Medicale* (Jan. 31, 1931): 157–58.

98. Donegan, "The Relation of and Utility of Aeroplanes in Connexion [sic] with Medical Services in the Field," *The British Medical Journal* (Aug. 9, 1913): 304. Donegan is probably the "Colonel Donovan" referred to by Air-Commodore David Munro in his Presidential Address to the War Section of the Royal Society of Medicine in 1924, who, Monro said, approached the War Office before the war with a "scheme" for carrying sick and wounded by airplane. Proceedings of the Royal Society of Medicine 17:III (1924): 7.

99. M. D. Scholl, and C. L. Geshekter, "The Zed Expedition: the World's First Air Ambulance?" *Journal of the Royal Society of Medicine* 82 (Nov. 1989): 679–80.

100. Capt. J.C. Burns, "A Note on the Evacuation of Service Casualties by Air" *Journal of the Royal Army Medical Corp*s 46 (Mar. 1926): 202–205.

101. Sir John Slessor, *The Central Blue: The Autobiography of Sir John Slessor, Marshal of the RAF* (New York: Frederick A. Praeger, 1957), 51–73.

102. Wng Cdr H. A. Treadgold, "Aerial Transport of Service Casualties," *Journal of the Royal Army Medical Corps* XLV (Nov. 1925): 343. The article, covering pages 321–43, has photographs of both the Vickers Vernon and Avro "Andover" ambulances. The British did not build an aircraft specifically dedicated to aeromedical evacuation until 1936. Bulletin of the League of Red Cross Societies XVII (July 1936): 107.

103. For example, Capt. Robert K. Simpson, "The Airplane Ambulance—Its use in war," *The Military Surgeon* LVII (Jan. 1929), 35–48.

Chapter Two

1. See Chapter 1.

2. Futrell, *The Development of Aeromedical Evacuation in the USAF*, p. 7.

3. *Ibid*., p. 6.

4. *Ibid*., p, 7. C. L. Beaven, "Airplane Ambulance Evacuation of Tornado Victims at Rocksprings, Texas," in "Medical and Military Notes," *The Military Surgeon* 61 (July 1927): 99–101. The evacuation from Rock Springs, some 125 miles from San Antonio, took place on Apr. 13–14, and was directed by Beaven, then a flight surgeon at Kelly Field.

5. Lt. Col. T. E. Darby, "Airplane Ambulance Evacuation," *The Military Surgeon* 70 (Aug. 1932): 163. Futrell, *The Development of Aeromedical Evacuation in the USAF*, p. 7.

6. Hathaway had cited both future "military necessity" as well as "present needs" in making his pleas in 1929. Futrell, *The Development of Aeromedical Evacuation in the USAF*, p. 7. However, given the effective ambulance service being provided by C–1s, which were converted transports, Hathaway's was probably motivated by his recognition that, unlike the Cox-Klemins, transport type aircraft were generally less suitable for crash rescue-type work.

7. Lt. Col. Frederick R. Guilford and Capt. Burton J. Soboroff, "Air Evacuation. An Historical Review," *Aviation Medicine*

(Dec. 1947): 605. Futrell, *The Development of Aeromedical Evacuation in the USAF*, p. 7. The Ford was evidently immediately reconverted because there is no further mention of it in the Surgeon General's reports or in the articles written by those medical department proponents of air ambulances.

8. Memo, Brig. Gen. Oscar Westover, Acting Chief of the Air Corps, for the Adjutant General, Subj: Military Characteristics of Airplanes and Airships, Dec. 13, 1933. OCAC, Correspondence, 1917–1938, 452.1 (Air Ambulances), RG 18, NARA, College Park, hereinafter cited as NARA II.)

9. Memo, Westover for the Adjutant General, Subj: Military Characteristics of Airplanes and Airships, Dec. 13, 1933. 2nd Endorsement, SGO to Adjutant General, Jan. 17, 1934; 5th Endorsement, Adjutant General to Chief of Air Corps, thru SGO, Feb. 15, 1934.

10. John F. Shiner, *Foulois and the U.S. Army Air Corps, 1931–1935* (Washington, D.C.: Office of Air Force History, 1983), p. 109. According to Shiner, most fatalities involved Reserve officers serving one year's active duty after completing flight training with pilot training itself being the next highest killer.

11. According to Maj.C. L. Beaven, the single-engine Fokker had a cruising speed of 115 mph, a top speed of 133 mph, and an endurance of 4½ to 5 hours, which translates into between 517 and 575 miles at cruising speed. It was soundproofed and had brakes to shorten its landing run and shock absorbers and extra large balloon tires to minimize the jar on patients from landing. However, it could carry only three litter patients, a flight surgeon, and one sitting patient. Beaven, "New Ambulance Airplane for U.S. Army Air Corps," *The Military Surgeon* 68 (June 1931): 777. According to the manufacturer, the top speed was 140 mph, and it had a relatively short landing roll of 410 ft. in Army tests. Ltr, V.E. Bertrandias, Asst. Gen. Mgr. of Sales, to Maj. Benjamin Warriner, Commander of the School of Aviation Medicine, Dec. 30, 1930, Brooks Aeromedical Archives.

12. Maj. C. L. Beaven, "First Air Division (Provisional) Maneuvers," *The Military Surgeon* 69 (Aug. 1931): 133. Four other transports that participated were committed for conversion to air ambulance use as necessary during the maneuvers. Hap Arnold served as the G–4, the logistics chief, responsible with Beaven, the maneuver surgeon, for air transport and aeromedical evacuation of "casualties." Futrell, Development of Aeromedical Evacuation in the USAF, 8.

13. Darby, "Airplane Ambulance Evacuation," 162–74. The title of Simpson's article was more specifically related to his proponency, "The Airplane Ambulance–Its Use in War," 63, 35–48. The quote is from Darby, p. 162.

14. Lecture, "Airplane Ambulance Evacuation," Medical Corps Course, 1931–1932, Air Corps Tactical School, File: 248.101-40A, USAF Historical Research Archives, Maxwell AFB, Alabama, hereinafter cited as HRA.

15. Except as otherwise indicated, the discussion that follows is drawn from the Darby and Simpson articles. The author of particular points discussed is identified in the text, and formal footnotes containing specific page numbers have been omitted in the interests of simplicity because each of the articles is relatively short.

16. Darby assumed squadrons of twenty-one air ambulances organized into three flights of seven, Simpson twelve to a squadron organized into three flights of four. Both assumed the capability of each aircraft to evacuate eight patients on each flight.

17. For the CRAF and its role in aeromedical evacuation systems, see Chapter 10.

18. "Discussion by Captain W. E. Lynd, Air Corps," in Simpson, "The Airplane Ambulance-Its Use in War," p. 45.

19. Darby explicitly used the rates suffered during the Meuse-Argonne offensive of

1918; the source of Simpson's estimates is less clear, but a reasonable inference is that they were based on World War I experience.

20. Lt. Col. G.P. Lawrence, "The Use of Autogyros in the Evacuation of Wounded," *The Military Surgeon* 67 (December 1933): 314.

21. In his article describing the First Air Division (Provisional) maneuvers for which he had served as division surgeon, Beaven had recommended that autogyros be considered for the small, two litter-capable crash rescue-type vehicles that he believed necessary to complement the large, transport-type aircraft that he reported had been used so successfully during the maneuvers. "First Air Division (Provisional) Maneuvers," 141.

22. Bauer's paper, presented before the 37th Annual Meeting in Denver, Colorado, was published as "The Development of Commercial Aeronautics and of the Airplane Ambulance," *The Military Surgeon* 66 (Feb. 1930); for Bauer's comment, see p. 170. Bauer, one of the first flight surgeons, had commanded the School of Aviation Medicine, and in 1926, by authority of the surgeon general, had published the first text on aviation medicine. He founded the Aero Medical Association in 1929 and, when he presented the paper, he was the Medical Director of Aeronautics for the U.S. Department of Commerce.

23. See the Report of the Surgeon General U.S. Army to the Secretary of War [Year] (Washington, D.C.: United States Government Printing Office, [Year]) for the years in question. In conjunction with urging procurement of additional air ambulances, several reports cite the number of medical evacuations accomplished: 103 during FY 1933; 139 including 73 members of the Civilian Conservation Corps during FY 1934; and 103 during FY 1933. Procurement of one autogyro was recommended in the 1933 report.

24. Futrell, *Development of Aeromedical Evacuation in the USAF*, 9–10.

25. For the Lyster episode, see Medical Support of the AAF in World War II, 17–18. Hiram Bingham, who served as chief of personnel for the Air Service of the AEF in France and became a U.S. senator, describes Pershing's actions regarding flying pay in his memoir of *World War I: An Explorer in the Air Service* (New Haven: Yale University Press, 1920), 221–22. The British and French were providing flight pay to their aviators at the time. Bingham also relates a number of telling anecdotes describing the gulf that arose between the AEF's young pilots and the nonflying regular officers who had been put in charge of air units in the AEF. Large numbers of these, according to Bingham, made no attempt to qualify as either pilots or observers, or even to fly cross-country as passengers. One of the most graphic examples of what lack of understanding such officers had about flying concerns one, newly assigned as commanding officer (CO) of one of the largest flying schools, who after his first tour of inspection issued a written order that there should be "no more rough landings" because the officer in charge of flying had told him that cadets' rough landings had caused the destruction of several relatively new aircraft that the new CO had observed on his tour. An Explorer in the Air Service, p. 103.

26. The original untitled review was published in the Aug. 1927 issue of the Proceedings and occupied seven pages. Reprinted in *The Military Surgeon* 59 (Oct. 1927), it occupied thirteen pages including a one-page editorial entitled "Pessimism and Aviation" by the editor of *The Military Surgeon*. Further citations will be by page number in the Proceedings reprint.

27. Harbord review, p. 481.

28. Harbord review, p. 484.

29. Harbord review, p. 487.

30. Harbord review, pp. 491–92.

31. Editorial, "Pessimism and Aviation," Harbord review, p. 480. Harbord was a graduate of the Army War College and a former cavalryman who was noted for his intense loyalty to his friend and former commander

in France, General John J. Pershing. Edward M. Coffman, *The War to End All Wars: The American Military Experience in World War I* (New York: Oxford University Press, 1968), p. 46.

32. Interview with Dr. Robert Joy, Director of the Medical History Program, Uniformed Services University of the Health Sciences, and his deputy, Dr. Dale Smith, Jan. 18, 1996. A very interesting piece of corroborating contemporary evidence is a letter from David Grant, the future first Air Surgeon of the Army Air Forces, to Lt. Col. C. L. Beaven, then Chief Flight Surgeon in the Office of the Chief of the Air Corps, Oct. 14, 1939, in which Grant reminds Beaven of the "old type" of flight surgeon "sitting on the line, drinking most of the night, etc." File 168.7248-4, HRA. A copy of the original letter to Beaven is also in General Grant's personal papers, which are in the possession of his son, David Grant, Jr. Mr. Grant, now deceased, kindly allowed the author to use his father's papers in preparing this manuscript.

33. Maurer discusses the depression-era budgets and sacrifices imposed on Army personnel in *Aviation in the U.S. Army, 1919–1939*, pp. 346–47. To save additional money, the new congress in 1934 also limited the number of flight surgeons receiving flying pay to five, thus prompting a repeated complaint in the section of the surgeon general's reports to the Secretary of War written by the Air Corps medical section about the embarrassment and difficulties created by the limitation. See, for example, the reports for 1935, 1936, and 1937.

34. Rhoads' article, some 125 pages in total length, appeared in vol. 54, Feb. through May, 1924; sources for the reference to "non-transportables" and consideration of airfield availability in selecting new general hospital sites are on pp. 411 and 522, respectively.

35. Maj. Thomas R. Goethals, "Some Phases of Army Evacuation," *The Military Surgeon* 61 (Oct. 1927): 425–37.

36. Beaven, "The Present Need for Airplane Ambulances by the United States Army" *The Military Surgeon* 75 (Sept. 1935): 146.

37. Perhaps primarily with an eye toward justifying procurement of more transport aircraft, Arnold, then of the Air Corps, noted in Dec. 1936 that, among other requirements, more transports were needed for use as air ambulances. Futrell, *Development of Aeromedical Evacuation in the USAF*, p. 11. As discussed earlier, Arnold had worked with the exercise surgeon as the G–4 responsible for air transport and aeromedical evacuation during the First Air Division (Provisional) maneuvers.

38. This section is heavily indebted to the previous work of Dr. Robert E. Skinner, who in 1983 published an article, "The Making of the Air Surgeon: The Early Life and Career of David N. W. Grant," in *Aviation, Space and Environmental Medicine* (ASEM), the journal of the Aerospace Medical Association founded in 1929 By Louis Bauer. Skinner's article was based in large part on selected portions of David Grant's papers released to Skinner by Grant's son, who supplemented this information with his own memories of life at Randolph Field and contact with his father during World War II when the younger Grant was also in the Army Air Forces. However, Mr. Grant did not release major portions of his father's typed diary to Skinner because he deemed them too frank in their appraisal of certain officers still living with whom his father had served during World War II. More than a decade having passed, Mr. Grant was kind enough to provide the author full access to his father's papers, and, moreover, provided his full cooperation in preparing this part of the manuscript. For convenience, Skinner's article is cited as the source occasionally even though the document upon which he bases his text has been viewed by the author. In these cases, Skinner's footnotes can cue the scholar to the proper document in the Grant papers. These are presently in the custody of the author, but

Mr. Grant indicated he wished ultimately to deposit them in the USAF Academy's Library Special Collection, a desire affirmed by Mr. Grant's widow.

39. "The Air Corps Training Center," Air Corps Newsletter XXII (Aug. 1939), 8. Skinner, "The Making of the Air Surgeon," 79. Grant's request for assignment to duties as a flight surgeon had been forwarded to the surgeon general's office recommending approval with the further recommendation that Grant be considered for assignment to Randolph as an additional flight surgeon to meet the requirements for expansion at that field. 2nd Endorsement, G. I. Jones, Chief, Medical Division, OCAC, to SG, Apr. 29, 1931, File of Personal Orders, Grant papers.

40. Shiner, *Foulois and the U.S. Army Air Corps*, p. 113. Grant's flight time is from Skinner, "The Making of the Air Surgeon," p. 24.

41. Grant's File of Personal Orders for the period shows numerous navigation flights, many of which were flown with the future general officers, Joe Cannon and David Schlatter. Grant papers.

42. Grant's son related an anecdote drawn from the family's time at Randolph when the then junior officer, Hoyt Vandenberg, USAF Chief of Staff, 1948–53, was almost killed during filming of a motion picture set at Randolph. Interview by the author, Feb. 2, 1996.

43. S.O. 72, War Department, Mar. 25, 1936, File of Personal Orders, Grant papers.

44. Andrews, in his report of the goodwill flight to the Canal Zone for which Grant had served as flight surgeon, remarked that Grant "had the proper temperament for this type of duty...and was always cheerful and alert." See fn. 41. According to Grant's son, who was a teenager during his father's assignment to Randolph, the elder Grant was always very popular with the Air Corps people, some of whom had previously had bad experiences with flight surgeons. Grant could recall no specific examples of the latter, basing his comments on impressions gathered during dinner table conversation at the time. Conversation with the author, May 20, 1996. Ltr to Grant from the Adjutant General, Subj: Qualifications for Promotion, Sept. 24, 1936. File of Personal Orders. Grant papers.

45. The ACTS was self-consciously radical, advertising "the new vistas" that it had opened for officers attending its courses, and affirming the "substantiation" of the doctrine of airpower that had been provided by new types of aircraft as early as 1925, obviously something with which not just General Harbord would have disagreed." The doctrine of daylight precision bombardment provided a specific means to achieve the destruction of an enemy's "vital establishments," which the school asserted was the "new mission of the military aviation forces. "The Air Corps Tactical School," Air Corps News Letter XXII (Aug. 1, 1939): 9.

46. The best brief study of the ACTS is still Robert T. Finney, *History of the Air Corps Tactical School, 1920–1940* (Washington, D.C.: Center for Air Force History, 1992), reprint of a study first published in 1955. The 1939 curriculum is detailed in "The Air Corps Tactical School," Air Corps News Letter XXII (Aug. 1, 1939): 13.

47. Grant, "The Value of the Autogyro in Military Operations," Thesis, U.S. Air Corps Tactical School, Maxwell Field, Ala. (May 10, 1937), pp. 8–9.

48. Grant diary, entry for Mar. 5, 1942. Grant papers.

49. Hume, "The International Congress of Military Medicine and Pharmacy," p. 35. However, the United States did not fund an official delegation to the 1933 Congress (p. 36). James M. Phalen, "Chiefs of the Medical Department, United States Army, 1775–1940. Biographical Sketches," *The Army Medical Bulletin* 52 (Apr. 1940): 105. "Third International Congress on Sanitary Aviation," *The Army Medical Bulletin* 33 (Oct. 1935): 67.

50. Lt. Col. Ernest F. Harrison,

"Evacuation of Sick and Wounded by Air" (Oct. 1937): 36–37. D. Palma, "L'aviation sanitaire de l'U.R.S.S.," *Comite international de la Croix-Rouge*, LXVIII (Apr. 1937): 520–21. "Launching of an Air Ambulance," *Monthly Bulletin of the League of Red Cross Societies* XVII (July 1936): 107; "First International Technical Conference on Aerial Relief," XIX (Aug. 1937); "The Third International Air Ambulance Congress," XVI (Jan. 1935): 13.

51. "The School of Aviation Medicine Exhibit," *Air Corps News Letter* XXII (15 June 1939): 3. Hippke, in an article published in 1940, which will be discussed later, mentioned a 1936 article in Der deutsche Militararzt in which he urged the need for large transport aircraft to evacuate sick and wounded rather than the usually small specially designed air ambulances that were usually seen at international exhibitions. "Transport by Air of the Sick and Wounded," *The Military Surgeon* 86 (May 1940): 439.

52. E. Evrard, "Les premieres evacuations sanitaire par air a la Force aerienne belge," *Acta Belgica Historiae Medicinae* 1:3–4 (1988): 26.

53. Skinner, "The Making of the Air Surgeon," p. 80.

54. Grant diary entry for Sept. 30, 1939. Grant papers.

55. Grant diary entry for Sept. 30, 1939. Grant papers.

56. Grant diary entry for Oct. 2, 1939. Grant papers.

57. The flight surgeon episode was described to Beaven in a very frank letter from Grant of Oct. 14, 1939. Grant papers. A copy is in File 168.7248-4, HRA. This episode and that concerning the attempt by Reynolds and his successor, James McGee, are treated in Link and Coleman, *Medical Support of the AAF in WWII*, pp. 24–35.

58. Link and Coleman, *Medical Support of the AAF in WW II*, pp. 359–60.

59. Hippke, "Transport by Air of the Sick and Wounded," *The Military Surgeon* 86 (May 1940): 439–44; Colonel Staff Inspector Hans Kowalzig, Medical Air Services, German Army, "Long Distance Transportation of the Wounded by Air at High Altitudes," *The Military Surgeon* 86 (June 1940): 565–71; Staff Surgeon Dr. W. Tonnis, Consultant on Staff, Chief of Medical Service, German Air Force, "Air Transportation of the Sick and Wounded: A Medical Problem," *The Military Surgeon* 87 (July 1940): 23–25; Staff Surgeon Frederick Schmidt, Chief Flight Surgeon, German Air Force, "Transportation of the Wounded by Plane," *The Military Surgeon* 87 (Aug. 1940): 137–41. Colonel Harold W. Jones, from the Army Medical Corps, edited all four articles, three of which were translated by Regina K. Plavsky, Hippke's by Beatrice Bickel, who was herself an M.D.

60. Quotation is from Link and Coleman, *Medical Support of the AAF in WW II*, p. 360. Although Link and Coleman also discuss the evolution of the first air ambulance units, the treatment by Clarence McKittrick Smith in his volume in the United States Army in World War II seems somewhat clearer: *The Technical Services: The Medical Department: Hospitalization and Evacuation, Zone of Interior* (Washington, D.C.: Office of the Chief of Military History,1956), pp. 438–39.

Chapter Three

1. Wesley Frank Craven and James Lea Cate, eds., *The Army Air Forces in World War II, Vol. VI, Men and Planes* (Chicago, University of Chicago Press, 1955), p. xv.

2. Irving B. Holley, *The U.S. Army in World War II. Buying Aircraft: Materiel Procurement for the Army Air Forces* (Washington, D.C.: Office of the Chief of Military History, 1964), p. 557.

3. Holley, *Buying Aircraft*, p. 16.

4. Robert F. Futrell, *Ideas, Concepts, Doctrine: Basic Thinking in the United States Air Force, 1907–1960*, Vol. I (Maxwell AFB,

Ala.: Air University Press, December, 1989), p. 178.

5. Charles E. Miller, *Airlift Doctrine* (Maxwell AFB, Ala: Air University Press, 1988), pp. 79–81.

6. In separate interviews several years after the war's end, both Maj. Gen. Howard McC. Snyder, a Medical Corps officer who had served as Deputy Army Inspector General, and Tracy Voorhees, former head of the control division in the surgeon general's office, stated that this was the original purpose of the committee investigation. Each was in a position to know, particularly Snyder who inspected medical facilities worldwide and was almost certainly the "Medical general officer in the Inspector General's Department" who General Marshall said he had placed there to keep an eye on the medical department. A lawyer by training, Voorhees was commissioned in the Judge Advocate General's Corps but, after assignment to the office of the surgeon general (SG), he became the SG's "troubleshooter," and, among other things, corrected serious deficiencies in the medical supply system in both the Pacific and European theaters on the surgeon's behalf. Blanche B. Armfield, *Medical Department, United States Army: Organization and Administration in World War II* (Washington, D.C.: Office of the Surgeon General, 1963), p. 185, fn 69, p. 200. Voorhees repeated this charge in a candid unpublished memoir written just at the end of the war: "Recollections of My Work for the Surgeon General," Oct. 1945, unpublished typescript, Tracy Voorhees papers, Special Collections, Alexander Library, Rutgers University. Somervell drafted a letter to President Roosevelt in Apr. 1943 in which Secretary Stimson expressed his "complete dissatisfaction with the present incumbent, and the lack of confidence in him on the part of the high command, and the almost universal condemnation of his work by the profession." Secretary of War's TS Files, box 13, RG 107, NARA II.

7. "Report of the Committee to Study the Medical Department of the Army," Nov. 24, 1942. Records of the Historical Division, ASF, box 487, RG 160, NARA II. Armfield, Organization and Administration of the Medical Department, devotes an entire chapter to the Wadhams Committee; Chapter V, pp. 45–85. Because of the recommendation of the committee regarding the AAF, Magee was never given a full copy of the report, although given the presence of two senior retired medical department officers on the committee who were sympathetic to his surgeon general's office were finally given a copy in the late 1940s.

8. Copies were even built under license by the Soviet Union, which also received large numbers of C–47s under Lend-Lease.

9. Holley, *Buying Aircraft*, p. 551; F. G. Swanborough, *U.S. Military Aircraft since 1909* (New York: Putnam, 1963), pp. 221–22. Holley cautions that the figures in the table from which these procurement numbers were taken include all acceptances by the AAF including those aircraft afterward transferred under Lend-Lease. The fact remains that very large numbers were procured and used widely throughout the combat theaters.

10. These aircraft are discussed in more detail in Chapter 4.

11. For a full discussion of ATC origins and development, see Craven and Cate, *AAF in WW II, Vol. I, Plans and Early Operations* (Chicago: University of Chicago Press, 1948), pp. 349–65.

12. Hqs., AAF, General Orders [GO] 8, June 20, 1942; also quoted in Craven and Cate, *AAF in WW. Plans and Early Operations*. The GO also redesignated the existing "Air Transport Command" as the" Troop Carrier Command" with the primary mission of any troop carrier units identified as to "provide transportation for parachute troops, air-borne infantry and glider units." Arnold had created the earlier Air Transport Command in Apr. 1942 to take over the Air

Service Command's ATGs.

13. "Inferentially," because a review of reports on relevant experiments conducted at the Aeromedical Laboratory at Wright Field prior to the war specifically extrapolates in only one case the results from a healthy subject who had undergone stress induced by conditions encountered inflight to a sick or wounded patient. Air Corps, Materiel Division, Memo Report EXP-M-54-653-27, Subj: The Effect of Decreased Barometric Pressure on the Electrocardiogram, Oct. 25, 1940, recommended "that all cardiac patients transported by air receive oxygen by inhalation throughout the flight." Aeromedical Laboratory Archives, Scientific and Technical Information Office (STINFO), Wright Field, Ohio.

14. In Aug. 1943, the War Department published the evacuation policy for overseas commands as: 180 days for the European theater, less Icelandand the CBI theater; and 120 days for all other overseas theaters, defense commands, department, and separate bases. Memo No. W40-19-43, The Adjutant General, "Policy on Evacuation of Sick and Wounded from Overseas Commands," Aug. 28, 1943. Office of the CG, ASF, Control Division, Special Reports, 1942–46, box 487, RG 160, NARA II.

15. In Mar. 1941, Grant published an article, "Airplane Ambulance Evacuation," in *The Military Surgeon* (88:3) that described a proposed air ambulance battalion that incorporated the elements of the later T/O. The historian of hospitalization and evacuation in the ZI by the U.S. Army during World War II is neutral on the issue, citing "collaboration" between the surgeon general and the Air Corps medical division in developing an agreed concept for such an organization and its mission. Link and Coleman, *Medical Support of the Army Air Forces in World War II*, p, 360. Charles McKittrick Smith, *United States Army in World War II. The Technical Services. The Medical Department: Hospitalization and Evacuation, Zone of Interior* (Washington, D.C.: Office of the Chief of Military History, 1956), pp. 438–39. Grant diary, entry for Sept. 15, 1942. Grant papers.

16. The Air Force Combat Command was formed in June 1941 by the integration of the four numbered Air Forces and their bases into a single organization and represented a further evolution of the consolidation of Air Force capability and centralization of control begun by formation of the General Headquarters Air Force in 1935. Craven and Cate, AAF in WWII. Services Around the World, pp. 154–55. For a full discussion of the GHQ Air Force, see Maurer, *Aviation in the U.S. Army, 1919–1939*, pp. 319–43.

17. Oral History, Maj. Gen. (Ret.) Richard L. Meiling, USAF MC, Oct. 25–28, 1982, pp. 49–51. USUHS Library. Meiling later served on the United States Strategic Bombing Survey, became Deputy Secretary of Defense in Charge of Medical and Health Affairs after the war in the Truman administration, and Dean of the Ohio State University School of Medicine in 1961.

18. Swanborough, *United States Military Aircraft since 1909*, pp. 215–16, 221–27.

19. Mss., David Grant, "Airplane Ambulance Evacuation," p. 10. Grant papers; published in *The Military Surgeon* 88 (Mar. 1941), 238–43. That the air ambulances were to be painted in accord with the Geneva Convention was clearly the understanding of the Director of Military Requirements. See Muir Fairchild quote on p. 22.

20. "Airplane Ambulance Evacuation," p. 12. Frederick R. Guilford and Burton J. Soboroff, "Air Evacuation: A Historical Review," *Aviation Medicine*, 18 (1947): 601–606. Although this article is much cited, Guilford and Soboroff do not footnote their article. The three most scholarly published sources–Futrell, Link and Coleman, and Clarence McKittrick Smith–differ in a number of particulars, with Smith presenting the most clear and convincing account of the process leading to T/O 8–437, although his

use of passive voice tends to obscure the less than enthusiastic role played in this process by the surgeon general. The account that follows is a synthesis that also draws on other sources, which are cited.

21. Smith, *Hospitalization and Evacuation, ZI*, pp. 437–38.

22. Futrell, *Development of Aeromedical Evacuation in the AAF*, p. 20.

23. Link and Coleman, *Medical Support of the AAF in WW II*, p. 50.

24. Although this account is totally consistent with the personalities of the protagonists and their respective attitudes toward using aircraft for casualty evacuation, it does not appear in the well-documented account of Clarence McKittrick Smith. Link and Coleman do not footnote a source for their account, but, on the basis of internal evidence, it would appear to have been based upon interviews long after the event. Their volume is comprehensive and obviously based upon extensive research, but it contains occasional errors of fact that suggest a certain degree of caution should be exercised when reading it. For example, the Air Corps never had more than two Cox-Klemins (not three "Klemum") air ambulances. Additionally, although Richard Meiling was extremely important in the development of aeromedical evacuation during the war, he was not as they assert the "first and only Air Evacuation Officer in the Office of the Air Surgeon," Col. Wood S. Woolford having been so designated by Grant in Nov. 1942. 1st Ind., Nov. 16, 1942, signed by Grant, to Memo for CG, AAF (Attn, Air Surgeon) from Col. F.A. Heileman, Dep. Asst. Chief of Staff for Operations, SOS, Subj: Evacuation Operation, Nov. 9, 1942. CDF 1942-1944, 370.05, Evacuation, box 505, RG 18, NARA II.

25. Smith, Hospitalization and Evacuation, ZI, p.438. Futrell, *Development of Aeromedical Evacuation in the USAF*, p. 20. Link and Coleman state that the AAF had activated the 38th, but the general order was issued by Headquarters Third Army, San Antonio, Tex. *Medical Support of the AAF in WW II*, pp. 366, 412, note 8. Grant noted in his diary on Nov. 12, 1942, that the unit at Fort Benning "now under the Surgeon General" was ready to be transferred to Bowman Field in accordance with tentative approval of Grant's Air Evacuation Plan by the War Department General Staff.

26. Futrell, *Development of Aeromedical Evacuation in the AAF*, p. 20.

27. *Ibid.* Training Bulletin, Conversion of C–46 & C–47A to Air Evacuation Plane (Bowman Field, Kentucky: Army Air Forces School of Air Evacuation, Aug. 15, 1943). These were Evans litter supports, presumably named after the designer. Grant's recommendation specifically ruled out the more bulky Navy-designed Stokes litter that had been in use for many years and that was essentially a wire basket.

28. Futrell, *Development of Aeromedical Evacuation in the USAF*, p. 20. Flight Surgeon's Reference File (Randolph Field, Tex.: AAF School of Aviation Medicine, Nov. 1945), p. 4-3-7. Futrell states that the metal brackets, when installed, provided a litter capacity of only thirteen, but this is contradicted by the Reference File, which also states that metal brackets were installed on only a few C–54As. The issue of litter installation devices was addressed by the Aeromedical Laboratory at Wright Field, which developed and tested strap assemblies and solved the problems of lost litter bracket parts, weight of the installations, and the use of aluminum (which was a critical material). Link and Coleman, *Medical Support of the AAF in WW II*, pp. 296–97.

29. Portions of the Special Orders are quoted in Grant diary, entry for Oct. 30, 1941. Grant papers.

30. Futrell quotes Woolford as writing in Feb. 1943, after an inspection of the North African front that he saw no requirement for nurses to accompany patients in flight in the North African theater because of the short flight times and the shortage of nurses.

Futrell, *Development of Aeromedical Evacuation* in the AAF, p. 24. Meiling was not yet assigned to the Air Surgeon's office and, in any event, makes no claim to having proposed the use of nurses in his oral history memoir. In the absence of other proof and in light of Grant's strong support of the flight nurses throughout the war, a reasonable conjecture may be that he suggested the idea to Woolford as an element he should include in the plan. However, Link and Coleman note that "the Chief of the Medical Division," in July 1940, opined that he did not believe "that in time of war, as a routine measure, nurses will be used on airplane ambulances." Although they do not name the author of the quotation, merely citing his position, the chief of the medical division at that time was, of course, Grant. Link and Coleman, *Medical Support of the AAF in WW II*, p. 370; note 33, p. 413.

31. Futrell, *Development of Aeromedical Evacuation in the AAF*, p. 24. Smith, *Hospitalization and Evacuation, ZI*, p. 439.

32. Futrell, p. 32. *Development of Aeromedical Evacuation in the AAF*, pp. 24–25. Smith, *Hospitalization and Evacuation, ZI*, 439. Grant diary entry for Nov. 16, 1942. Grant papers. 1st Ind., Nov. 16, 1942, Memo for CG, AAF (Attn, Air Surgeon) from Col. F.A. Heileman, Dep. Asst. Chief of Staff for Operations, SOS, Subj: Evacuation Operations, Nov. 9, 1942.

33. Grant diary entries for Aug. 7, Sept. 12, Oct. 16–17, 18–28, 1942. Grant papers.

34. Routing and Record Sheet, Comment #1, CG, Air Materiel Command, to Movements and Operations Division, Aug. 16, 1942. CDF, 1942–44, 452.1 Ambulance Planes, box 1231 RG 18, NARA II.

35. 1st Ind. [basic Ltr unknown], Mar. 8, 1943, CG, AAF Flying Training Command, to CG, AAF. CDF, 1942–44, 452.1, box 1231, RG 18,. Ltr, Dec. 16, 1943, CG, AAF Western Technical Training Command, to CG, Central Flying Training Command, Subj: Procurement of Airplane Ambulance. CDF. 452.1, box 1209. Ltr, Commandant, Field Artillery School, Ft. Sill, Oklahoma, to CG, Replacement and School Command, Army Ground Forces (AGF), Mar. 13, 1943. CDF, 1942–44, 452.1, Ambulance Planes, box 1209, RG 18, NARA II.

36. Ltr, Commandant, Field Artillery School, Ft. Sill, Oklahoma to CG, Replacement and School Command, AGF.

37. 3rd Ind. (basic memo unknown), Conversion of Liaison Type Airplanes, Oct. 30, 1942, Col. David A. Schlatter, Division of Ground Support. CDF 1942–44, 452.1, box 505, RG 18, NARA II.

38. 4th Ind. (basic memo unknown), Oct. 31, 1942, to Director of Training, CDF 1942–44, 452.1, box 505, RG 18, NARA II.

39. 4th Ind. (Basic memo unkown) Conversion of Liaison Type Airplanes, Oct. 31, 1942. The Navy Piper, designated the HE–1, had been championed by Maj. Victor Frazier, a flight surgeon assigned to Army Field Artillery School at Fort Sill, Okla., but it was evaluated by the Office of the Air Surgeon (OTAS) as too limited because only a Stokes litter could be used with it and the aircraft was underpowered. Memo, to the CG, ASF, for the Surgeon General, Sept. 1943, Subj: Air Evacuation by Light Airplane; 6th Ind., Colonel H.C. Chenault, OTAS, to CG, ASF, Oct. 6, 1943. CDF 1942–44, 452.1, box 505, RG 18, NARA II.

40. Futrell, *Development of Aeromedical Evacuation in the AAF*, p.25.

41. Arnold had asked Stratemeyer "what is your plan to evacuate the wounded?" to which Stratemeyer had responded that "all theaters had transports which carry supplies enroute and that they could well return the wounded." Interestingly, Stratemeyer could not answer Arnold's question whether the AAF's transports could take litters or not, but Arnold stipulated that, if this could be done, he would support retrograde movement as the way of evacuating the wounded. 1st Ind. [basic Ltr unknown, Subj: Conversion of Airplanes to Evacuate Wounded], Strate-

meyer to General Fairchild, Director of Military Requirements, Nov. 12, 1942. Quotes are from the Stratemeyer, CDF, 370.05, Evacuation, box 505, RG 18, NARA II.

42. Military Requirements Policy N. 41, Subj: Ambulance Airplanes for Evacuating Wounded by Cargo Airplanes, May 25, 1943. CDF, 1942–44, 370.05, Evacuation, box 505, RG 18, NARA II.

43. Military Requirements Policy N. 41, subj: Ambulance Airplanes for Evacuating Wounded, May 25, 1943.

44. *Ibid*.

45. *Ibid*.

46. R & R, Subj: Ambulance Airplanes, Comment 7, AFROM TO AFRIT thru AFAMC, Oct. 22, 1942. RG 18, CDF, 1942–44, 452.1 Airplanes (Misc.), box 1231, NARA II. No aircraft had been allocated to the Flying Training Command, and the first C–64 was not to be delivered until the following month.

47. The "puddle jumper" reference is in R & R, Subj: Conversion of Airplanes to Evacuate Wounded, Comment 2, AFDMR TO AFRAS (Attn Colonel Weyland), Nov. 14, 1942. CDF, 1942–44, 370.05, Evacuation, RG 18, NARA II.

48. World War II Flight Nurses Association, *The Story of Air Evacuation, 1942–1989* (Dallas, Tex.: Taylor Publishing Company, 1989),. p. 7. Smith, *Hospitalization and Evacuation, ZI*, p. 439. Smith states a figure of eight enlisted men per flight, six medical technicians, and two administrative specialists to allow a certain administrative autonomy to a flight.

49. Gen. Doolittle, who would command the 12th Air Force in North Africa, had asked for two Evacuation Groups according to Grant diary entry, Oct. 18–28 1942. Grant papers.

50. Grant diary entries, Sept. 15 and 17, and Sept. and Oct. 16 and 17, 1942. Grant papers. Candidates for admission to the Army nurse corps prior to the war were vetted by the Red Cross, and were all women. There was, of course, no draft for women during the war.

51. Margaret Richey Raffa, Matilda Grinivech, and Samuel Amirato, "History of the 801st MAES," Clara Morrey Murphy, Dottie Lonergan Jouvenat, Harold Carter, et al., "History of the 802 MAES," and Dr. Goeffrey P. Weidenmen, "History of the 804 MAES," in *The Story of Air Evacuation 1942–89* (Dallas, TX: Taylor Publishing Company, 1989), pp. 70–72, 73. The authors of the brief unit histories and related information in this book were all members of the units discussed. I am indebted to a number of the associations' members, particularly Col. (Ret.) Murphy and Lt. Col. (Ret.) Raffa, who was the Chief Nurse of the first MAETS, the 801st, which was also the first deployed overseas for their personal recollections.

52. As Grant's son was to put it many years later, it was the fact that his father proved to Arnold that he was an Air Force officer first and a doctor second–that is, that he believed that the Air Force Medical Service was there to support the Air Force mission–that made Arnold trust him completely. Conversation with David Grant, Jr., Sept. 3, 1996. For a discussion of the ASF's attitude, see John Millett, *United States Army in World War II. The Army Service Forces: The Organization and Role of the Army Service Forces* (Washington, D.C.: Center of Military History, 1987), pp. 132–33.

53. For example, see Chapter IX, "The Somervell Proposals for War Department Reorganization" of Millett, Organization and Role of the Army Service Forces.

54. Millet, *Organization and Role of the Army Service Forces*, p. 7. War Department Circular 59, "War Department Reorganization," Mar. 2, 1942. Office of the Air Surgeon, Executive Office, Historical Branch, Correspondence and Reports, 1940–46, box 2, RG 18, NARA II. The circular specified that the reorganization would take effect on Mar. 9, 1942.

55. Ltr, Sept. 12, 1943. Hawley–Kirk Correspondence. Refiles from the U.S. Army Center for Military History (War Department Decimal Filing system), 014 Public Health thru 121.6 Supply Costs, box 2, RG 112, NARA II.

56. According to Gramt's diary, Arnold agreed with Grant's decision because of the position of the surgeon general's office in the War Department organization but thought it would have been a good move if the surgeon general reported directly to General Marshall. Grant also told Arnold that he wanted to avoid the politics of the selection and had planned an inspection trip to the Pacific so that he would be out of town while it was being made. Entry for Mar. 5, 1943. Grant had been approached the previous November by a civilian doctor friend who told him over lunch at the prestigious Cosmos Club in Washington that he, Grant, had been mentioned as a candidate to succeed Magee and had the support of the American Medical Association as well as many influential doctors. Entry for Nov. 7, 1942. Grant diary. Grant had received one unsolicited testimonial regarding his qualifications to be the surgeon general in the form of a letter from his former clerk who wrote to President Roosevelt in May 1943 highly recommending Grant as "a leader, a man with initiative, a man with brains and experience." Ltr, William Chudnovsky to President Roosevelt, n.d. [stamped May 14, 1943, by the administrative assistant]. Original in Grant papers.

57. For example, when Eisenhower was appointed to command the invasion of Europe, he supported Spaatz to be the top U.S. airman on his staff vis-à-vis Gen. Ira Eaker. Richard G. Davis, *Carl A. Spaatz and the Air War in Europe* (Washington, D.C.: Center for Air Force History, 1993), p. 278. Also see Eisenhower's letter to General George Marshall of June 26, 1942, regarding how his senior commanders, including Spaatz, are working "enthusiastically" and agree with him on the attributes that the U.S. army in Europe must exemplify in order to be successful. Quoted in Joseph P. Hobbs, *Dear General. Eisenhower's Wartime Letters to Marshall* (Baltimore: The Johns Hopkins Press, 1971), p. 26. Finally, Spaatz and Omar Bradley were the first two general officers in his theater that Eisenhower recommended for promotion. Russell F. Weigley, *Eisenhower's Lieutenants. The Campaign of France and Germany, 1944–1945* (Bloomington, Ind.: Indiana University Press, 1990), p. 670. As for Kenney, the mere fact that he survived for the duration of the war as MacArthur's air commander after the Air Corps veteran and former Chief of the Air Corps, George Brett, was essentially fired says a great deal in itself. However, Kenney more than survived; he became perhaps MacArthur's closest confidant, according to MacArthur's most recent biographer. Geoffrey Perret, *Old Soldiers Never Die: The Life of Douglas MacArthur* (New York: Random House, 1996), p. 340. As noted previously, Spaatz requested two aeromedical evacuation groups to support Operation Torch in Oct. 1942.

58. Chapter 2 for Patterson's proposal. Christopher R. Gabel, *The U.S. Army GHQ Maneuvers of 1941* (Washington, D.C.: Center of Military History, 1992), pp. 46–47. Although casualties were generally assessed by umpires who did not require evacuation, Gabel indicates that some troops were designated to give evacuation squads practice. Whether they were simulated or actual casualties of accidents, there were apparently long lines of evacuees waiting for ground transportation. Link and Coleman, *Medical Support of the AAF in WW II*, pp. 360–61.

59. Link and Coleman, *Medical Support of the AAF in WWII*, p. 360.

60. Futrell, *Development of Aeromedical Evacuation in AAF*, p. 25.

61. Grant diary entry for Sept. 15, 1942. Grant papers.

62. Pers. Ltr, Tyng to Hawley, Oct. 18, 1942. Hawley–Kirk Correspondence. Tyng

was not an admirer of the Army's airmen and was somewhat vindictive. He began matter-of-factly "as you know, in America the Air Corps is hanging by the slenderest thread to the War Department." Tyng was convinced that the supplies Grant was sending were from stocks he had agreed to issue to AAF depots only for use in emergency situations. As punishment for the AAF "not playing the game," Tyng proposed on his own to sharply reduce the amount of supplies made available to AAF depots. He also tried to get Hawley to send an official communication through Maj. Gen. John C. Lee, commander of SOS in the ETO, to Eisenhower so that an official protest against "this pernicious practice" could be lodged with General Marshall. Eisenhower had been appointed ETO commander in June 1943, and directed to mount Operation Torch in September. Torch was launched on Nov. 8, and given the date of Tyng's letter, it seems probable that the colonel may not have known about the invasion of North Africa. If he did, he seems obtuse. See Stephen E. Ambrose, *Eisenhower: Soldier, General of the Army, President-Elect, 1890–1952* (New York: Simon and Schuster, 1983), pp. 182–88, and 201–07 for Eisenhower's intense activity regarding Torch at this time.

63. Grant read the letter to the Wadhams Committee during his testimony and left a copy to be placed in the record. Grant diary entry for October 18–28, 1942. Grant papers. Ltr, Hawley to Tyng, November 7, 1942. Hawley–Kirk Correspondence.

64. Voorhees, "Recollections of My Work for the Surgeon General," pp. 1–2. Voorhees papers. Browning was himself commissioned from a senior position in private business to put procurement on a more businesslike basis. Millet, Organization and Role of the ASF, p. 193.

65. For example, Grant diary entries for Sept. 9, 16, 24, and 26, 1942. Grant papers. Meiling Oral History interview, pp. 65–66. Meiling remarks at dedication of David Grant Medical Center. Grant papers. The idea of co-opting Grant by offering him a position as Deputy Surgeon General for Air had apparently been discussed by Somervell in Sept. 1942. Kirk's direct offer came after his selection in mid-1943.

66. Memo, Marshall for Arnold, Nov. 28, 1944. Arnold saw this as an attempt to take away some of the Air Surgeon's responsibilities and freedom, and he instructed Grant's deputy to prepare a good reason for turning down Somervell's proposal. Annotation on copy of the memo. Grant papers. Grant learned about the attempt only on his return from the Pacific, and he commented to his diary, "Kirk is evidently using every means to get rid of me." Grant diary entries for Nov. 30 and Dec. 1, 1944. Grant papers.

67. Some 1,300 casualties, sick and wounded, were evacuated during the first seventy days of the campaign on one-hour flights over the mountainous, jungle-covered interior. Link and Coleman, *Medical Support of the AAF in WW II*, p. 361.

68. The Australian Air Force brought experience using air ambulances to evacuate wounded from service under British commanders in Egypt and North Africa. "Air Evacuation of Casualties," Tab D, p. 1. Brigadier General Charles R. Glenn, Report of Mission to Theaters, to CG, AAF (Attention: Air Surgeon), July 22, 1944. OTAS, Exec. Office, Hist. Br., Correspondence & Reports, box 2, RG 18, NARA II. This document was a plan for organized air evacuation using the trained personnel of the then recently arrived first MAETS in MacArthur's theater. It had been prepared by the commander of the 804th MAETS and a group of flight surgeons at the direction of "command." Whether the reference was to MacArthur's staff or Kenney's is not clear.

69. Charles M. Wiltse, *U.S. Army in World War II. The Medical Department: Medical Service in the Mediterranean and Minor Theaters* (Washington, D.C.: Center of Military History, 1989), 139. Futrell, *Development of Aeromedical Evacuation in the AAF*, p. 42.

70. "Notes Submitted by Brig. Gen. C.R. Glenn," Tab I, "Personal Diary," p. 20. Glenn, Report of Mission to Theatres, July 22, 1944. In his notes, Glenn stated that the surgeon at the headquarters of the U.S. Army Forces in the Middle East had expressed his belief that movement by air was the only method to move certain patients but they could not get the British to take patients with psychoneuroses from his hospitals. Glenn "Personal Diary," p. 16.

71. Grant diary entry for Nov. 19, 1944. Grant papers. Grant told MacArthur of this reluctance, and MacArthur seemed surprised and said he would get orders out immediately to use aeromedical evacuation whenever it was available. Maj. Gen. David A. Grant, Report on Special Mission, to CG, AAF (Thru: CG, Far Eastern Air Force, CINC, Southwest Pacific Area [MacArthur], Nov. 23, 1944. Grant papers. Grant sent his report through Kenny and MacArthur to Arnold who had sent him to the theater to investigate reports of morale problems with AAF personnel. The problem at Tacloban may have had something to do with the difficulties of airfield and hospital construction on Leyte. See M. Hamlin Cannon, *Leyte: The Return to the Philippines* (Washington, D.C.: Center of Military History, 1996), pp. 192–94. Interestingly, Cannon, who knew Grant from their days together at Randolph Field in the early 1930s, makes no mention of evacuation by air in his discussion of casualty evacuation on the cited pages.

72. The letter of recommendation that Marshall sent to the Secretary of War stressed that the selectee should have wide military experience and the ability to organize a "widespread and complex military Medical service" and preferably should have had actual battle experience. Memo for the Secretary of War from the Chief of Staff, Subj: Appointment of Surgeon General, Feb. 21, 1943. Sec War TS File, box 13, RG 107, NARA II.

73. Marshall almost certainly knew Kenner in France because Marshall was Director of Operations for the U.S. First Division, which conducted the attack at Cantigny in May 1918, during which Kenner earned a Silver Star for gallantry. Forrest C. Pogue, *George C. Marshall: Education of a General, 1880–1939* (London: MacGibbon & Kee, 1964), pp. 184–85. Memo for Secretary of War from Marshall, Subj: Appointment of Surgeon General, Feb. 21, 1943. The recommendations from Patton and Eisenhower, both Marshall protégés, also certainly carried weight.

74. The President considered himself an expert on medicine, but who raised the issue of Kenner's standing in the civilian medical community is not clear. Without citing a source, Richard Meiling names Dr. James Paullin, president of the American Medical Association (AMA); Dr. Frank Leahy, president of the American College of Surgeons; Dr. Henderson, chairman of the AMA Board; and Dr. Churchill, from Harvard. Meiling Oral History, p. 64. Given the tantalizing picture of the internal politics of the medical department presented by passages in Grant's diary, the Hawley–Kirk correspondence, and, discretely, some of the official histories, it is not beyond the realm of possibility that Kirk may have been involved behind the scenes.

75. According to Richard Meiling, Marshall issued a directive that Kirk was never to be given an appointment unless Marshall called for him. Marshall was distrustful of the surgeon general's office even before this episode and had put his "man," an Army surgeon, into the Inspector General's office to keep him informed of its activities. Kirk had a previous association with Secretary of War Stimson but was only sixth in order of general efficiency ratings. The situation could not fail to have enraged the chief of staff who was quite unhappy with medical department internal politics. Graham A. Cosmas and Albert E. Cowdrey, *U.S. Army in World War II. The Medical Department: Medical Service in the European Theater of Operations* (Washington, DC: Center of

Military History, 1992), 504. Meiling Oral History, p. 65. Memo for Secretary of War from Marshall, Subj: Appointment of Surgeon General. Feb. 21, 1943. Kirk was a protégé of Col. Keller, who had commanded Walter Reed Army Hospital, and was also one of the two military doctors on the Wadhams Committee.

76. Ltr, Stimson to the President, Apr. 10, 1943. Secretary of War TS File, box 13, RG 107, NARA II.

77. After an inspection visit to the ETO in company with Grant and a "neutral" observer, Dr. Edward Strecker, ordered by the President to resolve issues raised by complaints to Roosevelt about the comparative medical care offered by the SOS and RAF to fliers, Kirk wrote exultantly about "complete victory" to Hawley regarding the favorable report the three issued on their return. Kirk's remark tends to typify the attitude he revealed particularly in his correspondence with Hawley that relations between the SOS medical department and the AAF medical service were purely some sort of bureaucratic struggle. Grant's diary, on the other hand, although it reveals a man not unafraid to use his power toward an objective, tends to reveal a more consistent focus on improving medical care for AAF and Army troops as a whole. The issue of comparative care seems to have been raised by Col. Elliot Roosevelt, who commanded a photographic reconnaissance unit in England, and not by anyone in the AAF medical service. For a fuller discussion of this episode, see Cosmas and Cowdrey, *Medical Service in the ETO*, pp. 70–71.

78. Ltr Kirk to Voorhees, Sept. 1, 1944. Hawley–Kirk Correspondence. Kirk's comments were uttered in the context of a lengthy discussion about the shortages of do ctors and nurses, and he quite rightly noted the occasional aeromedical evacuation of patients who did not appear to need care. However, the nurse shortage was alleviated by volunteers, and Kirk had to call on Voorhees, his troubleshooter, to get him out of his embarrassing insistence that a nurse draft was absolutely necessary. Mss, "My Work for the Surgeon General," Oct. 1945. Voorhees papers.

Kirk's comment about the flight nurses in his Sept. 1 letter was cavalier:

> I am inclined to believe we should take the thousand nurses that are now flying around in the air and use them on ships. No flight requires more than a day or night and there are always hospitals to take patients off that aren't transportable, and if they are properly selected little can go wrong with them in that length of time.

79. Cosmas and Cowdrey, *Medical Service in the ETO*, pp. 184–90. The authors portray Hawley convincingly as an extremely able man who was clearheaded to both see and successfully address the myriad problems associated with providing the necessary medical support of Eisenhower's forces in invading France and defeating the Germans in the west. Their characterization is supported by the picture of Hawley that emerges from his correspondence with Surgeon General Kirk.

80. Ltr, Kirk to Hawley, Feb. 12, 1944. Hawley–Kirk Correspondence. For a better sense of Voorhees' perspective, see "Informal Account of Visit–Dictated 11 Sep 44," Report to Surgeon General, Subj: Visit to China–Burma–India Theater to Survey Medical Supply. Voorhees papers. This trip was occasioned by complaints from the AAF both from General Glenn as a result of his visit and a "bitter" complaint from Maj. Gen. Thomas J. Hanley, Jr., Commander of the Air Service Command responsible for maintenance and supply for all U.S. air forces in the theater, about the inadequacy of medical supply. Voorhees report, p. 7.

81. Perry Smith overstates the case somewhat but does illustrate the primary focus on Air Force independence with which the air staff planners approached their task. See

Perry McCoy Smith, *The Air Force Plans for Peace, 1943–1945* (Baltimore: The Johns Hopkins Press, 1970), especially Chapter 2, "The Goal of Autonomy," pp. 15–26. As Colonel Tyng's letter to Hawley indicates, the idea that the Air Force would in fact become independent after the war was common among members of the U.S. Army medical department, not without some evident unhappiness at the prospect.

82. Grant, Report of Special Mission. Nov. 23, 1944, pp. 16, 20, and 22. Grant papers.

83. Ltr, Hawley to Kirk, Aug. 21, 1943. Hawley–Kirk Correspondence.

84. Memo for the Chief of Staff thru the Deputy Theater Commander, ETOUSA, from Maj. Gen. Norman T. Kirk, David N. W. Grant, and Dr. Edward A. Strecker, Mar. 20, 1944. Hawley–Kirk Correspondence. Copy in Grant papers. Meiling Oral History, p. 66.

85. Testimony, Sept. 1942, Wadhams Committee, Vol. I, p. 380.

86. Grant diary entry for Mar. 26, 1943. Grant papers. As noted, according to Grant, the trip was in part undertaken to get away from the politicking over the selection of a Surgeon General to replace Magee.

87. Grant diary entries for Mar. 24 and 25, 1943. Grant papers. Nandi had been open since Feb., and the base at PDG was a month away from being declared open operationally when Grant visited. For a brief description of these bases see, Craven and Cate, AAF in WWII, Vol. IV. The Pacific: Guadalcanal to Saipan (August 1942 to July 1944) (Chicago: University of Chicago Press, 1950), pp. 11–12.

88. Grant diary entries for Mar. 31 and Apr. 1, 1943. Grant papers. Hospitals were generally under command of SOS surgeons in the rather amorphous Communications Zone existing in the island-dotted theater.

89. Grant diary entries for Mar. 24 and 26, 1943. Grant papers. On his stop at MacArthur's headquarters in Brisbane, Grant noted a great deal of overlapping, criticizing what he termed "over organization," and the lack of a head with "full responsibility for the medical service."

90. Voorhees, "Recollections of My Work for the Surgeon General," Oct. 1945, p. 30. Voorhees papers. Grant believed Voorhees to be an impartial observer. Grant diary entry for Jan. 20–23, 1944. Grant papers.

Chapter Four

1. For example, see John H. Stone, Crisis Fleeting: *Original Reports on Military Medicine in India and Burma in the Second World War* (Washington, D.C.: Department of the Army, Office of the Surgeon General, 1969), especially the discussions of the role of aeromedical evacuation in the operations of Orde Wingate's "Chindits" and General Merrill's "Mauraders" behind Japanese lines in Burma 1943–44.

2. For earlier indications of some ground surgeons' attitudes toward aeromedical evacuation, see Chapter 3. Pletcher later served as Air Force Surgeon General, 1967–70, retiring as a lieutenant general. Interview, Lt. Gen. Kenneth E. Pletcher, USAF MC (Ret.), Aug. 13, 14, and 15, 1990. Library, F. Edward Hebert School of Medicine, Bethesda, Md.

3. The study was limited in scope by the relatively minor amount of aeromedical evacuation conducted by the School of Aviation Medicine, but no negative effects on patients were observed. Lt. Cols. K. E. Pletcher and F. L. Duff, and Sidney J. Cutler, "An Analysis of the Effects of Aerial Transportation on Patients," *Journal of Aviation Medicine* 20 (Aug. 1949): 252–56.

4. The creation of the defense department and the position of the Secretary of Defense are discussed later in this chapter.

5. The committee members selected the questionnaire recipients based on the members' personal knowledge of the selectees and their experience. There are seventy-four

responses in the archives: thirty-one Navy, twenty-five Army, and eighteen Air Force, not all of which address all questions in the questionnaire. These included, among other things, the effects of various policies regarding the mobilization and assignment of medical personnel, military dentistry, medical supply and logistics, duplication of medical efforts among the services, and reasons for the wide dissatisfaction among civilian medical professionals with their wartime service in the armed forces' medical departments. The questionnaire was entitled "Deficiencies, Operational Errors and Maldeployment of Military Medical Resources in World War II." RG 330, Entry 355A, boxes 46 (Army) and 47 (Air Force and Navy). Although not a scientific sample, the experience of the respondents and the nature of the committee members who selected them make the questionnaire responses of more than passing interest.

6. "Deficiencies, Operational Errors and Maldeployment of Military Medical Resources in World War II." RG 330, Entry 355A, boxes 46 (Army) and 47 (Air Force and Navy)

7. The unreliability of aircraft for evacuation because of tactical priorities was also mentioned by Col. Oscar Reeder, who was the evacuation officer for both the ETO and North African theater of operations, U.S. Army (NATOUSA). *Ibid.* Tab I, Report of Mission to Theatres, Brig. Gen. Charles R. Glenn, to Air Surgeon, July 22, 1944. RG 18, Entry 50, box 2, NARA II. The AAF leaders in the theater leadership had a very negative view of Williams who they wanted replaced, according to Tracey Voorhees, Kirk's medical supply troubleshooter, who heard this from "an authoritative source" during his visit to the CBI in the summer of 1944. "Miscellaneous Notes As To Medical Department Matters in CBI Theater Outside the Scope of the Supply Survey," for the Surgeon General, Aug. 17, 1944, Voorhees papers.

8. Board certification meant that the certified individual had met certain schooling and experience criteria and had successfully passed a test administered by a board of experts from a particular specialty, such as the American Board of Surgeons, who then had "certified" him or her as an expert colleague in that specialty.

9. Conversation with Dr. Michael DeBakey, Feb. 16, 1997. Dr. DeBakey specifically noted Kirk's medical credentials, which made him both well known and widely respected in civilian medical circles, especially the American Medical Association. DeBakey had wartime service in the Office of the Surgeon General and knew Kirk well.

10. General Marshall retired in November 1945.

11. For a detailed account of the Air Force achievement of independence within the context of the postwar unification debate, see Herman S. Wolk, *Planning and Organizing the Postwar Air Force 1943–1947* (Washington, D.C.: Office of Air Force History, 1984). Also see Perry Smith's previously cited *The Air Force Plans for Peace* (Chapter III).

12. Although the questionnaire responses generally implied a belief that the chain of evacuation would be needed to support ground combat like that which they had witnessed in the war, several speculated about these kinds of issues flowing from the possibility of atomic war.

13. Thomas M. Coffey, *Hap. The Story of the U.S. Air Force and the Man Who Built It, General Henry H. "Hap" Arnold* (New York: The Viking Press, 1982), pp. 364–65.

14. W. F. Craven and J. L. Cate, *The Army Air Forces in World War II, Vol. V: The Pacific-Matterhorn to Nagasaki* (June 1944 to August 1945) (Chicago: The University of Chicago Press, 1953), p. 39. In this original organizational structure, each member of Grant's staff served a counterpart function for 20th AF, and General Grant served initially as the 20th AF Surgeon.

15. Conversation with Gen. (Ret.) Jacob Smart USAF, Feb. 11, 1997. General Smart returned from the ETO in August to become Secretary of the Air Staff after having spent the bulk of the war in a German prisoner of war camp. As secretary, he worked directly for General Eaker.

16. Arnold also specified that the Air Staff should become more deeply involved in planning and policy development and that, in keeping with the future greater importance of technology, that regulations restricting the responsibilities and careers of nonrated officers be changed. Wolk, *Planning and Organizing the Postwar Air Force*, pp. 138–39.

17. Grant diary entry for July 11, 1945. Grant papers.

18. Grant determined to fight for the Medical Service for which he "fought, bled, and died." He attributed Eaker's hostility to a confrontation he had in 1939 with him, then the Executive in the Office of the Chief of the Air Corps (OCAC). What generated the earlier confrontation is not cited, although it may have been something during discussion of Army Surgeon General Reynold's attempt to move the OCAC's Medical Division to his office in early 1939. Grant diary entries for June 3, July 26, Aug. 2, 1945, Grant papers. For discussion of the 1939 episode, see Link and Coleman, Medical Support of the AAF in WW II, pp. 24–26.

19. Grant diary entry for May 31, 1945. Grant papers. Although the staff reorganization was arguably justified, it is apparent that Eaker wanted Grant replaced for reasons that are not altogether clear. In early July, Grant heard from two senior flight surgeons that 1) Eaker had actually approached the Undersecretary of War and Surgeon General in 1944 (that is, before Eaker's return to Washington) to try and have Grant relieved in favor of Grow, and 2) Kirk had actually approached Grow himself in mid-1944 and offered him Grant's job, which Grow had refused. Eaker did state later that he favored Grow over Grant because the former had combat experience, but it is clear from Grant's diary that he and Eaker did not have the cordial relationship that Grant had with Arnold and other senior AAF leaders. In fact, the picture drawn of Eaker's attitude toward Arnold in the diary suggests that Grant's close personal relationship with Arnold may have been a factor. Eaker's own relationship with Arnold had deteriorated sharply: he resented Arnold's replacing him with General Spaatz as director of the AAF's strategic air offensive against Germany in late 1943, and he was angry about having to leave the ETO in Mar. 1945 before the war was over. Coffey, *Hap, The Story of the U.S. Air Force and the Man Who Built It*, pp. 331–33; Parton, *Air Force Spoken Here*, pp. 434, 437–38. Disillusionment may have been mutual for Grant records that Arnold told him during a discussion of rumored changes in staff organizations that he now regretted bringing Eaker in as his deputy. Grant diary entry for July 22, 1945. Grant papers. Dr. Marquardt, the flight surgeon who had attended Arnold in Miami after one of his heart attacks, and Clay Chenault, Commander of the AAF convalescent center there, both advised Grant to retire immediately because it was only a matter of time before Kirk and Eaker "would get him." Grant diary entry for June 4, 1945. Grant papers. Interestingly, the War Department liaison officer to the White House had sought unsuccessfully to have General Kirk instead of General Grant accept the aircraft for the Army, something which the AAF refused to countenance.

20. Grant diary entries for May 29, 30, June 1, 1945. Grant papers. Link and Coleman give an account somewhat at variance with Grant. According to them, Eaker took the paper to the Deputy Chief of Staff who disapproved the Air Surgeon's recommendations that the AAF be given authority to discharge its medical officers, a decision that, according to their footnote, Eaker communicated to Grant by means of a record-and-routing (R&R) sheet. Unfortunately, the

authors do not give the date on the R&R, if it, in fact, was dated. *Medical Support of the AAF in WW II*, pp. 121; note 296, p. 142. However, Grant does not record receiving such an explanation in subsequent diary entries, and the explanation suggests that Arnold never saw the paper that Eaker probably discussed informally with the Deputy Chief of Staff and Kirk. Grant records that the acting AAF personnel director (A1) told Grant he was willing to release AAF medical men for three months to meet increasing congressional pressure but had been unable to do so because of War Department policy set by Kirk who had Secretary Stimson's backing. Grant diary entry July 24, 1945. Grant papers. The issue of discharging AAF medical personnel is discussed by Link and Coleman, *Medical Support of the AAF in WW II*, pp. 119–30.

21. On Jan. 10, 1945, the Surgeon General had submitted to the Secretary of War (and at the secretary's request) a memo entitled "The Medical Mission Reappraised." This resulted in preparation of a draft War Department circular [an Army-wide directive] that, if published, would have given the Surgeon General authority to exercise "staff supervision over the activities of the Medical Department in all components of the Army" (my emphasis), and specified that "all plans, policies, and procedures having medical aspects will be cleared with The Surgeon General." "Efforts to Secure War Department Staff Status for the Surgeon General; War Department Circular No. 120, 1945," p. 7, n.d. RG 18, Entry 50, box 2, NARA II. Also see Link and Coleman, *Medical Support of the Armed Forces in WW II*, pp. 114–19, which seems to be based upon this document. The War Department General Staff, Army Ground Forces, AAF, and even Kirk's commander, General Somervell, Commander of the Army Service Forces, all opposed Kirk's bid. However, Kirk was an old friend of Stimson's from shared service in the late 1920s in the Philippines. Conversation with Maj. Paul Daugherty, USA, MC, Feb. 16, 1997. Daugherty reviewed General Kirk's papers in the custody of his daughter in Jan. 1997, and noted Stimson was well known in Kirk's family.

22. Grant diary entries for July 2 and Aug. 4, 1945. Grant papers. Spaatz had requested that Grow go with him to the Pacific, but, in a conversation with Grant before leaving in August, Grow told him that he had been approached by Eaker on the latter's way to the Pentagon in March about the Air Surgeon's job, and that he had advised Eaker he did not want it and that Arnold would not let Grant go anyway. Eaker purportedly told Grow that he thought that he could get rid of Grant shortly after his arrival in Washington. Grant diary entry for Sept. 12–16, 1945. Grant papers. Arnold stayed on duty after Marshall retired to provide some continuity for Eisenhower, the new Chief of Staff.

23. Coleman and Link, *A History of the Origins of the U.S. Air Force Medical Service (1907–1909)*, Washington, D.C.: USAF Medical Service, n.d.). (This draft study was never officially published.) Richard Meiling, Oral History interview, Aug. 22, 1975.

24. .Wolk, *Planning and Organizing the Postwar Air Force*, p. 34.

25. *Ibid.*

26. Wolk, *Planning and Organizing the Postwar Air Force*, p. 35.

27. Grant diary entries for Aug. 7, 15, and 20, 1945. Grant papers.

28. AAF Ltr 25-74, Aug. 20, 1945, Subj: Relation of the AAF Medical Service to Command, to Commanding Generals, Major AAF Commands; Commanding Generals and Commanding Officers, Independent AAF Activities, Subordinate AAF Commands and AAF Divisions, Wings and Districts; Commanding Officers, AAF Base Units (not included above), from H. H. Arnold, Commanding General. Copy in Grant papers.

29. Wolk, *Planning and Organizing the Postwar Air Force*, p. 126. Arnold requested

retirement in a memo to Marshall on Nov. 8, 1945, and by the end of the year was on terminal leave. He did not formally retire until Feb. 9, 1946. Arnold's memo is printed in his autobiography, *Global Mission* (New York: Harper Brothers, 1949), pp. 608–609. Coffey, *Hap*, p. 376. It was Eisenhower, of course, whose preference for Spaatz over Eaker when he took over the ETO had resulted in Arnold's reassigning the latter to the Mediterranean Allied Air Forces, and Arnold told Eaker of Eisenhower's role. Coffey, *Hap*, pp. 331–33.

30. Marshall directed Lt. Gen. Alexander Patch to chair the study in late August 1945, but Patch died shortly after Gen. Eisenhower became Army Chief of Staff. Marshall picked Simpson to complete it, and Simpson delivered his report in late December, which, among other things, called for an autonomous AAF as a step toward independence. War Department Circular 138 embodied most of its recommendations and was published on May 14, 1946, to be effective June 11, 1946. Notably, the circular abolished the Army Service Forces and restored the Surgeon General's direct access to the Chief of Staff.

31. Wolk, *Planning and Organizing the Postwar Air Force*, p. 111. The board had originally recommended that the Surgeon General exercise technical and administrative supervision and inspection of subordinate units of the medical service not commanded by him and not under his immediate control, which would basically have restored the pre-1941 situation for flight surgeons on AAF bases.

32. Wolk, *Planning and Organizing the Postwar Air Force*, p. 111. The other technical services, such as the engineers, also had their organizational autonomy restored with Circular 138's abolition of the ASF.

33. Link and Coleman, *A History of the Origins of the U.S. Air Force Medical Service (1907–1909)*, Washington, D.C.: USAF Medical Service, n.d.), p. 119. Grow and Grant had discussed the future of the AAF Medical Service at some length shortly before the war ended and had agreed that its wartime status should be retained. Grow had also said that he would talk to Eaker about the matter. Grant diary entry for Aug. 3, 1945. Grant papers.

34. Link and Coleman, *Origins of the AF Medical Service*, p. 116.

35. The Simpson Board's recommendations pertaining to the Medical Department are covered in Link and Coleman, Origins of the USAF Medical Service, pp. 133–36. Kirk left the Surgeon General's post on May 31, 1947, and retired from the Army on July 31, 1947.

36. Quoted in Link and Coleman, O*rigins of the AF Medical Service*, pp. 143–44. Denit became acting Surgeon General following Kirk's retirement in July 1946. He had served with considerable distinction in both the ETO and the Pacific theater during World War II.

37. The ZI-based commands established included the Strategic Air Command (SAC), Tactical Air Command (TAC), Air Defense Command (ADC), Air Training Command, Air University, and Air Materiel Command, with which the USAF was to "fight" most of the Cold War.

38. Wolk, *Planning and Organizing the Postwar Air Force*, p. 137.

39. The statistics for the period show a dramatic decline from the last years of the war but are skewed somewhat because of the changes in evacuation means used in peacetime. During the war, the majority of patients evacuated to the U.S. were carried in vessels-hospital ships, converted troop transports, even converted ocean liners like the Queen Mary. Evacuation by aircraft in the postwar world was predominantly by aircraft. Statistical History of the Air Transport Command, 29 May 1941–31 May 1948 (Washington, D.C.: Headquarters ATC, n.d.), History Office, Air Mobility Command (AMC/HO), Scott AFB, Ill.

40. Futrell, *Development of Aeromedical*

Evacuation in the AF. Approximately twenty-eight thousand patients were evacuated by all means from overseas to hospitals in the United States during calendar year (CY) 1946, but only about half that number in the following calendar year. *National Military Establishment. Annual Report of the Secretary of the Army. 1948* (Washington, U.S. Government Printing Office, 1949), p. 270. The Secretary's report does not indicate what part of these numbers were carried by air, but statistics suggest that the overwhelming majority of the approximately 14,200 evacuees in CY 1947 were moved by aeromedical evacuation.

41. Futrell, *Development of Aeromedical Evacuation in the AF*. The process of assigning personnel from theater MAES to ATC had begun during the war as the intertheater use of aeromedical evacuation expanded with larger numbers of casualties, particularly from the ETO after the invasion, and the availability of larger numbers of C–54s. In late Nov. 1944, for example, the War Department increased the authorized strength of the 830th to 46 officers, 270 nurses, and 354 enlisted men (EM). Ltr, Adjutant General (AG) to Commanding General, ATC, Nov. 27, 1944, Subj: Augmentation of the 830th Medical Air Evacuation Squadron. AMC/HO. Four months later, several more MAES were disbanded in the ETO, and the 830th's authorization was again increased, this time to 58 officers, 345 nurses, and 450 EM. Ltr, AG to Commanding Generals, U.S. Forces in the ETO ATC, Mar. 26, 1945, Subj: Reassignment, Disbandment and Augmentation of Certain Medical Air Evacuation Squadrons. AMC/HO. Ironically, one of the MAES not decommissioned, the 806th, was stationed at Villacoublay near Paris, which had been the base for Dr. Chaissing's air ambulances in 1917. See Chapter 1.

42. At the end of Dec. 1947, of 3,000 regulars authorized for the Army Medical Corps, there were 1,206 in uniform; of 2,258 authorized for the Army Nurse Corps, there were 1,148 in uniform; and, of 1,022 authorized for the Medical Service Corps, 740 were in uniform. The highly educated and skilled doctors who patriotically entered the Army during the war were in great demand in civilian life, but their principal reasons for leaving centered on their dislike of the regimentation and the absence of opportunities to practice their professional specialties. Albert E. Cowdrey, United States Army in the Korean War: The Medics' War (Washington, D.C.; United States Army Center of Military History, 1987), p. 11. Grow also sponsored an airborne field hospital project being conducted at the School of Aviation Medicine (SAM). Ltr, Col. Harry Armstrong, Commandant SAM, to the Air Surgeon, Sept. 4, 1947.

43. The text of the Norstad–Sherman agreement is printed in Alice C. Cole, Alfred Goldberg, et al., eds., *The Department of Defense: Documents on Establishment and Organization 1944–1978* (Washington, D.C.: Office of The Secretary of Defense Historical Office, 1978), pp. 31–33.

44. *Ibid.*

45. The Hall Board is discussed in Wolk, *Planning and Organizing the Postwar Air Force*, pp. 162–63, and Link and Coleman, *Origins of the USAF Medical Service*, pp. 147–48.

46. Wolk, *Planning and Organizing the Postwar Air Force*, p. 195.

47. *Ibid*.

48. *Ibid*. Eisenhower quote in Link and Coleman, *Origins of the USAF Medical Service*, p. 164.

49. Link and Coleman, *Origins of the USAF Medical Service*, 163.

50. The Hoover Commission had committees and task forces assessing the Federal Medical Services and whether they should be organized under a single head. Schemes to amalgamate all hospitalization for the Federal Medical Services–including Army, Navy, and Air Force, the Public Health Service, and Veterans Administration, each of

which would have its own Surgeon General responsible to a new Secretary of Health–were being proposed within the AAF as early as May 1945, and discussed with several senators. Grant diary entry for May 28, 1945. Grant papers. Russell Lee of the Air Surgeon's staff proposed such an organization and discussed it with Grant who thought it "ideal, but it will never work." The issue of national health insurance was prominent in the presidential election year of 1948, President Truman having called Congress back into session after its normal adjournment because it had failed to enact such insurance according to his acceptance speech for the Democratic nomination for president. Washington Report on the Medical Sciences (July 19, 1948), p.1.

51. According to Richard Meiling, Kirk had convinced Eisenhower of the need for a unified medical service on a visit to England before he returned to be Army Chief of Staff. Hawley, who was to later formally favor such an arrangement, may also have been a factor in helping convince Eisenhower of such a need because of Hawley's success in directing the Army medical service in the ETO during the war. Meiling Oral History.

52. Quoted in Link and Coleman, *Origins of the USAF Medical Service,* p. 174. Later in his testimony, he was more specific about the need for "more planning, more brains put on...the long term program of providing for the medical services in case, ever, of a war in which we may visualize the use of an atomic bomb" (p. 176). The topic was given considerable attention; for example, The *Washington Daily News* published a long article "Disaster Plan Being Prepared for Atom War," on Sept. 3, 1948. RG 264, Entry 18, box 7, "Newspapers."

53. The quote is from Kirk's statement to the committee. Link and Coleman, *Origins of the USAF Medical Service*, p.194.

54. *Ibid*.

55. Link and Coleman, *Origins of the USAF Medical Service*, p. 195.

56. Link and Coleman, *Origins of the USAF Medical Service*, p. 195.

57. "Transportation of the Sick and Wounded" (Washington, D.C.: United States Government Printing Office, Feb. 1945).

58. Pletcher Oral History, Aug. 13, 14, and 15, 1990. USUHS Library, F. Edward Hebert School of Medicine. There is no evidence that the Eaker situation gave Grant any pause with regard to his commitment to the Air Force.

59. The drive to professionalize the medical department and its reasons are described in Cowdrey, *United States Army in the Korean War*, pp. 14–16. Dissatisfaction with the Army by doctors who had served for the duration also had roots in the regimentation and privations of Army life, a dissatisfaction that extended to the AAF. One doctor who had served in the southwest Pacific responded to a letter of thanks for his service by David Grant: "Do not kid us any further. Your letter and our experience findings do not add properly. So leave well enough alone. We are U.S. taxpayers now." Note, Dr. Warren Fake to the Air Surgeon, n.d., typed on Grant's Ltr to Fake, Oct. 6, 1945. Original in Grant papers.

60. Grow was pressing development, among other things, of an airborne field hospital. Ltr, Col. Harry Armstrong, Commander, SAM, to Grow, Sept. 1947.

61. The text is printed in Alice Cole, et al., *DoD Documents on Establishment and Organization*, pp. 35–50.

62. *Ibid*.

63. Link and Coleman, *Origins of the USAF Medical Service*, p. 236.

64. Link and Coleman, *Origins of the USAF Medical Service*, p. 238.

65. WRMS, 67, Sept. 13, 1948.

66. Other committees included the National Security Resources Board, the Committee on Medical Science of the Research and Development Board, the American Medical Association's Council on National Emergency Service, and the Air Force Association, which passed a resolution

in Nov. 1947 calling for a USAF medical service as an organizational element of the USAF. WRMS, 67, Sept. 13, 1948. Link and Coleman, *Origins of the USAF Medical Service*, pp. 238–40.

67. For example, see Appendix A, "Recommendations of the Committee on Federal Medical Services," Nov. 1, 1948. RG 264, Entry, 36, box 12. The Eberstadt Committee report was published on Nov. 15, 1948; the Voorhees Committee on Federal Medical Services on Nov. 1, 1948, and the Hawley Committee's report not until July 5, 1949.

68. Link and Coleman, *Origins of the USAF Medical Service*, p. 327.

69. Based heavily on interviews with the key participants soon after the events, Link and Coleman's Origins of the USAF Medical Service is the best study to date, although the first chapter ("Between the Wars") of Cowdrey's The Medics' War provides an excellent brief description of the background events from an Army point of view, especially pp. 22–28 on unification. The retirement of both Eisenhower and Spaatz in 1948 helped clear the way for the agreement to separate the medical services.

70. Arnold, *Global Mission*.

71. Betty Kennedy, *Air Mobility En Route Structure: The Historical Perspective, 1941–1991* (Scott AFB, Ill.: Headquarters Air Mobility Command, Sept. 1993), p. 9.

72. This seems to have been instigated by Richard Meiling who by this time was Director of Medical Services and Assistant to Secretary of Defense Louis Johnson, who had succeeded Forrestal. Meiling makes a convincing case in his oral history memoir, but his memory of the timing of this episode is not consistent with the actual date of the directive. See Meiling Oral History, p. 167.

73. Futrell, *Development of Aeromedical Evacuation in the USAF*, p. 161.

74. For the development of Army air observation posts, see Edward Raines, "The Origins of Modern U.S. Army Aviation in World War II," unpublished mss., U.S. Army Center of Military History, Jan. 25, 1995. This definitive work will be published by the Center in the near future. I am indebted to Dr. Raines for his kind permission to review the manuscript prior to publication.

75. Raines, "The Origins of Modern U.S. Army Aviation in World War II, pp. 46–47. Conversation with Dr. Raines, Jan. 17, 1997.

76. Grant diary entry for Aug. 8, 1945. Grant papers. Eaker had announced the policy of expanding the number of aircraft organic to Army ground unit a few days before.

77. David M. Lam, "From Balloon to Black Hawk. The Army Forward Aeromedical Evacuation Story. Part I: The Origins," U.S. Army Aviation Digest (June 1981), pp. 46–47.

78. Lam, "From Balloon to Black Hawk," p. 48. Summary of aeromedical evacuation experience of Maj. Gen. Spurgeon Neel. Neel chaired the board that conducted the tests. Center of Military History Files.

Chapter Five

1. For example, see Capt. Francis P. Thorp, ANC, "Problems in Aerospace Nursing," Journal of Aviation Medicine (Apr. 1949): 136–39, based on a paper she presented to the 19th Annual Meeting of the Aeromedical Association in June 1948. The "problems" she discusses are, in order, inflight feeding, sanitary facilities, nursing care, and communications. These clearly are problems for effective patient movement by air, but they relate much more to the residual MATS aeromedical evacuation system of the immediate postwar period than evacuating casualties from the combat zone. The quotation is from a draft Chapter II, "The Korean War," in an anonymous draft mss. on the Army and aeromedical evacuation in the Vietnam War, n.d., RG 319, CMH Refiles, "Dust-off," box 3, NARA II.

2. Robert Frank Futrell, *The United States Air Force in Korea 1950–1953* (New York: Duell, Sloan and Pierce, 1961), note, pp. 544-45.

3. Robert Frank Futrell, *Development of Aeromedical Evacuation in the USAF*, pp. 161–62; "Main Differences Table," T.O. 1C-54M-1, "USAF Series C–54M Aircraft, Flight Handbook," Apr. 15, 1957; and "Characteristics Summary, C–54M," July, 1961. I am indebted to Mr. David Menard, Air Force Museum Office of Research, Wright-Patterson AFB, Ohio, for this information. Robert Frank Futrell in his pioneering study of aeromedical evacuation in the USAF asserts flatly that no C–97s were reconfigured as medical aircraft like the MC–54Ms in time for use during the Korean War. However, archival sources indicate the first of ten MC–97s were delivered beginning in Feb. 1951. See Futrell, p. 190. (ASI never published Futrell's study in final edited form. Page references are to an unedited single spaced version retyped and published by the 375th Aeromedical Airlift Wing (MAC), Scott AFB, Ill., Jan. 1977).

4. "Airborne Hospital. Lightweight, compact field unit is designed for air transport." Life Magazine (Sept. 13, 1948): 161–62. Malcolm Grow was particularly interested in the airborne hospital. See Ltr, Col. Harry G. Armstrong, Commandant of School of Aviation Medicine, to Grow, the Air Surgeon, Sept. 4, 1947, and Grow's annotations. RG 341, Entry 44, box 93, NARA II. Grow noted, apropos the suggestion that SAM prepare to demonstrate the complete airborne hospital to the Army Surgeon General, Maj. Gen. Bliss, that Bliss "should be willing to share in this project but probably won't" [emphasis in the original].

5. "Air Evacuation Vehicles in the 20th Century," Appendix I to Draft Chapter II, "The Korean War." RG 319, 19, CMH Refiles, "Helicopters," box 4. NARA II.

6. The Air Force offered promotions and other incentives to those who chose to serve in the new organization, a fact that left a bitter taste in the mouth of the Army Surgeon General and his senior staff. Interview, Col. (Ret.) Robert Joy, USA MC, Apr. 5, 1997. Dr. Joy is the emeritus director of the Medical History Program at USUHS.

7. Maj. Gen. George E. Armstrong, who succeeded Bliss as the Surgeon General of the Army, noted while serving as Bliss's deputy that, in spite of a variety of measures designed to help, the medical department was still five hundred doctors short of its full requirement for providing medical care to the JCS-specified 667,000-man army. *The Military Surgeon* 106 (Mar. 1950): 31. The drive for greater professionalization was also present in military nursing. For example, see Agnes Gelinas, "Nursing Education Today–Civilian and Military. The Educational Program Available for Student Nurses in Schools of Nursing Today," *The Military Surgeon* 106 (Mar. 1950): 203–07; and Marguerite C. Holmes, "The Educational Programs Available for Graduate Nurses in Universities and Colleges," *The Military Surgeon* 106 (Mar. 1950): 207–09. Both articles and several others related to professional educational opportunities for military nurses originated as papers presented to the Association of Military Surgeons at their 1949 Annual Meeting. The quotation is from Brig. Gen. J. I. Martin, "Medical Field Service," *The Military Surgeon* 104 (Apr. 1949): 251. Like those just cited, this article was first presented as a paper to an annual meeting of the Association of Military Surgeons.

8. For a sense of the intensity of the services' struggle to find resources, see Jeffrey Barlow, *The Revolt of the Admirals* (Washington: Naval Historical Center, 1995). In such circumstances, the medical services necessarily had lower priority.

9. Richard Tierney, *The Army Aviation Story* (Northport, Ala.: Colonial Press, 1963), 206. Also see B. Franklin Cooling, "A History of Army Aviation," *Aerospace Historian*:104.

10. Hastings, *The Korean War*, 52–53.

11. For a brief discussion of the background to the President's action, see Hastings, *The Korean War*, pp. 54–75.

12. See Bevin Alexander, *Korea: The First War We Lost* (New York: Hippocrene Books, 1986), pp. 46–62, for a discussion of the state of training of the occupation forces.

13. Alexander, *Korea*, p. 58. Alexander describes the fate of "Task Force Smith" vividly on pp. 53–62. Also see Fehrenbach, *This Kind of War*, pp. 65–71.

14. Futrell, *USAF in Korea*, pp. 12–13.

15. Futrell, *Development of Aeromedical Evacuation in the USAF*, pp. 165–66. The heavier C–46s were soon ruled out of the Korean airlift because of the damage they began to cause to critical airfields like that at Pusan (K9). They later played a major role in aeromedical evacuation after the recapture of Kimpo and Suwon and the work of engineers who improved many fields.

16. Additionally, the road from Ashiya to Fukuoka, although paved, was very poor in places, making road transportation of casualties somewhat risky. The author was stationed at Ashiya from Oct. 1953 until Aug. 1955.

17. *Ibid.*, p. 167. Capt. Annis G. Thompson, *The Greatest Airlift: The Story of Combat Cargo* (Tokyo: Dai-Nippon Printing Company, 1954), p. 6. Thompson witnessed a number of events discussed in his book as a pilot in a troop carrier wing that arrived in Japan in Nov. 1950. He subsequently became the public information officer and historian of the 315th Air Division (Combat Cargo), which operated the aeromedical evacuation system. Albert E. Cowdrey, who wrote the official account of the U.S. Army medical department in the Korean War, apparently was unaware of the C–54 "backhauls" from Kyushu having been integrated into the intra-Japan aeromedical evacuation system from the earliest days of the war. He writes of general hospital patients having to endure fifteen-hour train rides to Osaka or having to travel twenty-seven hours to Tokyo from the station hospital at Fukuoka and implies that this continued until Jan. 1951. *The Medics' War* (Washington, D.C.: U.S. Army Center of Military History, 1987), pp. 266–67.

18. Futrell, *Development of Aeromedical Evacuation in the USAF*, p. 167. The 8th Army Surgeon set the evacuation policy for Korea at thirty days.

19. *Ibid*.

20. Draft Vietnam aeromedical evacuation mss., Chapter I, p. 19. Commenting on a proposal for the "snatching" of capsules containing casualties as a means of frontline evacuation, Col. George Baier, Chief of the Operations Division of the Air Surgeon's Office, rejected it with the recommendation that helicopter evacuation was much better. Ltr to Col. Chenault, Nov. 3, 1944. RG 341, Entry 44, box 93, NARA II. Helicopters were used both in China and the Philippines. Col. M. S. White, "The Air Evacuation of Ground Force Troops," *The Military Surgeon* 101 (Aug. 1947): 104.

21. Futrell, *Development of Aeromedical Evacuation in the USAF*, p. 165. Quote is from David M. Lam, "From Balloon to Kittyhawk. Part II: World War II," *U.S. Army Aviation Digest*, (July 1981): 48.

22. Oral History, General Spurgeon Neel, Mar. 3, 1977, p. 1; Neel CV, n.d., files USUHS Medical History Office, p. 1. Neel in his interview said the tests were conducted with an H–5. In his CV, he indicates it had internal storage for two litters (which H–5s did not). David Lam identifies the test helicopter as the Sikorsky YH–18, and is almost certainly correct. Lam, "From Balloon to Kittyhawk. The Army Forward Aeromedical Evacuation Story. Part II: World War II," p. 48.

23. Futrell, *Development of Aeromedical Evacuation in the USAF*, p. 169.

24. Cowdrey, *The Medics' War*, pp. 94–95.

25. Futrell, *Development of Aeromedical Evacuation in the USAF*, pp. 173–74. Stratemeyer had commanded the Eastern Air Command during World War II and was certainly aware of the wartime aeromedical evacuations carried out in the CBI during 1944.

26. Futrell, *Development of Aeromedical Evacuation in the USAF*, pp. 173–74.

27. Spurgeon H. Neel, "Helicopter Evacuation in Korea," *U.S. Armed Forces Medical Journal* VI (May 1955): 691–92.

28. Futrell, *The United States Air Force in Korea*, pp. 148–49.

29. *Ibid.*

30. Futrell, *The United States Air Force in Korea*, pp. 546–47. Cowdrey, *The Medics' War*, p. 264.

31. Futrell, *Development of Aeromedical Evacuation in the USAF*, pp. 170, 184. "Medical Air Evacuation," *FEAF Report on the Korean War*, Vol. II (Mar. 26, 1954), 24. (File: 168.7082-572, box 65, HRA.)

32. *Ibid.*

33. Mossman, *Ebb and Flow*, p. 237. Later, in January, Ridgway was to write of his situation, "what I had [in combat units] was all there was."

34. Lt. Col. Lucille C. Slattery, "Air Force Nurses Progress Toward the Space Age," pp. 12–13; paper presented to the 66th Annual Convention of the Association of Military Surgeons, Nov. 9, 1959. Col. Slattery recounted her experiences as part of this presentation. The 8055 MASH was the most forward Army Mobile Army Surgical Hospital at the time.

35. Thompson, *The Greatest Airlift*, p. 39. Thompson's account of airlift and aeromedical evacuation's role in the retreat from the Changjin Reservoir is particularly good. Although his sources are not indicated in his text, given his own experience and access to information, including other participants, as well as the near contemporaneous nature of his writing, the book must be considered authoritative on what happened if not necessarily why. The author can validate much of the context of the events from his own experience in the 315th Air Division flying C–119s at Ashiya.

36. The figure for those evacuated comes from Futrell, *Development of Aeromedical Evacuation in the Air Force*, p. 27, who used the FEAF Combat Cargo Command History for the period Sept. 10, 1950 to Jan. 24, 1951; see note 27, p. 282. Cowdrey says nothing about aeromedical evacuation from Hagaru-ri or Koto-ri by C–47s, although he mentions Marine helicopters lifting casualties from isolated units and transferring them to airstrips where X Corps liaison planes flew them to medical facilities, presumably at Hungham. *The Medics' War*, pp. 122–23, 125–27. By contrast, Alexander calls the Hagaru-ri airstrip "one of the great legends in man's conquest of the air, a testament to man's determination." Alexander, *Korea*, p. 356.

37. Thompson, *The Greatest Airlift*, p.56. Futrell, *Development of Aeromedical Evacuation in the USAF*, p. 170.

38. Futrell, *The USAF in Korea*, pp. 319, 549; *Development of Aeromedical Evacuation in the USAF*, p. 174. Earl H. Tilford, Jr., *The USAF in Southeast Asia: Search and Rescue in Southeast Asia* (Washington, D.C.: Center for Air Force History, 1992), pp. 12–13. Neel, "Helicopter Evacuation in Korea," p. 692.

39. For example, the 395th Station Hospital at Nagoya expanded from 100 beds in June 1950 to 500 beds in Oct. and 1,200 in Jan. 1951. It received patients aeromedically evacuated from Korea and Itazuke through Komaki air base and others moved by rail from southern Japan. "Historical Data for the Period 1 October 1950 to 31 January 1951," Feb. 19, 1951. (File: KHOS-STA 395-H1, Oct 50–Jan 51, box 40, HRA.)

40. Cowdrey, *The Medics' War*, p. 269; Futrell, *Development of Aeromedical Evacuation in the USAF*, p. 173.

41. In June 1951 as C–54s were once again able to operate into airfields in central Korea as UN forces were driving north, the 315th Surgeon, Col. Allen Smith, strongly urged that patients be cleared directly from Seoul and Hoengsong to save the additional hardships of multiple movements and to reduce airlift requirements. Once again, Eighth Army refused and would clear

patients to Japan only from the evacuation hospitals at Taegu and Pusan. *Ibid.*, p. 173; Cowdrey, The Medics' War, p. 269. The Army evacuation chain is depicted schematically in Cowdrey, The Medics' War, p. 152.

42. During July and August, 1,849 evacuees from Pusan to Kokura, the Japanese port through which they were moved by train to Army hospitals in Japan, were carried by the USS Maine which had only one air-conditioned ward, with temperatures elsewhere below decks rising above 100 deg. Cowdrey, *The Medics' War*, p. 263.

43. Thompson, *The Greatest Airlift*, p.56. On Dec. 5, 1950, 3,925 patients were aeromedically evacuated from Korea for safety's sake.

44. Neel, Oral History, pp. 13–14. General Armstrong, the Army Surgeon General, argued somewhat similarly defending the adequacy of general Army evacuation methods against the charge that the Army chain of evacuation was inferior to that of the U.S. Marines in Korea. Cowdrey, *The Medics's War*, pp. 194–95.

45. Futrell, *Development of Aeromedical Evacuation in the USAF*, p. 175.

46. Ltr, Col. B. Warden, Adjutant General, FEC, to CG, 8th Army, et al., Subj: Air Transportation of Patients within the Far East Command and Korea, cited in Futrell, *Development of Aeromedical Evacuation in the USAF*, p. 181.

47. Office of the Surgeon General, Theater Aeromedical Evacuation System, n.d. (internal evidence indicates it was published after Apr. 1951), foreword by the Air Force Surgeon General, General Armstrong, p. 17. Armstrong identifies this document, which was classified "Restricted," as a "manual" and the Introduction notes that it had been compiled "to serve as a guide in training personnel for the establishment, operation, and continuing development of the Aeromedical Evacuation System." Although there is no AF manual number, the document was clearly issued and was not merely a draft. (File: 1268.2082-568, 51/00/00. HRA.)

48. Office of the Surgeon General, Theater Aeromedical Evacuation System, p. 21. For example, the C–123 could carry fifty litter or sixty ambulatory patients. Theater Aeromedical Evacuation System, p. 61.

49. General Eisenhower's strong views on air support of ground forces had been a factor in the original creation of TAC, but there was also a defensive element. The AAF leadership in 1946, looking toward independence, was well aware that the Army sought control of tactical aviation, and, if a separate organization for tactical support of the Army ground forces had not been created, the Army would have sought to achieve it. Wolk, *Planning and Organizing the Postwar Air Force*, pp. 131–32.

50. After observing the utility of Marine helicopters to Marine operations in general, the 8th Army Commander, Gen. Matthew Ridgway, became enthusiastic about their potential value to the Army. In Nov. 1951, he requested that the Department of the Army send him four helicopter transport battalions, each to be equipped with 280 helicopters. He asserted that the Korean War had shown the Army vitally needed helicopters and recommended the future typical field army have ten helicopter transportation battalions. The Army followed his recommendation regarding the future field army but scaled it down to four helicopter transport battalions, each with three companies. Futrell, *The USAF in Korea*, pp. 333–334.

51. Futrell, *Development of Aeromedical Evacuation in the USAF*, p. 184. FEAF interpreted the dispute, which involved "a maze of statements and counter-statements," as not over professional jurisdiction "but rather over administrative control of patient movement and evacuation." FEAF Report on the Korean War, p. 24.

52. Col. Adriel N. Williams, "Aeromedical Evacuation in a Theater of Operations," Air War College thesis, Mar. 1953, Air University Library, Maxwell AFB,

Ala. Williams had served on a special TAC study group, Project Vicksburg Blue, evaluating aeromedical evacuation. Somewhat ironically, Williams's assignment after the Air War College was as commander of the 374th Troop Carrier Wing at Tachikawa.

53. Quotes from Memo of Understanding between the Secretary of the Army and the Secretary of the Air Force, Oct. 2, 1951, in Richard I. Wolf, ed., *The United States Air Force: Basic Documents on Roles and Missions* (Washington, D.C.: Office of Air Force History, 1987), p. 22.

54. Williams, "Aeromedical Evacuation," pp. 18–19. Jean R. Monk, A *History of Large-Scale Army Maneuvers in the United States, 1935–1964* (Fort Monroe, Va.: Historical Branch, Continental Army Command, Dec. 1969), p. 179.

55. Quotations are the text printed in Wolf, *Basic Documents*, pp. 243–45.

56. In his thesis, Williams proposes an Air Force-operated forward evacuation system such as that proposed by the Project Vicksburg Blue study group chaired by the TAC Surgeon, Col. M. S. White, and of which Williams had been a member. Its report was filed in July 1952. Williams, "Aeromedical Evacuation;" Introduction and Phase I: Aeromedical Evacuation: Project VICKSBURG BLUE (Langley AFB, Virginia: Headquarters TAC, File: 168.7082-571, HRA.)

57. "Concept of Aeromedical Evacuation in Overseas Combat Areas," foreword by Maj. Gen. Chester McCarty, CG, 18th Air Force. (File: K237.163.3, 52/03/20–55/04/00 HRA.)

58. Futrell, *Development of Aeromedical Evacuation in the USAF*, p. 187.

59. *Ibid*.

60. Appendix I, to draft study " Aeromedical Evacuation in Vietnam," p. 176. RG 319, CMH Refiles, Dust Off, box 4, NARA II.

61. Memo for the Surgeon General, Subj: The Civil Reserve Air Fleet, Apr. 2, 1952, from Maj. Gen. Robert E. Lee, Director of Plans with cover routing memo, Col. Maurice Johnson, Deputy Surgeon General, for Col. Allen Smith, n.d. (File: K237.163-3, HRA.) For a brief discussion of the CRAF origins, see Anything, Anywhere, Anytime, pp. 81–86.

62. Lt. Gen. William H. Tunner, *Over the Hump* (Wash., D.C.: Office of Air Force History, 1985), p. 287. Also see Ltr, Tunner to Thomas D. White, Air Force Chief of Staff, July 17, 1959. "Commands, MATS," Thomas D. White papers, LC/MD. Any Thing, Any Where, Any Time also discusses the role of Congress in acting as critic on behalf of the commercial carriers (pp. 94–98).

Chapter Six

1. See Chapter 5 for the provisions of the manual. The manual was published as AFM 160-27, NAVMED P-5047, and FM 31-8, dated Jan. 9, 1956.

2. Futrell, *Development of Aeromedical Evacuation in the USAF*, p. 202. *The Air National Guard Medical Service. A Perspective from 1947 to the Present: The Annual Reports, Chief National Guard Bureau* (Andrews AFB, D.C.: Air National Guard Readiness Center, July 4, 1992) (Report, 1956), pp. 41–42; (Report 1958), p. 56.

3. Futrell, *Development of Aeromedical Evacuation in the USAF*, pp. 201–202.

4. "Air Evac Flights Slated for Demise," *Army–Navy–Air Force Journal* (Mar. 5, 1960): pp. 1, 28; "Medical Airlift System Will Phase Out by `63," *Air Force Times* (Mar. 19, 1960), pp. 28. The Journal editorialized sharply against the idea in the same issue in which it published the story on the proposed cuts. In a conversation, Apr. 10, 1997, Dr. Futrell indicated his belief that his unpublished study on aeromedical evacuation may have helped influence General White's decision to retain the mission for the active force. Clearly, there would have been pressure from

elsewhere too because this was an assigned Air Force mission. Maj. Gen. Twitchell, the former Surgeon of the United States Air Forces in Europe (USAFE), in a contemporary interview (1961), speaking about the aeromedical evacuation system, noted that decisions that had "practically eliminated the system within [the] Continental United States" had been made "without any reference to the Surgeon General's office." Oral History, General Harold H. Twitchell, USAF MC, May 8, 1961. (File: K230.052-568, HRA.) The plan was abandoned several months later. "Air Evac Demise Plans Rescinded," *Army–Navy–Air Force Journal* (July 2, 1960): 1.

5. (Donaldson AFB, S.C.: Headquarters 18th Air Force, n.d.), pp. 16–17. Foreward signed by the commander, Maj. Gen. Chester E. McCarty, USAF. (File: K237,163.3, 52/03/20–55/04/00, HRA.) Quotation is from "Theater Aeromedical Evacuation System," p. 22.

6. "Concept of Aeromedical Evacuation in Overseas Combat Areas," 15.

7. Lam, "From Balloon to Kittyhawk: Part III: Korea," p. 46.

8. Futrell, *Development of Aeromedical Evacuation in the USAF*, p. 221. The Army Air Corps had, of course, procured two Cox-Klemin aircraft, which were especially designed for air ambulance work in the latter part of the 1920s. (See Chapter 2.) C–131E models obtained by MATS later had not been designed for aeromedical evacuation and after modification could carry only twelve litter and eighteen ambulatory patients. Futrell, *Development of Aeromedical Evacuation in the USAF*, p. 221.

9. Futrell, *Development of Aeromedical Evacuation in the USAF*, p. 221.

10. *Ibid*.

11. Futrell, *Development of Aeromedical Evacuation in the USAF*, pp. 220, 223–25.

12. Input for the period Jan. 1, 1965–Mar. 31, 1968, to Corona Harvest, Vol. I, 1st Casualty Staging Flight, USAF Hospital, Scott AFB, May, 1969, p. 5, HRA. Although the number of patients processed during 1965 fell to 3,365, none of whom were battle casualties, difficulties still existed in handling patients who remained over night (RON). Corona Harvest is the code name for the massive USAF project to document its role in the Vietnam War. Documents from this collection located at the USAF Historical Research Agency (HRA), will hereafter be identified as Corona Harvest reports in the interest of brevity. For a discussion of the project, see Robert F. Futrell, I*deas, Concepts, Doctrine: Basic Thinking in the United States Air Force, 1961–1984, Vol. II* (Maxwell AFB, Ala.: Air University Press, 1989), pp. 316–23.

13. Corona Harvest Report, 2nd CSF, Jan. 1, 1965–Mar. 31, 1968, Vol. I, July 1, 1969, p. 1. Corona Harvest, 1st CSF, 1965–1968, p. 7. Futrell, *Development of Aeromedical Evacuation in the USAF*, pp. 224–25. These CSF tasks were those proposed by 18th Air Force and approved by TAC in 1955.

14. Charles E. Miller, *Airlift Doctrine* (Maxwell AFB, Ala.: Air University Press, 1968), p. 240. Quotation is from the DOD directive printed in Wolf, *USAF Basic Documents on Roles and Missions*, p. 309.

15. Miller, *Airlift Doctrine*, p. 240.

16. Various directives published in the late 1950s and in the 1960s predating the introduction of U.S. combat troops into Vietnam dealt with aeromedical evacuation at general and theater levels. These included Air Force Regulation 164-1, "World-wide Aeromedical Evacuation," May 15, 1964; MAC Reg. 160-2, "Aeromedical Evacuation," Apr. 28, 1961; and PACAF Manual 55–13, "Pacific Air Forces in Joint Operations," Chapter 7, Apr. 1, 1965. Interestingly, only in the Aug. 1964 version of the basic Air Force doctrinal manual, AFM 1-1, was the airlift mission discussed and for the first time. Miller, Airlift Doctrine, p. 299.

17. Robert F. Futrell, *The United States Air Force in Southeast Asia: The Advisory*

Years to 1965 (Washington, D.C.: USAF Office of Air Force History, 1981), p. 31. Raymond L. Bowers, *The United States Air Force in Southeast Asia. Tactical Airlift* (Washington, D.C.: USAF Office of Air Force History, 1983), pp. 21–22. The wounded troops were primarily French Foreign Legionnaires who had participated in the battles at Dien Bien Phu. They were flown to Orly Field, Paris, and Oran, Algeria. Conversation with Col. (Ret.) John Schlight USAF, July 12, 1997. Colonel Schlight was assigned to the 374th Wing as a navigator and served on the crew of one of the Wounded Warrior flights from Tan Son Nhut to Tachikawa. His mission carried fifty amputees on litters back to Japan. Some French wounded survivors were apparently treated in U.S. hospitals before being returned to French control. Bernard B. Fall, *Hell in a Very Small Place: The Siege of Dien Bien Phu* (New York: Vintage Books, 1966), p. 430–31.

18. *Anything, Anywhere, Anytime*, pp. 98–99. In an interesting precedent for Operation New Leaf, the Belgian government at the conclusion of World War II in Europe had asked the United States to aeromedically evacuate approximately one thousand Belgian nationals from its then colony, the Belgian Congo, to Brussels. MATS predecessor, the AAF's Air Transport Command, developed a plan for such an operation but recommended that it not be implemented for two reasons: a single surface vessel could do the job more cheaply and rapidly (ATC estimated that the move would require thirty-seven round trips by C–54 and take a minimum of five weeks) and that the use of these resources for evacuating Belgians when U.S. Army personnel eligible to return to the United States could not do so because of a lack of transportation would harm their morale and loose a flood of criticism of ATC and the War Department. Draft "Plan for Air Transportation of Debilitated Persons from the Belgian Congo to Belgium," n.d., Air Mobility Command History Office, Scott AFB, Ill. The plan estimated that 25 percent of the evacuees would be litter patients and the rest ambulatory. Of the total, "reliable estimates" indicated that 30 to 35 percent might be psychiatric cases requiring additional medical personnel for care in transit. The Hashemites were the family that had helped the British against the Turks in World War and had received two kingdoms as their reward, Trans-Jordan and Iraq.

19. Twitchell interview, May 8, 1961.

20. In 1959, the Air Force's Air Material Command had three logistic support squadrons collectively comprising 36 C–124 aircraft. The Strategic Air Command also employed three strategic support squadrons comprising a total of 48 C–124s to move nuclear weapons among its bases. A total of 920 Air Force and Navy transport aircraft remained outside MATS control after Single Manager was implemented. Futrell, *Ideas, Concepts, Doctrine, II*, pp. 12, 14.

21. Good brief discussions of the activities of these subcommittees' and the various issues and recommendations are in Miller, Airlift Doctrine, pp. 240–74, and Anything, Anywhere, Anytime, pp. 89–98. The Hoover Commission of the mid-1950s had, among other things, recommended that "the level of MATS peacetime operations be limited to that necessary to maintain the minimum war readiness of the command," and stressed that other service transportation needs be handled by commercial transportation lest the result be "a continuing and expanding military socialism over all air transportation." Quotations from Anything, Anywhere, Anytime, p. 91.

22. House, Committee on Armed Services, Hearings before Special Subcommittee on National Military Airlift, 86th Cong., 2d sess., pp. 4148–49. The Rivers' subcommittee hearings are covered in Miller, *Airlift Doctrine*, pp. 258–71.

23. Miller, *Airlift Doctrine*, pp. 269–71.

Army Navy Air Force Journal (Mar. 19, 1960): 29. Miller excerpts the dialogue between the Air Force Chief of Staff, General Thomas D. White, and Rivers in which White makes the extraordinary if possibly technically correct comment that "MATS is not a creature of the Air Force."

24. The specifications called for an aircraft capable of carrying a 70,000–80,000 lb. payload nonstop across the Atlantic or Pacific, cruising at 440 knots, operating from 5,000 ft. runways, and airdropping troops and equipment. It was to incorporate design features to facilitate the loading and offloading of cargo including an aircraft floor at the same height as standard truck beds, doors in the rear of the fuselage that, when opened, allowed trucks to abut the aircraft floor from the rear directly for transferring cargo, and a minimum cargo area of 9 by 10 by 60 ft.–essentially, the C–141A. Miller, Airlift Doctrine, p. 264

25. During the Berlin crisis of 1961, the Air Force called to active duty thirty-six squadrons of the Air National Guard and Air Force Reserves, including C–124 and C–97 units. *Futrell, Ideas, Concepts, Doctrine, Vol. II*, p. 38.

26. Quoted in Miller, *Airlift Doctrine*, p. 276.

27. Futrell, *Ideas, Concepts, Doctrine, Vol. II*, pp. 30, 47. In the Berlin crisis of 1961, forty-five C–135s that had been diverted from the KC–135 production line were allocated to MATS.

28. The term medevac was commonly applied to army helicopters dedicated to aeromedical evacuation and will be used here to help differentiate U.S Air Force and Army aeromedical evacuation units.

29. Following resolution of the forward aeromedical evacuation issue and the more favorable attitude toward Army aviation shown by the Kennedy administration, the Army procured fixed-wing transports, the CV–2 Caribous, and twin-engine Mohawk reconnaissance aircraft. The Caribou was reportedly capable of carrying twenty litter patients. The Army also possessed U–1 "Otters" which were used for corps support and could carry one ton of small bulk cargo or seven to eight passengers. Futrell, *The Advisory Years*, p. 110.

30. Memo for Members of the Armed Forces Policy Council, Subj: Clarification of Roles and Missions to Improve the Effectiveness of Operation of the Department of Defense, quoted in Wolf, *Basic Documents on Roles and Missions*, p. 296. The members of the Armed Forces Policy Council consisted of the Secretary of Defense (SECDEF), the Deputy SECDEF, and the Assistant SECDEFs; the Chairman of the Joint Chiefs of Staff (JCS), and the JCS members with the addition of the Commandant of the Marine Corps, and the General Counsel.

31. Quotations are from "USAF Tactical Air Concepts for Test and Evaluation," Dec. 6, 1963, extracted in the STRICOM Joint Test and Evaluation Task Force Final Report on Operation Goldfire. AMC History Office Files, Scott AFB. For a discussion of Operation Goldfire, see Futrell, *Ideas, Concepts, Doctrine*, pp. 185–89.

32. Quotes are from hearings before a special subcommittee on military airlift, House Committee on Armed Forces (Washington, D.C.: U.S. GPO, Oct. 22, 1965), pp. 462–63. Both the Caribou and Buffalo were built by DeHavilland Aircraft of Canada and could land on extremely short runways. The Caribou had a gross takeoff weight of 28,500 lb., about half that of the comparable Air Force assault transport, the C–123, and could carry about half its payload of 11,000 lb. Bowers, *Tactical Airlift*, p. 34. The STRICOM commander, Army Gen. Adams, seems to have disagreed with the Army position concluding on the basis of STRICOM maneuver experience that Air Force tactical transports should deliver supplies as far forward as possible and that Army helicopters should make further distribution. Futrell, *Ideas, Concepts, Doctrine*, p. 313.

33. Peter Dorland and James Nanney, *Dust Off: Army Aeromedical Evacuation in Vietnam* (Washington, D.C.: U.S. Army Center of Military History, 1982), pp. 23–24. Jeffrey Greenhut, "Aeromedical Evacuation," Chapter VI, pp. 5–6, in "I Have Your Wounded. The Army Medical Department in Vietnam," draft mss., USUHS Library. I am indebted to Dr. Edward Raines of the Center of Military History for bringing this unpublished mss., which was prepared by a Center historian, to my attention. Each chapter is paginated separately.

34. Divided from the communist Peoples Democratic Republic of Vietnam at the 17th parallel of north latitude by agreement at the Geneva Conference of 1954, the Republic of Vietnam (RVN, or more commonly identified as "South Vietnam") comprised only Cochin China in the south and part of Annam in the north of the historic three sections of the country. Vietnam's communications infrastructure as a whole had been strained by the effects of World War II, when the country had been occupied by the Japanese, and the Viet Minh insurgency that followed beginning in 1946. Ironically, in view of the more destructive war to come, an English-speaking Vietnamese storekeeper in Haiphong tried to impress on the author in early 1954 what a terrible impact continuing conflict had on his country by emphasizing that the insurgency had gone on by then for eight years! (The emphasis reflects the vigor with which he made the point.)

35. The classic case was the annihilation of Groupement Mobile 100 on Highway 19, one of the few major west-east roads in the highlands, between An Khe and Pleiku in June 1954. Bernard B. Fall, *Street Without Joy* (London: Pall Mall Press, 4th ed., 1965), pp. 207–35. The situation had not changed a dozen years later. General Neel, the MACV Surgeon during this period, noted of the period 1965–70 that, "since there was no secure road network within the combat area of Vietnam, surface evacuation of the wounded was almost impossible." Vietnam Studies: Medical Support of the U.S. Army in Vietnam 1965–1970 (Washington, Department of the Army, 1973), p.59.

36. Bowers, *Tactical Airlift*, pp. 3–23, covers the French period. Futrell, *The Advisory Years to 1965*, pp. 3–31, also covers the French period and the period cited, including the formation of MACV, pp. 94–100. Also see Futrell, *Ideas, Concepts, Doctrine, Vol. II*, p. 287, for a discussion of MACV's deactivation. The author observed the extent of U.S. aid while stationed during Feb. to June 1954 at Cat Bi Airfield, Haiphong, while Dien Bien Phu was under siege and briefly later at Tourane.

37. Another factor may well have been the Johnson administration's reluctance to alarm the U.S. public and lose support for the President's domestic program by too visible deployments of forces to Vietnam.

38. Dorland and Nanney, *Dust Off*, pp. 23–25. Futrell, *The Advisory Years*, pp. 85–91, discusses the elements of the initial Kennedy program for increasing support of the South Vietnamese counterinsurgency effort short of U.S. combat units becoming involved.

39. Dorland and Nanney, *Dust Off*, pp. 24–25. Initial attitudes of apparent indifference toward the 57th described later support this conclusion. The VNAF had no dedicated medevac helicopter units and responded to medevac requests depending on aircraft availability, the security of the landing zone, and "the temperament of the VNAF pilots," according to Dorland and Nanney, p. 390.

40. Although MAAG policy restricted medevac to the U.S. advisors, ARVN commanders sometimes refused to cooperate unless their wounded were included. The 57th found it expedient to do so because it was reliant on ARVN communications for medevac requests and also on the ARVN to designate secure landing zones.

41. Dorland and Nanney, *Dust Off*, p. 27. Greenhut, "Aeromedical Evacuation," p. 3.

Who was to control helicopter ambulances was still an open question within the Army leadership in the mid-1950s. In an exchange of correspondence between the Continental Army Command (CONARC) and the Army G–3 (Operations) in 1955 regarding the Surgeon General's comments about apparent Army aeromedical evacuation planning, CONARC took the position that "no army aircraft should be designated specifically as an ambulance." CONARC also argued against the Surgeon General's proposition that forward air evacuation for divisions was best provided by a "minimum" number of dedicated aircraft under medical control rather than the division's organic aircraft. Memo for CG, CONARC, from Maj. Gen. Paul D. Adams, Acting ACOFS, DA, Subj: Medical Air Evacuation, Apr. 27, 1955, covering Disposition Form, Surgeon General for Deputy G–4 (Logistics), Subj: Medical Air Evacuation, Feb. 1, 1955; 1st Ind., CG, CONARC, to Army G–3, May 20, 1955. RG 319, CMH Refiles, "Dust Off," box 1, NARA II.

42. Dorland and Nanney, *Dust Off*, p. 27.

43. *Ibid*.

44. *Ibid*.; Greenhut, "Aeromedical Evacuation," p. 4.

45. Dorland and Nanney, *Dust Off*, p. 28.

46. Bowers, *Tactical Airlift*, p. 85; Futrell, *The Advisory Years*, p. 108.

47. Based on the personal experience of the author who piloted a C–123 based in Danang, RVN, for a year, 1965–66.

48. Bowers, *Tactical Airlift*, p. 108. General Neel, *Vietnam Studies. Medical Support of the U.S. Army in Vietnam 1965–1970* (Washington, D.C.: Department of the Army, 1973), p. 60.

49. LCDR Bobbi Hovis, NC, USN (Ret.), *Station Hospital, Saigon: A Navy Nurse in Vietnam, 1963–1964* (Annapolis, Md.: Naval Institute Press, 1991), pp. 16–17, 108–109, 157. Commander Hovis was dispatched with the initial cadre to convert a naval dispensary into a fully equipped naval station hospital. The hospital staff was also responsible for treating U.S. Embassy staff, members of the Agency for International Development, and allied military personnel and Vietnamese civilians when possible. In Jan. 1966, the daughter of Gen. Hguyen Khanh, briefly prime minister of the RVN, had a large facial hemangioma (a purple birthmark) removed at the hospital. In Mar. 1966, the naval hospital was turned over to the U.S. Army and became the Army 3rd Field Hospital. Conversation with Commander Hovis, July 17, 1997. Interview with Commander Hovis, Dec. 8, 1995.

50. The Allison T–56A engines of the C–130A ran at a constant speed, producing a very deep and constant roaring noise that could damage hearing. At the first TAC base to which the C–130As were delivered, the 463rd Troop Carrier Wing at Ardmore, Okla., the flight surgeons required the use of ear defenders by passengers and ground crews. Personal knowledge of the author who was assigned to the 463d in 1955–1956, and flew on familiarization flights at the Marietta, Ga., Lockheed factory.

51. Commander Hovis was a trained Navy flight nurse and was called upon to accompany a desperately ill Army major to Clark on a C–130 that had been diverted to Saigon from its planned return from Clark AB to Tachikawa. She was joined by an Air Force flight nurse who had fortuitously arrived at Clark from Tachikawa to coordinate the aeromedical evacuation schedule for the southeast Asia system and "deadheaded" (that is, performed no flight duties) on the diverted aircraft to Saigon. Hovis, Station Hospital Saigon, 142–43. Hovis conversation. Apropos the C–130A's noise level previously mentioned, Commander Hovis notes being issued wax earplugs for her return flight to Saigon from Clark on a C–130A. Hovis, *Station Hospital Saigon*, p. 144.

52. Bowers, *Tactical Airlift*, p. 396.

53. Of the 105 officer spaces allocated to MACV at its creation in Mar. 1962, the Air

Force got 22, the Navy and Marines got 29, and the Army got 54; the J–2 (Intelligence) was an Air Force colonel, but the Air Force got none of the key operational positions and only one of the five general officer billets, the J–5 (Plans). He tended to be "out of loop" operationally because, in accordance with Army practice, Gen. Harkins, the first MACV Commander, relied on his J–3 (Operations), an Army officer. As a result, the J–5 was often outside daily MACV activities, a situation that was worsened by the physical separation of his office in a different part of Saigon from the other major MACV staff locations. Futrell, *The Advisory Years*, pp. 97, 102; Bowers, *Tactical Airlift*, pp. 103–4.

54. The Army's bias was evident even to a presumably neutral (Navy) observer like Admiral Felt, the Commander-in-Chief Pacific Command (CINCPAC) who commanded the major unified command in the Pacific. Felt asserted to Secretary of Defense MacNamara and General Taylor that Army advisors deliberately neglected to forward air support requests at times because they wanted to use Army aircraft to further Army doctrinal concepts. MacNamara and Taylor both rejected the criticism. Futrell, *The Advisory Years*, pp. 207–8.

55. Anticipating possible future U.S. combat operations that by law no MAAG could command, PACOM had established an advanced echelon of 13th Air Force in Saigon in Nov. 1961. This ADVON (which became 7th Air Force in Feb. 1966) was designated as the air component of MACV when it was activated in early 1962. However, MACV kept tight control of air operations and consistently resisted the centralization of airlift the Air Force sought. See Futrell, *The Advisory Years*, pp. 111–12, et seq.; also John Schlight, *The United States Air Force in Southeast Asia. The War in South Vietnam: The Years of the Offensive 1965–68* (Washington, D.C.: Office of Air Force History, 1988), Chapter 1s.

56. Bowers, *Tactical Airlift*, pp. 109–110. In Jan. 1963, Admiral Felt, CINCPAC, recommended to the JCS that all Caribous should "be included in the established airlift system," and, two months later, the JCS approved Felt's position. He formally reiterated it in June, but the MACV managed to keep the Caribous' operations conducted almost entirely for corps-level support. Bowers, *Tactical Airlift*, pp. 121–22.

57. Futrell, *The Advisory Years*, p. 207. In fairness, the first MACV Commander-designate, General Paul Harkins, had sought to give the J–3 (Operations) position to an Air Force officer but had been overruled by Secretary of Defense MacNamara who wanted the Army to have the J–3 billet. Futrell, *The Advisory Years*, p. 97.

58. MacNamara seems to have viewed the Army as an innovative force within the U.S. military because of its new airmobile concept, and he obviously was fascinated by the emerging counterinsurgency doctrines as was President Kennedy. Personalities also undoubtedly played a role in MacNamara's perceptions and helped condition his decisions. MacNamara had recommended Harkins to the President to head the new command, and Harkins was a protégé of Gen. Maxwell Taylor, who had been called out of retirement to be President Kennedy's military advisor. Whether he was the source of the recommendation or not, Taylor's strong support can be taken for granted. Taylor had been the most severe uniformed critic of the emphasis that the Eisenhower administration placed on nuclear deterrence at the expense of the Army's capability to fight "limited wars" like the Korean War, and he chaired a Special Working Group on Counter-insurgency that was created by President Kennedy to fuse all governmental efforts to combat the Viet Cong insurgency in South Vietnam. On the other hand, the Air Force Chief of Staff, Gen. Curtis E. LeMay, was the former commanding general of the Strategic Air Command and personified the focus on the previous administration's reliance on the

threat of nuclear war to maintain U.S. security. Futrell, *The Advisory Years*, pp. 97, 104–5.

59. By March 1966, the 315th Troop Carrier Group had gone through two transformations to become the 315th Air Commando Wing.

60. Bowers, *Tactical Airlift*, p. 241–42.

61. Bowers, *Tactical Airlift*, pp. 282–83.

62. The circumstances of this agreement are discussed in Schlight, *The Years of the Offensive*, pp. 122–24.

63. Bowers, *Tactical Airlift*, pp. 186–87.

64. TAC CORONA HARVEST Report on Tactical Airlift in SEA, 1965–68, Vol. IV: Aeromedical Evacuation (File: K417.03-4, Vol. IV. HRA), pp. 35a–35b. Although not "officially" a TAC report, the document was submitted over the signatures of the commander of the USAF Tactical Airlift Center and Gen. Momyer, Commander TAC, to the Corona Harvest project office. Since the document was intended for internal Air Force use only, the authors obviously were more blunt than they might otherwise have been.

65. For example, occasionally, a patient suffering from some mild illness might be evacuated with a group of seriously wounded from ground action. In one case, such an individual was reportedly given a Purple Heart while lying on a stretcher at a CSF in spite of his protests. Interview, Dr. Robert Joy, Professor Emeritus, Medical History, USUHS, July 31, 1997. Carl Von Clausewitz, the Prussian philosopher of war, would undoubtedly have recognized these events as resulting from the "friction" inherent in any conflict, which he had conceptualized in his writings. In spite of the excellent work done by specialists like Peter Paret, Clausewitz requires an investment of time that few non-specialists are usually willing to invest. For a short brilliant summary of his ideas, see Christopher Bassford, *Clausewitz in English: The Reception of Clausewitz in Britain and America, 1815–1945* (New York: Oxford University Press, 1994), Chapter II, "Clausewitz and His Works."

66. Quotation is extracted from the end-of-tour report of the 7th Air Force Surgeon, Col. Stanley Bear, for the period June 1967–May 1968. TAC CORONA HARVEST Report Aeromedical Evacuation, 1965–1968, p. 6.

67. Neel, *Medical Support of the U.S. Army in Vietnam*, pp. 60–62. There were also U.S. Air Force hospitals in Thailand where Air Force fighter-bombers and supporting aircraft were stationed for attacks on North Vietnam during Operation Rolling Thunder. Interview Col. (Ret.) Russell Rayman, USAF MC. Colonel Rayman commanded one of such hospitals at Udorn, Thailand. For a discussion of Rolling Thunder, see Futrell, *The Advisory Years*, p. 22, et passim.

68. Neel, *Medical Support of the U.S. Army in Vietnam*, p. 72.

69. Interview of General Neel, Jr., USA MC (Ret.), U.S. Army Senior Officer Oral History Program, Vol. I, pp. 88–89. Neel says essentially the same thing with more precision in an earlier interview while still on active duty. See Oral History interview conducted by John Bullard at Ft. Sam Houston, Tex., Mar. 3, 1977. (File: K239.0512-966, 77/013/03. HRA.) Gen. Neel was MACV Surgeon twice: July 1965–July 1966 and Aug. 1968–July 1969. During the first half of the latter tour, he was USARV Surgeon and Commander of the 44th Medical Brigade, the central medical organization in South Vietnam.

70. Quoted in TAC CORONA HARVEST Report on Aeromedical Evacuation, 1965–1968, p. 38b.

71. Dorland and Nanney refer to the Dak To episode although in a way that suggests they were unaware that Air Force tactical aeromedical evacuation (AE) doctrine called for mobile CSFs to routinely receive and hold casualties from ground combat for tactical AE, which the Air Force believed was its responsibility. In Vietnam, as discussed later, this responsibility was often assumed by Army medevac helicopters. Dust Off, pp.

59–60. Greenhut discusses the Dak To battle in some detail in his mss. but says nothing about the Air Force roles. "I Have Your Wounded," Chapter IV, pp. 29–32.

72. Neel, *Medical Support of the U.S. Army in Vietnam*, pp. 73–74. Greenhut discusses the origins of the in-country regulating system, in "I Have Your Wounded," Chapter IV, pp. 17–18.

73. Neel, interview Mar. 3, 1977, pp. 19–22

74. Greenhut, "Aeromedical Evacuation," pp. 2–3, 6; Dorland and Nanney, *Dust Off*, pp. 78–79.

75. The extreme case was the 3d Surgical Hospital at Dong Tam in the Delta, which was mortared twice in Nov. 1966 and suffered thirteen separate attacks in 1968 that damaged the hospital area. Neel, *Medical Support of the U.S. Army in Vietnam*, p. 67.

76. Neel, *Medical Support of the U.S. Army in Vietnam*, pp. 76–77.

77. *Ibid*., pp. 70–71.

78. TAC CORONA HARVEST Report on Aeromedical Evacuation, 1965–1968, pp. 4–5.

79. In its after-action evaluation, TAC noted that no 7th Air Force document of the period made any mention of an in-country aeromedevac responsibility. TAC CORONA HARVEST Report on Aeromedical Evacuation, 1965–1968, p. 35.

80. *Ibid*., pp. 35c–35d.

81. *Ibid*., pp. 7, 16.

82. Quote is from TAC CORONA HARVEST Report on Aeromedical Evacuation, 1965–1968, pp. 38c–39. An anonymous but evidently senior official reviewing the TAC report annotated it extensively including an occasional vigorous disagreement written in the margin; for example, apropos the preceding quotation, he twice underlined the word "threat", following it with a double question mark and the comment "a help!" Beside the author's comment that, as the RVN patient load increased the "diversion of more and more C–130 aircraft to scheduled medevac duty became a serious concern," the anonymous reviewer wrote "This is a TAC mission!! Diversion?!" TAC CORONA HARVEST Report on Aeromedical Evacuation, 1965–1968, p. 35f. The author identified other factors that weakened the tactical aeromedical evacuation effort, and these factors originated with the Air Force itself, including eager but inexperienced flight nurses, the lack of sufficient numbers of SSB/HF radios, uncooperative hospital commanders and unnecessary red tape constraining AMES personnel, and corrupt supply practices–a CSF officer on temporary duty at Clark AB reported reading a Clark "Medical Supply Operation Procedure" that directed that serviceable litters be retained locally and unserviceable litters be shipped to Vietnam. TAC CORONA HARVEST Report on Aeromedical Evacuation, 1965–1968, p. 26.

83. TAC CORONA HARVEST Report on Aeromedical Evacuation, 1965–1968, p. 39. For example, Maj. Gen. (Ret.) Benjamin R. Baker, USAF MC, a former Surgeon of the United States Air Force in Europe (USAFE), long after the Vietnam War, argued the case for using aeromedical evacuation to permit reducing the size of forward medical establishments, although he recognized that, if carried to the extreme, this would create substantial training and replacement problems. He attributed the Army's unwillingness to look seriously at the issue in the 1960s due to the conservatism of the Army Surgeon General, Leonard Heaton, and the usual argument that aeromedical evacuation took personnel out of theater and, hence, tended to drain combat strength. Oral History interview by Dr. George M. Watson, Jr., May 9. 16, 1990. (File: K239.0512-2019, HRA.)

84. TAC CORONA HARVEST Report on Aeromedical Evacuation, 1965–1968, p. 39.

85. The 903d AMES treated and moved more than ten thousand patients in the thirty days following its beginning on Jan. 30, not

all of whom, of course, were evacuated out of country. Bowers, *Tactical Airlift*, p. 400.

86. For example, General Baker, the former Air Force Deputy Surgeon General, took this position in discussions with General Heaton, the Army Surgeon General, with regard to how to use aeromedical evacuation to greatest advantage during the Vietnam conflict. According to Baker, Heaton disagreed because of the potential drain on Army manpower in-country, a position that Baker implied was adopted by the Army because of Heaton's "bias," but which was actually a long-standing concern in the Army about "overevacuation." Interview of Maj. Gen. (Ret.) Benjamin R. Baker, USAF MC, May 9, 16, 1990. USUHS Library. It will be remembered that General Tunner, 315th Air Division Commander during the Korean War, had suggested flying casualties directly back to Japan from the combat areas but been turned down by the 8th Army Surgeon.

87. Ltr, Col. Earl W. Brannon, 7th Air Force Surgeon, to MACV (MACMD), Subj: Cessation of Designations of Evacuation of Patients to CONUS, 15 Feb, 1967. (File: 168.7082-135, HRA.)

88. *Ibid*.

89. Ltr, Col. Stanley Bear to Col. John R. Archdeacon, Director, Hospital Services, Clark, Dec. 27, 1967; Ltr Archdeacon to Bear, Jan. 15, 1968. (File: 168.7082, M.S. White Collection, HRA.) In his letter, Bear recalls for Archdeacon a conversation they had, presumably by telephone, on the 20th in which Bear told the latter that medical personnel of Navy, Marines, and Army were "upset about the number of their patients that are being removed from air-evacuation aircraft at Clark ... and retained for further stabilization." Bear provided a list of twenty such patients asking Archdeacon to "check on" them because "our credibility is being questioned," and he was concerned that "the good relations which had been built up with the Army and Navy could be jeopardized."

90. An analysis was conducted recently of the data provided in the Archdeacon letter by an experience Army doctor who had served in Vietnam. His conclusions support a lay reading of Archdeacon's stated reasons that appear persuasive. Ltr, Dr. Robert T. Joy, MD, Professor Emeritus, Medical History, USUHS, to the author, Aug. 5, 1997.

91. For example, Ltr, Major Irwin A. Silberman, USAF MC, Chief of Aeromedical Services, 347 USAF Dispensary, Yokota Air Base, Japan, to Surgeons, 5th Air Force, PACAF, and MAC, Jan. 30, 1968; Ltr with attached study, Col. Donald N. Vivian, USAF MC, Commander, Tachikawa Hospital, July 15, 1968; Ltr, Brig. Gen. A.A. Hoffman, Commander, Malcolm Grow Hospital, Andrews AFB, Maryland, to Maj. Gen. M.S. White, PACAF Surgeon, Jan. 8, 1968. The School of Aviation Medicine also conducted a study of selected aspects of aeromedical evacuation in PACOM including a discussion of patient "stabilization" (quotes in the original index.) Capt. John E. Murphy, USAF MSC, An Exploratory Study of Selected Medical Aspects of the Aeromedical Evacuation System in the Pacific Area (Headquarters Aerospace Medical Division, Mar. 1968), in HRA.

92. Extension of the roughly 5,000 ft. runways at Tachikawa had been blocked for a decade by local farmers. Personal knowledge of the author. MAC CORONA HARVEST Report, Aeromedical Evacuation, 1968–1969. (File: K300.04-27, 1 Apr. 1968–31 Dec. 1969, HRA), pp. I-4-6. (The sections of the report are paginated separately.)

93. MAC CORONA HARVEST Report, Aeromedical Evacuation, 1968–1969. Ibid, p. I-7.

94. HQS, MATS, Modernization of the Domestic Aeromedical Evacuation System, Apr. 15, 1965, Amended HQ, USAF (June 15, 1965), pp. 1–6, et passim.

95. Aeronautical Evacuation Division, Office of the Command Surgeon, MAC CORONA HARVEST Report on Aeromedical Evacuation in SEA, 1 January

1965–31 March 1968 (Dec. 31, 1969), p. II-10. This report also has separately paginated chapters. It was approved by Brig. Gen. Harold Funsch and the MAC commander, Gen. Jack Catton.

96. Disposition Form, Subj: Aeromedical Training for ANC Officers on Active Duty, from Colonel Mildred I Clark, to the Director of Professional Services, Mar. 3, 1964. I am indebted to Maj. C. J. Moore, USA, ANC, the ANC historian at the Center of Military History for a copy of this letter.

97. Quote from John P. McGann, M.D., et al., Medical Systems Analysis, Aeronautical Evacuation System, Dec., 1968, in MAC CORONA HARVEST Report, Aeromedical Evacuation, 1968–1968 (July 16, 1970), p. I-10. The chapters are paginated separately, and this report was approved by the same command-level personnel as the preceding MAC report on the subject.

98. MAC CORONA HARVEST Report, Aeromedical Evacuation, 1968–1968, p. IV-30.

Chapter Seven

1. The Corona Harvest format included a discussion of personnel issues, and both the MAC and TAC reports on aeromedical evacuation indicate some problems arose in the training and manning areas. Shortages of personnel as the aeromedical evacuation system expanded caused MAC to generate two programs for augumenting the Pacific division, Cold Dove, which drew upon AE personnel in other MAC organizations, and Patch Up, which drew AE personnel from other Air Force commands. MAC CORONA HARVEST Report, Aeromedical Evacuation, 1968–1969, p. IV–V-1.

2. Cecil L. Reynolds, *MAC Aeromedical Airlift Support of Southeast Asia Operations (1964–1971)* (Scott AFB, IL: Office of Military Command History, Nov. 1, 1972), Appendix II, Section V, p, 124.

3. MAC Aeromedical Airlift Support, p. 117. The PACAF surgeon noted long after the event that he had "trouble" with the Army because it was designating nondetoxified drug abusers for aeromedical evacuation, which was contrary to Air Force policy. Telephone conversation with Maj. Gen. (Ret.) Larry Smith, USAF MC, Aug. 13, 1997.

4. Coy F. Cross, II, *MAC and Operation BABYLIFT: Air Transport in Support of Noncombatant Evacuation Operations* (Scott AFB, Ill., Headquarters Military Airlift Command, 1989), p. 10.

5. *MAC and Operation BABYLIFT*, p. 12.

6. Lt. Col. Gerald W. Noga, commander, 9th AEG, after-action reports: Operations Babylift, Frequent Wind, New Life, Eagle Pull, the Mayaguez affair (Clark Air Base, Philippines: 9th AEG, June 1975), p. 2. File: Aeromedical Evacuation, Historical Office, Office of the Surgeon General.

7. Daly made an unsanctioned flight to Danang in late March, taking off from Tan Son Nhut without clearance and returning with 268 people –but only two women and one baby-jammed into the airplane and wheel wells. When Operation Babylift was announced, Daly unilaterally announced that a World Airways 747 would carry 458 orphans out of Saigon, but was thwarted by the U.S. ambassador. However, he did carry the first load of 54 orphans, together with 27 adult escorts, from Saigon on Apr. 2, characteristically ignoring the Tan Son Nhut control tower's advisory that the runway was closed. Six of the adult escorts had neither passport nor exit visa. Daly's general attitude seems to be captured by his comment to reporters concerning the Danang flight: "People who should have been doing something about it sat on their asses and refused to move." Coy, MAC and Operation BABYLIFT, p. 46.

8. David Butler, *The Fall of Saigon: Scenes from the Sudden End of a Long War* (New York: Simon & Schuster, 1985), p. 155. Butler chronicles Daly's activities vividly on pp. 155, 162–70, and 221–22.

9. Butler, *The Fall of Saigon*, p. 33.

10. Lt. Col. Regina C. Aune, USAF NC, "Reflections on a Humanitarian Mission 20 Years Later: Operation BABYLIFT," Military Medicine 160 (Nov. 1995): 585. Aune was assigned to the 10th AES based at Travis, which was in the process of merging with the 9th AES pursuant to the centralization of worldwide AE under MAC.

11. Cross, *MAC and Operation BABYLIFT*, p. 39.

12. Cross, *Ibid*., pp. 36–38.

13. Cross, *Ibid.*, p. 45.

14. Cross, *Ibid.*, p. 15. The documentation for this is a transcript of a telephone conversation between MAC DCS/Operations and the commander of the Pacific Exchange System in which the PES commander related his conversation with a State Department official.

15. Noga, after action reports: Operation BABYLIFT, p. 2.

16. Cross, *MAC and Operation BABYLIFT*, pp. 49–50. For example, a World Airways 747 landed in Los Angeles on Apr. 12 with 330 orphans, several of whom were seriously ill and another 20 severely dehydrated. One three-month-old child had died enroute from Clark to Los Angeles. Twenty-two children were scheduled to continue on a Scandinavian Air Service (SAS) to Norway for adoption by Norwegian families if their health permitted. Another 220 children were enroute to Fort Benning, Ga., for adoption by U.S. families. Pacific Stars and Stripes (Apr. 14, 1975): 1.

17. Robert D. Schulzinger, *A Time for War: The United States and Vietnam, 1941–1975* (New York: Oxford University Press, 1997), p. 307.

18. 9th AEG OPLAN 1-72, 9th AEG OPLAN FOR THE REPATRIATION AND RETURN OF PRISONERS OF WAR (EGRESS RECAP), Sept. 1, 1972, printed in Narrative Reports of "Operation Homecoming" (Clark Air Base: 9th Aeromedical Evacuation Group (PACAF), 1973), AMC History Office, Scott AFB, Ill. (cited hereafter as Operation Homecoming Reports).

19. Col. Leonard W. Johnson, after-action report of the overall aeromedical evacuation coordinator, Apr. 1973, in Operation HOMECOMING Reports, p. 21.

20. By 1973, the treatment of U.S. POWs was well known from a variety of sources including foreign and U.S. visitors to Hanoi, some of whom opposed the war but were concerned about the plight of the POWs, and several U.S. military men who were released as a gesture in 1969, one of whom was in the author's National War College Class in 1970–71.

21. CORONA HARVEST Report, Aeromedical Evacuation, 1968–1969, p. IV–I-25.

22. Aeromedical Support of Project Homecoming, p. 1. Interview with Col. (Ret.) Russell Rayman, USAF MC, July 11, 1997. Colonel Rayman was assigned to the USAF hospital at Clark AB, participated in the final C–141 pickup of released POWs at Gia Lam on March 27, 1975, and briefly commanded the 9th AEG following Colonel Johnson's reassignment. Coordination was not accomplished without significant senior involvement. In a demonstration of the efficacy of the MAC worldwide command and control system-and symbolic of the establishment of the MAC-directed worldwide aeromedical evacuation system-the commander of 22d Air Force was in direct contact by radio with C–141s orbiting near Hanoi before they were cleared to land for POW pickup. Telephone conversation with Col. (Ret.) John Doglione, USAF, Sept. 22, 1997. Colonel Doglione later commanded the parent C–9 unit, the 375th Aeromedical Airlift Wing at Scott AFB. However, on Feb. 12, 1973, he was a C–141A squadron commander from Travis AFB flying the first C–141A scheduled to land at Gia Lam Airport, and he was receiving instructions personally radioed from the 22d Air Force commander, Maj. Gen. John Gonge. The author was Deputy Commander

for Operations of the 60th Military Airlift Wing at Travis AFB, the headquarters of 22d Air Force, and was told of this by the operations staff.

23. Aeromedical Evacuation Missions, Operation Homecoming (formerly Egress Recap), pp. 25–26. Seven of those freed by the North Vietnamese and Viet Cong were allied military and civilians. Two were Thai military, two were Philippine civilians, two (one of them a woman) were German civilians, two were Filipino civilians and one was a Canadian civilian. The last was the only allied person to be evacuated to the U.S. during Phase II of the operation.

24. Aeromedical Evacuation Missions, p. 25; Lt. Col. William Runkle, USAF, MC, Report on Phase I Homecoming Mission #2311, Apr. 1, 1973, Operation HOMECOMING Reports, pp. 135–39. Runkle was one of the flight surgeons detailed to provide medical escort on the C–9s moving ex-POWs from Tan Son Nhut to Clark AB. He flew on one of two Hueys to Xom Tieu in the Delta area of South Vietnam to pick up a U.S. Army captain who had been a helicopter pilot prior to his capture. Runkle's normal assignment was as hospital commander at Ubon Royal Thai Air Force Base, and his was the last scheduled POW pickup. After-action report of the overall aeromedical evacuation coordinator, pp. 21, 152. Major Richard E. Gordon, "MAC Aeromedical Support of Southeast Asia," p. 72. (File: M-U 43122 G664m, Air University Library (AUL), Maxwell AFB, Ala.)

25. Aeromedical Support of Project Homecoming; Report of Hanoi Special Mission, Cardiac Requirement, pp. 17–18, 73–75.

26. Lt. Col. Robert C. Hauver, USAF MC, Report of Phase I Homecoming Mission from Hanoi, Feb. 12, 1973, p. 46. Gordon, "MAC Aeromedical Support of Southeast Asia," p. 21.

27. LCDR Michael Stenberg, USN, MC, and Cdr. R. Paul Caudill, Jr., Report on South Pickup (Gia Lam) Phase I, Mar. 9, 1973,; Lt. Col. Frank S. Pettyjohn, USA, MC, Memo, to U.S. Army Aeromedical Research Laboratory, Subj: Delayed Homecoming Mission Report (Initial Report Lost), Oct. 29, 1973 (mission was flown Mar. 7, 1973; Pettyjohn was an Army cardiologist who was chief of cardiovascular medicine at the laboratory in Oct. 1973); Major Jose Trabal, USAF MC, Phase I Homecoming Mission, Feb. 12, 1973; Aeromedical Support of Operation Homecoming; Operation HOMECOMING Reports, pp. 77–78, 80–823, 42–43, 15–18.

28. Quotations from Caudill and Stenberg, Report on South Pickup (Gia Lam) Phase I, p. 79. One of the pilots who flew a Phase II mission to CONUS recorded marveling at the POWs' collective spirit and evident pride in the United States and what it stood for which compelled him to take a "long look" at himself and conduct "some deep soul-searching." Captain Paul Cronin, quoted in Anything, Anywhere, Anytime, p. 149.

29. Aeromedical Support of Operation Homecoming, p. 23.

30. Interview with Lt. Col. (Ret.) Olivia Theriot, USAF NC, Aug. 12, 1997. Col. Theriot was stationed at Clark as a member of the 902d AES. References to the duration of the fighting in Saigon and the strength of the VC attack on Tan Son Nhut are from General Westmoreland's memoirs. William C. Westmoreland, A Soldier Reports (Garden City, NY: Doubleday & Company, 1976), pp. 323–28.

31. Interview with Lt. Gen. (Ret.) Kenneth E. Pletcher, USAF MC, Aug. 2, 1997. Whatever the factors in AF headquarters' thinking that militated against the C–9A procurement mentioned in the last chapter, the decisive factor in overcoming the Air Force reluctance was almost certainly President Johnson's praise for the aeromedically configured aircraft that he toured at Cam Ranh Bay in Vietnam in Oct. 1966.

Gen. Westmoreland had set up a visit to the AF hospital there and directed his chief of staff to transfer some Army patients from the Army 3d Field Hospital at Nha Trang to the AF hospital so that the president could see a "representative group of hospital patients." Westmoreland, A Soldier Reports, p. 191.

32. The "continuum" comment is from MAC CORONA HARVEST Report, "Strategic Airlift in SEA, 1 January 1965–31 March 1968," Dec. 31, 1969, p. V-25 (File: K300.04-27, Jan. 1965–Mar. 1968, vol. I, HRA.) Other quotations are from Anything, Anywhere, Anytime, p. 164.

33. *Anything, Anywhere, Anytime*, pp. 154–7, 164–5.

34. *Anything, Anywhere, Anytime*, p. 164. Betty R. Kennedy, Hq, AMC/Historical Office (HO) Point Paper, Subj: Aeromedical Evacuation Historical Precedents, Sept. 23, 1994; and Betty R. Kennedy, *An Illustrated History of Scott AFB, 1917–1987* (Scott AFB, IL: MAC HO, Sept. 1987), p. 122.

35. Colonel Aune, another nurse, and a medical technician, all from the 10th, were temporarily assigned to Clark to provide help during the transition of the 9th AEG from PACAF to MAC control as MAC assumed worldwide responsibility for aeromedical evacuation. Telephone conversation with Colonel Regina Aune, Sept. 22, 1997.

36. In an interview long after the events, Brig. Gen. (Ret.) Claire Gorrecht, USAF NC, who was Chief Nurse of the 10th AEG the parent organization of the MAC AEGs at Clark and Yokota in the late 1960s, commented that her nurses never got adequate crew rest. Interview, August 13, 1997. General Gorrecht later became Chief Nurse of the Air Force. At that, MAC may have been better than theater organizations. In an undoubtedly hyperbolic remark, Col. Theriot remarked that she had not known what crew rest was until she got into MAC after first serving in the PACAF 902 AES. Theriot Interview.

37. Interview with Dr. Russell Rayman, July 11, 1997. In Oct. 1946, there were 24 hospitals in the U.S. zone of Germany and four hospitals still in Belgium and France supporting three hundred thousand troops in Europe. A reduction in U.S. forces programmed to be accomplished by Feb. 1, 1947, was to be paralleled by a reduction to seventeen hospitals in the U.S. zone. Minutes of the Command Surgeon's Conference, Headquarters United States Air Forces in Europe, Oct. 18, 1946, p. 33. RG 341, Entry 44, box 314, NARA II.

38. For example, in May and June, 1953, the 1st Aeromedical Evacuation Flight operating as part of 12th Air Force flew 43 scheduled missions and 44 special or emergency missions, which transported 465 patients to hospitals in Germany and returned 63 recovered patients to their home stations. Patients were embarked at points in France including Bordeaux, La Rochelle, and Paris, Brussels, Pisa, Ankara, Rome, Algiers, Madrid, and Trieste among others. Maj. Stanley B. Westort, USAF MSC, "History of 1st Aeromedical Evacuation Flight from 1 May 1953 to 30 June 1953," pp. 4, Appendices 1 and 2. (File: K-MED-1-HI, May–June 53, box 40, HRA.) The appendices summarize air evacuation completed and show point of embarkation and point of debarkation for each patient. The three debarkation points were essentially Wiesbaden, Frankfort, and Landstuhl with the first two receiving the vast bulk of patients. One patient went to Stuttgart and another to Bitburg.

39. Memo, Col. M. S. White, MC, ATC surgeon, for the ATC chief of staff, Subj: Overseas Medical Air Evacuation, January 8, 1947. AMC HO. During 1965, before the massive U.S. buildup in southeast Asia (SEA) had gotten fully underway, aeromedical evacuees from the Pacific totaled 8,072, and 3,758 from Europe. For the next five years, the average number of evacuees from Europe per year averaged just under 3,000, an average decrease of 800, whereas aeromedical evacuees from SEA for the next five years averaged just under 34,000 per year. Reynolds,

MAC Aeromedical Support of SEA Operations, p. 122. MAC CORONA HARVEST Report Aeromedical Evacuation in SEA, 1965–1968, p. D-2. USAFE Command Surgeon's Conference, p. 23. The European theater in 1946 did not encompass the geographic area for which the U.S. European command was later to be responsible because a Mediterranean command that included Italy and other littoral states still existed.

40. Annual Report of the Assistant to the Secretary of Defense (Health and Medical) to the Secretary of Defense, June 30, 1952, pp. 50–52. RG 264, Entry 36, box 12, NARA II.

41. For example, the U.S. mission to NATO developed a chart in the early 1980s that showed there were more than 100 NATO committees, subcommittees and working groups considering various aspects of NATO military communications. Copy in possession of the author.

42. Telephone conversation with Maj. Gen. (Ret.) William Greendyke, USAF MC. General Greendyke was assigned to Europe initially to be the USAFE surgeon but in late 1984 was designated the first full-time USEUCOM surgeon. Previous to that time, the senior surgeon of the three service components of the European command held the post as an additional duty.

43. Interview with Lt. Gen. Kenneth E. Pletcher,USAF MC, Aug. 2, 1997. Pletcher had previously served as an attaché in the United Kingdom and was sent back there specifically to identify sites for hospitals to support SAC bomb wings.

44. Interview with Lt. Gen. (Ret.) Paul W. Myers, USAF MC, Aug. 11, 1997; Myers was Air Force surgeon general at the time. Interview with the Honorable Ron Richards, Principal Director, Health Services, Operations, and Readiness, OASD, Health Affairs, Oct. 2, 1997. Richards remembered Beary's testimony as that there were beds sufficient to treat only one in five casualties.

45. Richards interview. Richards recalled the Navy as balking at procuring hospital ships and noted that HA had to use the Defense Resources Board (DRB), an OSD body that reviewed service budgets and made final budget decisions, as a way of putting pressure on the services to change their budget priorities. For example, in 1985, the DRB issued a program decision memo that reestablished military readiness spending that the services had either cut or postponed. Lt. Col. John R. Beaty, USAF, et al., "Planning for the Mobilization of the Nation's Medical Resources," p. IV-7. NDU, 1985, USUHS Library.

46. Richards interview. Richards indicated that Mayer focused almost exclusively on medical readiness and noted that Mayer was not interested in issues like managed care or other ways of controlling the costs of providing health care to the active and retired force and their dependents. However, Secretary Weinberger was concerned about such costs, and, whatever his priorities, Mayer was involved in changes to the ways in which medical care was provided to dependent civilians. Mayer's apparent solution was to contract out dependent medical care. "DoD Medical Plan to Send More Kin Off Base for Care," *Air Force Times* (Sept. 30, 1985): 1, 18. Interview with Brig. Gen. (Ret.) John Johns, Oct. 7, 1997. Resource allocation over hospital construction was also centralized in OASD/HA during Mayer's' tenure, a move growing out of a recommendation from a blue ribbon panel on hospital sizing that stirred controversy in the services' medical departments. Maj. Chester H. Morgan, Congressional Hearing Resume, Wartime Medical Readiness and Planning, Sept. 19, 1985. Copies in the possession of General William H. Greendyke, USAF MC. I am indebted to General Greendyke for access to his papers. Greendyke interview.

47. Greendyke interview. The USEUCOM staff dissected Mayer's testimony on military medical readiness before a subcommittee of the House Armed Services Committee on Sept. 18–19, 1985, for the

command surgeon. It compared Mayer's statements with the facts known in the theater. Even allowing for a staff member's "best case" analysis–that is, one most favorable to USEUCOM–this staff product does support the critics' allegations when it is compared with summaries of Mayer's testimony. Analysis of Testimony of Dr. Mayer before the United States Congress on 18 and 19 September 1985, n.d.; Colonel Frank J. McKeown, Congressional Hearing Resume, September 18, 1985; Morgan, Congressional Hearing Resume, September 19, 1985; Greendyke papers.

48. Interview with Maj. Gen. (Ret.) William H. Greendyke, MC, USAF, Aug. 24, 1997. According to General Greendyke, Colin Powell, then assistant to the chairman of the JCS, told him that Mayer was exaggerating the deficiencies in European medical support in order to win Congress's support for increased funding that could be allocated to medical readiness in the Pacific. On the other hand, Gen. Richard Lawson, USAF, the former deputy commander of the U.S. European command (DCINCEUR) in an interview long after the events in question indicated that he had not felt when he became DCINC in 1984 that the command's medical readiness was sufficient to support actual conflict and thereby demonstrate to Soviet planners that NATO forces were capable and intent on resisting a Warsaw Pact attack. Drawing on his SAC background, General Lawson commented that General LeMay had taught him that you deterred someone only if you could demonstrate to them that you were capable of doing what you said. Interview with General Richard Lawson, USAF, July 29, 1997.

49. Mayer had administered the California Department of Health for then governor Ronald Reagan. Richards interview. Consequently, Mayer probably had more internal "clout" with senior figures in the administration than did his predecessors because of Richard Meiling's warm relationship with Secretary of Defense George C. Marshall. I am indebted to Dr. Dale Smith, Director of Medical History at USUHS, for first bringing Mayer's' close personal relationship with President Reagan to my attention. Mayer became ASD/HA in Dec. 1983, two months after the Beirut bombing. Interview with Dr. John Mazzuchi, DASD/HA for clinical services, Oct. 2, 1997. For more detailed information on Mayer's background, see Tom Philpott, "DoD Health Chief Still Makes Waves As He Did 1950," *Air Force Times* (Nov. 5, 1984).

50. Quotes are from Memo for Secretaries of the Military Departments, Chairman JCS, ASD/HA, IG, Director, Washington Headquarters Services from Secretary of Defense Casper Weinberger, January 20, 1984, subj: Review of U.S. European Command Medical Readiness Planning, Appendix A: Secretary of Defense Tasking, to RADM James A. Zimble, MC USN, Medical Readiness Planning in the U.S. European Command (Department of Defense: Medical Readiness Review Group, Apr. 18, 1984), USUHS library. A note on the cover of the document personally inscribed by the author describes it as a "pre classified version." Admiral Zimble appears to have sent it to Admiral Long. An Army doctor had accused the Deputy USEUCOM surgeon, an Air Force brigadier general, of directing the aircraft commander of the aeromedical evacuation aircraft to land casualties from Lebanon at a base where they could be admitted to an Air Force medical facility. "Medical Readiness for War Stalled , Mayer Says," Army Times (Sept. 30, 1985): 1. Greendyke papers.

51. Weinberger Memo.

52. William "Bud" Mayer, Charge to the Review Group, Feb. 6, 1984, Appendix B, Zimble Report.

53. Interview with Maj. Gen. (Ret.) Davis C. Rohr, USAF, Sept. 30, 1997. Rohr was the USEUCOM Director of Plans (J–5) at the time. He referred to it long after the event as "that terrible report" and indicated that the

USEUCOM staff directors felt that its conclusions had been determined in advance.

54. Ron Richards made the same point about the methodology of the review group in his recent interview. The report notes that what it termed "critical shortages" in deployable medical systems were identified first in 1976–1978 by a JCS-sponsored study of the medical capabilities required to support a conventional conflict between NATO and the Warsaw Pact. Zimble Report, p. v.

55. Zimble Report, pp. 6, 8–9. The report noted that JCS publications on the subject of the USEUCOM surgeon's authority, missions, and functions are ambiguous on the first point and insufficiently delineated on the second and third. Zimble Report, p. 18.

56. Zimble Report, p. 2.

57. Richards interview.

58. Zimble Report, p. vi. OASD/HA did not see aeromedical evacuation capabilities as a major problem because evacuating casualties by air was no good unless there were medical facilities to which they could be taken for treatment. Richards interview.

59. Zimble Report, pp. 25–26. MAC was responsible for both strategic aeromedical evacuation and the worldwide evacuation system utilizing C–9s domestically and in the theaters. One telling criticism of USEUCOM priorities was implied in the review group's report that, of six available C–9As in the theater, three had been configured for administrative missions, and there were no evident plans for rapidly reconfiguring these aircraft for aeromedical evacuation in contingencies.

60. Zimble Report, p. 26.

61. Zimble Report, pp. 27–28.

62. When interviewed long after the events in question, Lawson spoke critically about the lack of medical readiness he found in the command when he became Deputy Commander-in-Chief, Europe (DCINCEUR). Immediately preceding this assignment, Lawson had spent three years in senior NATO positions, first as U.S. representative to the NATO Military Committee, which provided military advice to the North Atlantic Council, NATO's governing political body, and then, as chief of staff to the Supreme Allied Commander, Europe (SACEUR). Medical questions had begun to be a subject for consideration by SACEUR headquarters around 1980 when new positions were created on the Supreme headquarters' logistic staff, but, because aeromedical evacuation and medical support of the national forces committed to NATO were as a matter of alliance policy each nation's responsibility, Lawson had no reason to be knowledgeable except in the most general way prior to his assignment as DCINC in Aug. 1983, several months before the Lebanon bombing. Referring to his SAC experience with General Curtis LeMay, Lawson expressed his belief that no prospective enemy would be deterred unless you had a completely credible defense posture including provisions to support your troops medically. Interview with General Richard Lawson, July 29, 1997. General John Chain, USAF, Lawson's successor as SACEUR chief of staff wrote long after his service that he had never dealt with any issue pertaining to aeromedical evacuation during his tenure. Ltr to the author, June 17, 1997.

63. Interview with Col. (Ret.) Carroll Bloomquist, MSC, SAF, Aug. 15, 1997. Colonel Bloomquist served on the USEUCOM surgeon's staff, 1981–1984, and later at SHAPE for three years as the second medical logistics staff officer.

64. Long after the events in question, General Myers said that the impetus for his initiative was the result of Dr. Beary's testimony before Congress. According to Myers, discussions were even held with the Egyptians although it is not clear whether actual contingency hospitals were established there. Given Egypt's later cooperation with the U.S. Central Command, it seems probable. Myers interview.

65. Myers Interview. Nocton Hall was a former RAF hospital that was accepted by

the USAF in 1983 for the contingency hospital program. When activated, Nocton Hall was staffed by medical personnel drawn from the David Grant Medical Center at Travis AFB. Operation Desert Storm After Action Report, 310th USAF Contingency Hospital, RAF Nocton Hall, United Kingdom, Mar. 15, 1991, p. 1. HQ USAFE/SGR, Target USAFE Contingency Hospital Bed Availability by CY, Dec. 17, 1985. Greendyke papers.

66. The Air Force chief of staff from 1974 to 1978 was General David Jones who as USAFE commander immediately prior to his selection had sought to put his command and NATO air forces on a more positive war footing. One of his initiatives was the move of USAFE headquarters from Wiesbaden on the east bank of the Rhine River near Frankfort to Ramstein, some sixty miles to the southwest and perhaps more importantly, some fifty miles west of the Rhine River, the only really formidable barrier to a Warsaw Pact invasion in central Germany. In 1978, Jones became chairman of the JCS where he continued to push for NATO readiness, a subject of such importance to the Carter administration that it created the post of an undersecretary of defense to deal specifically with NATO. Myers' tenure as AF SG was from 1978 to 1982.

67. Morgan, Congressional Hearing Resume, p. 2. The actual estimates were classified, but some sense of what might have been expected can be extrapolated from General Rogers' quarterly update of Sept. 1985 for the Secretary of Defense that "we can very rapidly count on 65,000 beds in support of U.S. casualties...this will meet our requirement for the first 30 days." Resume and statement copy in Greendyke papers.

68. Bloomquist interview. Interestingly, whereas Dr. Mayer had testified about efforts to speed the conclusion of more such agreements, he reportedly expressed great skepticism in private to CINCEUR and his staff that the nations concerned would honor them in actual crisis. USEUCOM Analysis of Testimony of Dr. Mayer. Greendyke interview.

69. U.S. troops and airmen were in place or scheduled to reinforce every continental part of Allied Command, Europe, with the U.S. Marines planning to enter Norway in support of Norwegian forces. Personal knowledge of the author.

70. Col. Craig Llewellyn, MC USA; Captain John A. Hansen, MC USN; Col. James G. Vermillion, MSC USA; Lt. Col. Ronald A. Kerchner, USAF; Lt. Col. Nicholas R. Hurst, USA; and Lt. Col. Herbert M. Hamako, USAF MSC, "Wartime Strategic/Domestic Aeromedical Evacuation and Distribution of Patients," Research Report, ICAF, Apr. 1982, USUHS library.

71. "Wartime Strategic/Domestic Aeromedical Evacuation and Distribution of Patients," pp. 22–23.

72. The Secretary of Defense had directed establishment of the CMCHS in 1980. "Wartime Strategic/Domestic Aeromedical Evacuation and Distribution of Patients," p. 6 (footnote).

73. Interview with Dr. Craig Llewellyn, July 31, 1997. Dr. Llewellyn was one of the principal authors of the study. The president of NDU at the time was Lt. Gen. John Pustay. In a telephone call long after the event, he recalled going to HA to successfully plead the ICAF students' case, but he could not recollect with whom he spoke. Interview with Lt. Gen. (Ret.) Pustay, Aug. 3, 1997. According to Dr. Llewellyn, the study was briefed in Europe to various officials including the USAF Surgeon.

74. Lawson interview. Interview with Col. (Ret.) John C. Patchin USAF MSC, October 8, 1997.

75. "Talking Paper [TP] on The Air Evacuation System–Will it Work?" USEUCOM SG's office, n.d. Greendyke papers. The paper's answer was "yes," and it affirmed alliance policy that each nation should provide its own airlift support while showing procedures that would permit tap-

ping into all the various sources of airlift support throughout Europe. The AF expected to incur its highest level of casualties during the first five days of an attack when the Soviet air offensive would strike USAFE main operating bases in an attempt to secure air superiority. Thereafter, USAF casualties were expected to decline while U.S. Army casualties rapidly increased. The use of the AF contingency hospitals would then shift to receiving Army casualties.

76. Colonel Patchin recalls that, when projected evacuation requirements were presented to MAC representatives in the theater, they indicated that there was no way they could be met given operational airlift requirements. "Talking Paper [TP] on The Air Evacuation System."

77. Patchin interview.

78. The principal briefer recalled long after the event that Admiral Smalls, CINCUSNAVEUR, began the briefing session by telling the briefer to go ahead, but that he would not believe anything that the briefer said. Patchin interview.

79. Greendyke interview. Col. Borngasser, HQ USAFE/SGAX, "Update Talking Paper on Dedicated In-Theater Aeromedical Evacuation," Sept. 24, 1985. Borngasser identifies Chong, the senior MAC staff member, having "reluctance" to support USEUCOM's proposal. Greendyke papers.

80. Quote from Ltr, Lawson to Ryan, May 8, 1985. Copy in the Greendyke papers. Greendyke interview.

81. *Ibid.*

82. Ltr Ryan to Lawson, June 4, 1985. Greendyke papers. Herman Jones and Patricia Warner, "History of the 375 Aeromedical Airlift Wing (MAC), Scott AFB, Illinois, 1 January–31 December 1985, Vol. I: Narrative," p. 29, n.d. 375 AAW/HO, Scott AFB.

83. 375 AAW 1985 History, pp. 47–48.

84. This was Maj. Gen. William H. Greendyke, who had previously served as both USAFE and USEUCOM command surgeon. Patchin interview. Telephone conversation with Gen. Greendyke Oct. 8, 1997. Before he could move from Ramstein to Patch Barracks, Vaihingen, Germany, where USEUCOM headquarters was located, he was relieved by Secretary of Defense Weinberger. It was widely believed that this was done at the behest of the ASD/HA. Patchin, Johns, Lawson, and Mazzuchi interviews. Ron Richards indicated that this appearance was deceptive and that the initiative had come from Weinberger, who had become angry at what he perceived were comments by Gen. Greendyke intended to stimulate protests to Congress over new programs for military dependents' care being proposed by the OASD. Richards interview.

85. Col. Thomas J. Hughes, Chief, Professional Services, Officer of the Surgeon, MAC, Staff Summary Sheet, subj: Wartime Aeromed Capability & Aeromedical Evacuation-Europe," Sept. 9, 1985. Air Mobility Command History Office.

86. Army medevac helicopters had reportedly sought to land casualties from fighting on Grenada on-board a Navy hospital ship and had been refused because the crews had not been certified for such an operation. McKeown, Congressional Hearing Resume. Medical planning for Urgent Fury also appeared to be inadequate, and, according to the flight surgeon who accompanied the first load of casualties moved to Barbados by a C–130, they were in poor condition: wounds wrapped in whatever was at hand (including dirty clothing) and some individuals in need of expert medical care. *URGENT FURY: The United States Air Force and the Grenada Operation* (Scott AFB, IL: MAC Office of History, n.d.), pp. 86–87.

87. These figures represented increases from 14,739 patients and attendants and 796 missions. Ssgt Mary D. Hebert and Patricia K. Warner, "History of the 375th Aeromedical Airlift Wing (MAC), Scott AFB, Illinois, 1 July–31 December 1989.

Vol. I: Narrative," p. 8. AMC HO, Scott AFB, n.d.

88. Patchin interview.

Chapter Eight

1. Ten–year evaluations of how effective the Goldwater–Nichols legislation was in fostering true "jointness" tend to be very positive, for example, William Bresson, draft study, "Goldwater–Nichols: A Ten Year Assessment," (Cambridge, MA: Harvard University Program on Information Resources Policy, 1997). The results of the Gulf War and various nonanalytic published sources such as Colin Powell's memoirs seem to support this view. The author can offer an anecdote from his own experience that illustrates the Joint Staff's apparent sense of its position vis-à-vis the service staffs in the early 1980s. A member of the Joint Staff defended his joint staff agency to an audience composed predominantly of representatives from the unified overseas commands at the Armed Forces Staff College in 1983 with a revealing statement. The occasion was a conference to consider improvements in the Joint Operation Planning System (JOPS, now JOPES, "execution" having now been added to its function). Pressed by many attendees to include a particular improvement in the next version of JOPS, the Joint Staff briefer demurred, saying "You have to remember, we're only one of four," indicating they could not direct but only seek a consensus for such a change. The author attended as a consultant conducting a study of JCS Exercise Nifty Nugget.

2. Interview with Admiral Long, Oct. 27, 1997. In fairness, the lack of communication seems to have existed in both directions. One USEUCOM staff officer recalls hearing an obviously frustrated CINC prior to the terrorist attack tell the Deputy J3, a U.S. marine brigadier general, in no uncertain terms to find out what was going on in Beirut. In fact, a USEUCOM liaison team was visiting Beirut and was billeted quite near the Marine barracks when the explosion occurred. Telephone interview with Capt. (Ret.) William Dial, USN MSC, January 13, 1998. The personality of the individual CINCs obviously played a role in their relations with their formally subordinate but equal in four star rank Service component commanders whose materiel support came from their parent services. Following the disastrous terrorist attack, Gen. Rogers and his staff insisted in changes in the physical protection of the remaining marine force, according to Dial. Long had himself been commander of a unified command, the Pacific Command, prior to his retirement.

3. Colin Powell discusses the changes in his memoirs: Colin Powell with Joseph E. Persico, *My American Journey* (New York: Random House, 1995), pp. 409–11. A particularly useful mechanism for enhancing the CINCs' authority was the greater control of the budgets of their service components' that the CINCs were given by GNA. Interestingly, the position given the chairman by the GNA statute is not unlike the informal role assumed by Gen. Maxwell Taylor as CJCS vis-à-vis the Secretary of Defense and the Joint Chiefs of Staff during the Kennedy administration when the decision to intervene in Vietnam was made. The legal position of the members of the JCS was, of course, quite different, as were the service cultures of the time and the determination of Secretary of Defense McNamara and the other civilian officials of the administration to preclude JCS involvement in decision-making. For General Taylor's situation, see the heavily documented study by H. R. McMaster, *Dereliction of Duty: Lyndon Johnson, Robert McNamara, the Joint Chiefs of Staff, and the Lies that Led to Vietnam* (New York: Harper Collins Publishers, 1997).

4. Powell, *My American Journey*, p. 292. Contemporary analyses were even more harsh in some respects, and the official joint history monograph echoes the same short-

comings in more measured and detailed terms. See the assessment in Ronald H. Cole, *Operation URGENT FURY. Grenada* (Washington, D.C.: Joint History Office, Office of the Chairman of the Joint Chiefs of Staff, 1977), pp. 63–67. Gen. Norman Schwarzkopf's memoirs illustrate vividly the interservice suspicion attendant to the Grenada operation. Norman H. Schwarzkopf with Peter Petrie, *The Autobiography: It Doesn't Take a Hero* (New York: Linda Gray Bantam Books, 1992), pp. 247–55.

5. This was apparently another result of the absence of medical planners from the operational planning for Urgent Fury. Complicating the situation was the similar exclusion of the communication planners. Capt. James L. Quinlan, USAF NC, "Tactical Aeromedical Evaluation Grenada: Training Made the Difference," USAF Medical Service Digest (Spring 1984): 2–3.

6. Telephone interview with Lt. Gen. (Ret.) Frank G. Ledford, Jr., MC, USA, Nov. 12, 1997.

7. Perhaps the best account of the reasons for the decision to remove Noriega and dismantle the PDF from the point of view of a key high-level U.S. participant is Colin Powell's *My American Journey*, pp. 413–44.

8. The evolution and termination of MAC command of Special Forces aviation is chronicled in *Anything, Anywhere, Anytime*, pp. 185–89.

9. In an interview several years after his retirement as Air Force surgeon general, Lt. Gen. Alexander Sloan described discussions about augmenting aeromedical evacuation aircrews regularly with physicians as having gone on for "twenty years." Telephone interview, Feb. 17, 1998. Regarding the changing service attitudes toward joint operations, the comment of one 82d Airborne Division sergeant major is perhaps indicative of how past problems in joint operations tended to force greater cooperation. He commented with regard to the paradrop on Torrijos airport during Just Cause that "no one wanted to repeat the f--ing snafu we had at Port Salinas [Grenada]." In that flawed but ultimately successful operation, information had not been provided to the Rangers–in part due to the exclusion of intelligence from the operational planning–that the Cuban construction workers building the new airport on Grenada were Cuban reservists who carried their arms and could be expected to resist vigorously. This they did, including firing upon the U.S. paratroopers in the air. The unexpectedly heavy resistance forced the Rangers to lower the planned jump altitude, as would happen later in Panama. Quotation is from Malcolm McConnell, *Just Cause: The Real Story of America's High-Tech Invasion of Panama* (New York: St. Martin's Press, 1991), p. 294, fn 3. For a full account of the Port Salinas drop, see Cole, *Operation URGENT FURY*, pp. 42–43. Telephone interview, Col. (Ret.) Craig Llewellyn, USA MC, Feb. 5, 1998. Air Force News Service, "Grenada: Special Report," *Airman* (Feb. 1984): 37. Norman Schwarzkopf, who was initially detailed as the Army observer to the staff of the joint task force commander for the Grenada operation, also describes Cuban resistance and its discounting in the planning for the operation when he was told that the six to eight hundred armed Cubans were "not going to fight." Schwarzkopf, *It Doesn't Take a Hero*, pp. 247.

10. The indictment of Noriega for drug trafficking in Feb. 1988 by a federal grand jury was followed by a JCS planning order to CINCSOUTH to write a contingency plan to defend the Panama Canal and U.S. lives and property in Panama. McConnell, *JUST CAUSE*, p. 29. Cole, *Operation JUST CAUSE*, also cites "nearly two years of deliberate planning" (p. 72). Col. Darrel Porr, described by General Ledford, the former army surgeon general, as the chief planner for the operation, stated in a recent interview that the medical planning had started two years before. Ledford stated that his office had not been involved with the medical planning. Telephone interviews with Lt Gen. Frank

Ledford, USA MC, and Col. Porr, USA MC, Nov. 12, 1997. Colonel Robert Brannon, USAF MSC, who commanded the 1st AMES, states in his unit's after-action report that planning was conducted over "several months," and he stated in a later interview that he was brought into the planning in April 1984. The differences probably reflect the changes in planning concept that were ongoing during 1984 and that intensified after the decision to seize Noriega was made and General Maxwell Thurman replaced General Fred Woerner as CINCSOUTH in October 1989. Lt. Col. Brannon, "1st Aeromedical Evacuation Squadron After Action Report, Operation JUST CAUSE." AMC Historical Office, Scott AFB, IL. Telephone interview Brannon, Feb. 16, 1998.

11. Immediately prior to the invasion, Brannon deployed to Howard AFB in the Canal Zone with elements of his squadron where he helped establish the medical facilities for preparing U.S. casualties for evacuation. Brannon says that he also deployed to Panama in May 1989 when Noriega cancelled the already completed elections for the Panamanian presidency and U.S. action was apparently at least considered. Brannon, Just Cause after-action report. Telephone interview with Colonel Brannon, Nov. 12, 1997.

12. According to Brannon, the cover story for his absence from Pope was that he had "gone to Modesto," and, when his immediate superior in the medical chain of command, the 375th Aeromedical Airlift Wing surgeon, at Scott AFB tried to contact him for some reason and was told that he had left for California, the surgeon was both surprised and irritated. Brannon also indicated that the MAC vice commander might also not have been informed of the "execute" decision. Brannon telephone interview, Feb. 16, 1998. Interview with VADM (Ret.) James Zimble, former Navy surgeon general, Feb. 6, 1998; telephone interviews with Lt. Gens. Frank Ledford, USA MC, and Monte Miller, USAF MC, on Feb. 9, 1998, and Feb. 11, 1998, respectively. The apparent analogue to the secrecy surrounding the invasion of Grenada should not be pushed too far because it was planned on a relatively hasty basis compared to the two-year lead time on Just Cause for most planning.

13. Telephone interview with Gen. Oaks, Nov. 14, 1997. Oaks was still bemused eight years after the event and repeated the "bizarre" characterization of the instructions he had received several times during the interview. He related that he was informed of the impending operation and information restriction by two sergeants who introduced themselves by one pulling a telephone from his briefcase and telling Oaks to dial a certain number to verify his visitors' credentials.

14. The same two emissaries who had briefed Gen. Oaks also briefed Brig. Gen. Vernon Chong, commander of Wilford Hall, on the impending operation with the same injunction to maintain secrecy. Telephone interview, Col. (Ret.) Carroll Bloomquist, USAF MSC. Bloomquist was the JMMC Operations Officer at the time. The 18th Airborne Corps curgeon had received a similar very late notification of Operation Urgent Fury and injunction not to tell any of his staff of the impending operation, an injunction that he reportedly "bent" somewhat so his medics would be better prepared to provide the medical support necessary. Interview, Dr. Robert Joy, Mar. 2, 1998.

15. Brannon, Just Cause after-action report.

16. Some small increase in flight time was occasioned by the need not to compromise the operation by flying the evacuation missions over the Yucatan peninsula or other parts of Central America. Consequently, flight plans called for detouring east out over the Caribbean Sea before turning on a direct course for San Antonio. Interview Col. Courtney Scott, Feb. 26, 1998. A map of the area shows a direct course from Panama City to San Antonio crosses Yucatan and parts of Honduras and Nicaragua.

17. Telephone interview with Dr. Spencer Greendyke, Sept. 30, 1997. At the time of Just Cause, Greendyke, whose father had been the first USEUCOM surgeon, was on active duty as a doctor in the USAF temporarily assigned to Brooke. The ostensible reason for designating Wilford Hall is supported by a variety of sources who confirm the sensitivity of special forces' commanders to the exposure of their troops' identities to the public. Telephone interview with Col. Brannon, Nov. 15, 1997; telephone interview, Col. Bloomquist, Feb. 23, 1998; telephone interview, Dr. Craig Llewellyn, Feb. 5, 1998. Dr. Llewellyn is a former special forces surgeon who now directs the Military and Emergency Medicine Division of USUHS. In his interview, Gen. Oaks noted that there was a "burble," as he put it, the night of the invasion: a telephone call from a very senior military figure in Washington expressing concern that the identities of the first loads of casualties who were predominantly from the special forces not be divulged to the press. Oaks interview.

18. Brannon later said that consideration had been given to deploying a full air-transportable hospital to Howard, but it was decided that this would require such a large effort as to be too obvious that something was afoot to PDF watchers. Brannon telephone interview, Feb. 16, 1998.

19. Brannon, Just Cause after-action report. An Army Health Services command spokesman reported that two physicians had been sent from Fort Ord, California, and two others from the Eisenhower Medical Center at Fort Gordon, Georgia, all four of whom had been alerted for the deployment prior to the invasion. "Panama Operation: Readiness Pays Off," *U.S. Medicine* (Feb. 1990): 1, 7. Colonel Porr, the 82d Airborne Division surgeon, jumped into Torrijos–Tocumen and moved to Howard to assist in triage and treatment of the casualties. Porr telephone interview, Feb. 19, 1998.

20. Eight years after the event, this was still the position of the Air Force surgeon general in office during Operation Just Cause, who expressed strong reservations about moving stabilized rather than stable patients. Telephone interview Lt. Gen. (Ret.) Monte Miller, USAF MC, Feb. 12, 1998. Although laudatory of the smoothness of the working relationship between Army and Air Force and the medical support of the operation's casualties in a contemporary interview, Miller was noted as having said that in general [my emphasis], the principles of triage and air evacuation were complied with. "Panama Operation: Readiness Pays Off," *U.S. Medicine*, p.7. One should note that definitions of "stable" and "stabilized" may differ among individual physicians, and the distinction between these conditions may be more ambiguous than nonmedical observers may believe.

21. Brannon, Just Cause after-action report; Porr telephone interviews, Nov. 12, 1997, Feb. 19, 1998; Miller telephone interview, Feb. 12, 1998. In a 1993 article, three USAF MC doctors, including the present Director of the Air Force Medical Operating Agency in the Office of the Surgeon General, wrote that the medical support plan had called for the patients to be stabilized in a surgical intensive care unit at Howard and evacuated to Kelly by air only when completely stable. The authors attributed the actual evacuation of "stabilized" and not stable patients to a failure of transportation for the 44th Medical Brigade from Fort Bragg, which ostensibly precluded postoperative recovery and surgical intensive care at Howard. Earl W. Mabry, Robert A. Munson, and Londe A. Richardson, "The Wartime Need for Aeromedical Evacuation Physicians: The U.S. Air Force Experience During Operation Desert Storm," *Aviation, Space, and Environmental Medicine* (Oct. 1993): 943. However, two of the planners and participants who were at Howard state that this is erroneous information. Telephone interview, Col. Courtney Scott, USAF MC, Feb. 18,

1998, citing Col. Brannon; Porr telephone interview, Feb. 19, 1998. It appears that the JTFSO commander's assertion that "early joint planning, coordination, and rehearsal enabled the medical operation to be executed as planned," was in fact correct, although moving unstable patients did result in expressions of concern after the event, according to Col. Porr in the interview just cited. Quotation is from Memo for CINC, SOUTH, from Lt. Gen. Carl W. Stiner, USA, Jan. 29, 1990, "First Impressions Report, Joint Task Force South (JTFSO) 'Operation JUST CAUSE' 20 Dec 89–12 Jan 90," AMC Historical Office.

22. The 624 Army Rangers who were dropped at Rio Hato suffered a 35 percent injury rate as determined by individual interviews of 471 troopers conducted by three Army Medical Corps doctors within one week of their return to Fort Bragg. This contrasts sharply with the 8.5 percent casualty rate actually reported by the 44th Medical Brigade for this unit. Ninety percent of the Rangers injuries occurred during the jump, an unsurprising conclusion given the low altitude and the fact that some must have landed on the runway. Lt. Col. William F. Miser, Maj. (P) Wade Lillegard, and Maj. William C. Doukas, "Injuries and Illnesses Incurred by an Army Ranger Unit during Operation Just Cause," *Military Medicine* 160 (Aug. 1995): 373. For analyses of the injuries and wounds suffered by the casualties, also see Capt. Theodore W. Parson; Majs. William C. Lauerman, David B. Ethier, James E. Cain, and Zev Elias; Lt. Col. Jeffrey; and Col. William Gormley, all USAF MC, "Spine Injuries in Combat Troops–Panama, 1989," *Military Medicine* 157 (Oct. 1957); and Dr. Elliot Jacob, Maj. Joseph M. Erpelding, and Capt. Kevin P. Murphy, USAF MC, "A Retrospective Analysis of Open Fractures Sustained by U.S. Military Personnel during Operation Just Cause," *Military Medicine* 158 (July 1983). The assault force was fired upon from the ground at both Rio Hato and Torrijos–Tocumen, according to the 82d Division surgeon who parachuted into Torrijos–Tocumen and then joined the medical team at Howard. Porr telephone interview, Feb. 19, 1998.

23. Jacob, et al., "A Retrospective Analysis of Open Fractures," pp. 554–55; Mabry, et al., "Wartime Need for Aeromedical Evacuation Physicians," p. 943. Three civilian physicians also analyzed the disposition of the Beirut casualties and concluded that the operation emphasizes "the significant influence of early and aggressive resuscitation on prevention of such complications as sepsis [infection] and multiple organ failure that lead to late death." Eric R. Frykberg, Joseph J. Teppas III, and Raymond Alexander, " The 1983 Beirut Airport Terrorist Bombing: Injuries, Patterns and Implications for Disaster Management," *The American Surgeon* 55 (Jan. 1989): 140.

24. Mabry and his coauthors assert that each evacuation flight to Kelly "ultimately" had a surgeon on board. However, Brannon and others indicate that augmenting medical personnel were carried only on the first two aeromedical evacuation missions. Mabry, et al., "The Wartime Need for Aeromedical Evacuation Physicians," p. 943. Porr telephone interview, Feb. 19, 1998; Brannon telephone interview, Feb. 16, 1998. Brannon in this interview noted that the SEAL leadership had asked that SEALs who were wounded in action or killed in action be evacuated together if at all possible because this was their general practice. Ironically in view of the fact that the Just Cause evacuation process served as an inadvertent model for physician-augmented aeromedical evacuation crews, the flight surgeon on the second evacuation flight was actually being expelled from Howard because his presence was unauthorized. Interview with Lt. Col. Farley Howell, USAF NC, Feb. 26, 1998.

25. According to a physician not involved in the actual treatment of the casualties but who conducted extensive research about the effect on patients' conditions of the way they

were evacuated, the entire staff of BAMC was called in and kept on duty for the first twenty-four hours. Interview Col. Courtney Scott, USAF MC, Feb. 26, 1998.

26. Taylor, Point Paper. The C–21, a small administrative jet built by Learjet, can be configured variably for no litters and seven seats (for ambulatory), one litter and five seats, or two litters and three seats. Operational support aircraft [OSA] became MAC's responsibility in 1988.

27. Spencer Greendyke interview; Brannon, Just Cause after-action report. Gen. Oaks recalls escorting the President and his party through the hospitals to meet the casualties. Oaks interview. Cole, Operation JUST CAUSE, p.65. The evacuee who died after reaching Kelly was a Navy SEAL who the triage personnel at Howard decided could not survive if he were retained at the air base but might if he could be gotten to Wilford Hall or Brooke. Porr telephone interview, Feb. 12, 1998; Brannon telephone interview, Feb. 16, 1998. The army surgeon general expressed his general approbation of the medical support provided the evacuees, noting only one exception: he believed that one evacuee's leg amputation might have been precluded if there had been a vascular surgeon on the ground at Howard. Ledford telephone interview, Nov. 12, 1997. Brannon afterward stated that his decision to send KIAs on the first two aircraft was in response to a prior request by a senior Navy SEAL officer to evacuate SEAL WIAs and KIAs together, if at all possible, because this was their normal procedure. Twenty-eight C–9 and three C–21 domestic aeromedical evacuation missions moved 215 of the evacuees from Kelly to other locations in CONUS. Lt. Col. John Brower, MAC DOOX, Point Paper, subj: Operation JUST CAUSE, Apr. 12, 1990. AMC Historical Office.

28. Brannon, Just Cause after-action report. Brannon telephone interview, Feb. 16, 1998. The fact that airlift was available to deploy these reservists so quickly seems to cast further doubt on the asserted "transportation" failure explanation for the absence of purportedly planned additional 44th Medical Brigade personnel to provide intensive postoperative care and to ensure that evacuees were clinically stable. It should be noted that special forces deploy only limited medical capability and doctrinally look to the early evacuation of their casualties.

29. Looking back on his thirty-seven-year career, the former Air Force surgeon general, Lt. Gen. Alexander Sloan, characterized regulating as a frequent source of tension between the services that was marked many times with an ongoing suspicion of the Air Force because it controlled the evacuation vehicles. Telephone interview Feb. 16, 1998. See Chapter 6 for what would seem to be a persuasive case study of the truth of Sloan's observation during the early years of the Vietnam War. The modern medical regulating system dates from World War II, which also saw the conflict between the air surgeon and the surgeon general of the Army over the U.S. Army medical department policy of not differentiating AAF aircrew from ground force casualties in returning them to duty.

30. When the joint directive was issued, six Army commanders had the authority to regulate patients in their respective areas without reference to ASMRO, and the commanders of ten naval districts also had the same authority in their districts. Lecture, "Medical Regulating," Wing Base Surgeon's Course, Gunter AFB, [Alabama], Aug. 17, 1954, USAF Office of the Surgeon General, Health & Education Division (File: Record Group 341, Entry 44, box 138, NARA II). An audit of the system some twenty-five years later seems to show that, if anything, the situation was worse. Memo for the ASD/HA and the Asst. Sec. Air Force (FM) from James H. Curry, Defense Audit Service, subj: Draft Report on the Audit of the Worldwide Aeromedical Evacuation System (Project 8ST-033), Nov. 6, 1978, p. 39. AMC/HO.

31. "Overview of the Armed Services

Medical Regulating Office," n.d., AMC Historical Office. Office of the MAC Surgeon, "Briefing Regarding Establishment of Air Force Medical Regulating Concept," June 5, 1968. Office of the Surgeon General Historical Files.

32. For example, the Hoover commissions of the late 1940s and early 1950s. See Chapter 4.

33. Draft audit report, Worldwide Aeromedical Evacuation System, 1978. Nowhere in the report does there appear any sense that there may be legitimate sizing issues for the domestic AE fleet of C–9s and supporting AE squadrons pertaining to wartime contingencies, especially a possible NATO–Warsaw Pact War.

34. "Medical Regulating" Lecture. Local base populations or dependents and retirees living near AF hospitals were not likely to generate patients of clinic interest on a continuing basis sufficient to support specialty and residency programs for new AF physicians. Memo, Harry R. Rowell, Chief Medical Evacuation Branch, ASMRO, for Historian, OSG, USAF, Mar. 4, 1952. RG 341, Entry 44, box 138. Although less valid than during World War II when the Army ground and service forces ran the Army hospital system overseas and handled AAF casualties inappropriately fro m the air surgeon's point of view, the same concern that only Air Force flight surgeons understood the peculiar medical requirements of aircrew must have been an element in the Air Force's attitude toward wanting to treat its own members.

35. Memo, Col. Anthony H. Vervena for 375 Aeromedical Airlift Wing CC/CV/ Surgeon, subj: ASMRO Relocation, 25 Sep 81 Meeting Report, Sept. 28, 1981. 375th AAW Wing Archives, Scott AFB, IL. Vervena notes that the Army is opposed to the move, but that the ASD/HA had initiated the project, culminating a series of overtures over the preceding fifteen years to effect this collocation.

36. According to Col. Brannon, who was constantly involved with special forces as commander of the 1st AES, their commanders always preferred to evacuate any casualties they might have suffered to the Womack Hospital at Fort Bragg where access to them could be tightly controlled. Brannon telephone interview, Feb. 16, 1998. This sensitivity was confirmed by Col. Scott. Interview, Feb. 24, 1998.

37. T. E. Kowalsky, J. Griffen, and 1/Lt G. M. Cusack, Aeromedical Airlift Model (Scott AFB, Ill.: HQS MAC, Command Operations Analysis, Nov. 1968). CORONA HARVEST Documents, HRA, Maxwell AFB, Ala.

38. Draft Audit Report on the Worldwide AE System, 1978, 42–43.

39. Telephone interview, Col. Carroll Bloomquist, Feb. 23, 1998.

40. Frank Best and Nancy Tomich, *Medicine in the Gulf War* (Washington, D.C.: U.S. Medicine, Inc., 1995), pp. 130–31.

41. Best and Tomich, *Medicine in the Gulf War*. Perhaps anticipating the aggressive nature of public interest from his experiences with Just Cause, Gen. Oaks, the USAFE commander, directed during Desert Shield that facilities be provided near the various contingency hospitals in Europe for family members who might choose to travel to be near wounded and sick relatives. Oaks interview. Stiner after-action report.

42. Scott interview. Col. Scott had been a resident in public health in San Antonio and conducted extensive interviews with the participants in the evacuation and care of the casualties and reviewed the bulk of patient records in his research. Scott's analysis and conclusions are contained in "The Impact of Strategic Aeromedical Evacuation in Operation JUST CAUSE," June 1991, which was never formally published reportedly because it was felt that it might occasion criticism of the Air Force. According to Scott, only eight copies were ever made and distributed. Scott interview Feb. 24, 1998.

43. Col. Jones, MAC/SGRO, Point Paper, subj: MAC Aeromedical Evacuation Support for URGENT FURY, 24 October to Present

(for MAC Medical Facility Commanders and Administrators Conference, 14–16 December 1983), Nov. 28, 1983. AMC Historical Office. MAC Office of History, Urgent Fury: The USAF and the Grenada Operation, pp. 86–87. Flight surgeons augmentees were added to the standard medical crews as a precaution since the absence of communications between the combat zone and Barbados where an AECC had been established made it impossible to obtain information on how stable casualties needing evacuation were.

44. Looking back in 1998 on the early years of TRANSCOM, CINCTRANSCOM, Gen. Walter Kross, who from May 1990 until July 1991 had been General Johnson's Director of Operations and Logistics (J3/4), noted that prior to the Gulf War, the TRANSCOM components and their parent Services were very "suspicious" of their new superior joint headquarters, "particularly at the highest levels of leadership." They viewed TRANSCOM as a "threat" to the way they had been doing business, but when he returned as the CINC, the situation had changed radically because the Gulf war had demonstrated the need for TRANSCOM to act as a "single entity." General Walter Kross, An Oral History (Scott AFB, IL: TRANSCOM Research Center, October 1999), pp. 1–2.

45. *Anything, Anywhere, Anytime*, p. 175. The study concluded that the then current mobility forces could meet the requirements of any of the contingencies postulated.

46. *Anything, Anywhere, Anytime*, pp. 175–78.

47. Point Paper, Subj: Status of Aeromedical Evacuation (AE) Conversion Kits for CRAF Airlift, Aug. 23, 1985, attached to Staff Summary Sheet (SSS), Subj.: Aeromedical Evacuation–Europe (CSD #3505), Aug. 23, 1985, signed by Brig. Gen. Vernon Chong, MAC Surgeon. AMC History Office.

48. SSS Subj: Aeromedical Evacuation–Europe, Aug. 23, 1985.

49. Point Paper, Status of Aeromedical Evacuation (AE) Conversion Kits for CRAF Airlift, Aug. 23, 1985. Msg., Vernon Chong, MAC Surgeon, to JCS/J–4, Subj: Patient Distribution Study and CONUS Beds, Aug. 22, 1985. AMC Historical Office.

50. See the CINC's annotation for Gen. Chong, the MAC Surgeon, on Point Paper, Subj: Status of Aeromedical Evacuation (AE) Conversion Kits for CRAF Airlift, Aug. 23, 1985. The CINC wrote in the margins that he thought there was "a natural reluctance among OJCS/OSD to belly up to hard numbers [for the number of wartime casualties and CONUS beds available] because they believe those numbers will be used to justify high cost airlift/medical programs," and he emphasized getting a "good handle on a low cost [emphasis in the original], universal CRAF conversion kit."

51. The DoD plan for the CRAF was presented to air carrier industry executives in March 1952. MATS had proposed that all 331 required four-engine CRAF aircraft be modified to accommodate litter equipment and that four-engine transport aircraft manufactured in the future should have litter assemblies installed on the production line. Maj. Gen. Robert M. Lee, USAF Director of Plans, for the Surgeon General, subj: The Civil Reserve Air Fleet Plan, Apr. 24, 1952. (File: K237.163-3, 52/03/20-55/04/00, HRA.) Draft CONOPS, attached to memo from Col. Mahlon H. Long, to HQ AMC [Air Mobility Command, successor designation of MAC], Subj: Civil Reserve Air Fleet (CRAF) Aeromedical Evacuation Shipset System (AESS) Operational Status Report, Nov. 9, 1994. AMC History Office.

52. SSS, Subj: CRAF Aeromedical Evacuation Memo of Agreement Between MAC and Aerospace Medical Division (AMD), Aug. 22, 1986, signed by Brig. Gen. Paul E. Landers, USAF, Asst. Deputy Chief of Staff, Plans, Hqs., USAF.

53. SSS, Subj: Aeromedical Evacuation Memo of Agreement. Draft AE Civil Reserve Air Fleet (CRAF) CONOPS. AMC History Office.

54. The double- and single-litter stanchions composed the patient transport system (PTS); the therapeutic oxygen composed the medical oxygen subsystem (MOS), and the two nurse work stations together with the electrical distribution system composed the aeronautical operations subsystem (AOS). Point Paper, Subj: Civil Reserve Air Fleet – Aeromedical Evacuation Ship Set (CRAF-AESS), Aug. 1996. Draft AE Civil Reserve Air Fleet (CRAF) CONOPS. AMC History Office.

55. SSS with proposed Ltr, CINCMAC to the Air Force Surgeon General, Subj: CRAF Aeromedical Segment Incentives, May 25, 1988, signed by Maj. Gen. Richard Trzskoma, DCS/Plans. AMC History Office.

Chapter Nine

1. CENTCOM was not the only organization that was evaluating an Iraqi-initiated conflict in the Middle East in late July 1990. One of the scenarios being "played" at the annual Global War Game conducted by the Naval War College in Newport, Rhode Island, during July was an Iraqi invasion of Kuwait. This "move" in the game occurred virtually simultaneously with the actual invasion on August 1, 1990. The author was a participant in the Global War Game at the time.

2. Aeromedical Evacuation in the 1990s: The United States Plan and a NATO Proposal, n.d. I am indebted to Col. (Ret.) Carroll Bloomquist, USAF MSC (who was assigned to the SHAPE staff at the time) for a copy of this proposal. With this proposal, the United States thus for the first time in the area of medical support formally breached "the wall" between those functions deemed "national responsibilities" (such as logistical support of each nation's own forces) and those functions that the NATO nations as a group had agreed should be performed-and funded-jointly to support the forces they had committed to NATO's continental military arm, Allied Command, Europe (ACE). The NATO aeromedical force would have been funded under the NATO infrastructure program on the obvious model of the NATO airborne warning and control system (AWACS). The NATO AWACS were Boeing E–3A aircraft manned by airmen from several NATO nations that provided early warning of a Warsaw Pact air attack on ACE. See Arnold Lee Tessmer, *Politics of Compromise: NATO and AWACS* (Washington, D.C.: National Defense University Press, 1988).

3. Naturally enough, returning many of those U.S. forces stationed in Europe that had been committed to NATO's integrated military structure assumed a high priority. Many of these units were scheduled to be disbanded after they arrived in the ZI. This drawdown of U.S. forces was to be accomplished within the context of agreements for a mutual reduction of forces in Europe by both NATO and the Warsaw Pact. Ironically in view of what was to happen a year later, the senior U.S. Army commander in Europe in the spring of 1989 sought to justify retaining the U.S. Seventh Corps largely intact in Europe as an alliance-sanctioned "out of area" rapid-response force, although the alliance at that time still refused to use forces committed to it for anything other than the direct defense of NATO territory. The author was present in Heidelberg, Germany, in May 1989 when his director of operations, an Army major general, argued this position vigorously for visitors from the National Defense University in Washington.

4. In 1986, the Air Force, Army, and Navy lost control of planning, programming, and resource allocation for their medical facilities to a "Defense Medical Facilities Office," and on October 1, 1991, these functions were made subject to the authority of the Assistant Secretary of Defense for Health Affairs. Joseph Marchese, *Regionalization in the Air Force Medical Service World War II Through 1993* (Washington, D.C.: Office of the United States Air Force Surgeon General, [n.d.]), pp. 12–13.

5. As noted in the last chapter, General Ledford, the army surgeon general during both Just Cause and the Gulf crisis identified his fear at the time that the Panama evacuation might be seen by Congress as a model for the future that would allow reducing appropriations for the U.S. Army medical department. Telephone interview, Dec. 11, 1997.

6. One knowledgeable retired MSC officer stated that the UTC designations were at least partially inspired by bureaucratic considerations and represented an Air Force attempt to demonstrate an enhanced "readiness" role for flight surgeons in response to the heavy emphasis placed on readiness by the influential William Mayer while ASD/HA during the Reagan presidency. Telephone interview, Col. (Ret.) Carroll Bloomquist, USAF MSC, Sept. 20, 1998. Bloomquist was assigned to ASD/HA at the time after assignments on the USEUCOM and SHAPE staffs. Mayer had served as Governor Reagan's California state education chief".

7. Telephone interview, Lt. Gen. (Ret.) Alexander Sloan, USAF MC, Feb. 17, 1998.

8. The most authoritative although necessarily condensed description of the role that aeromedical evacuation played in the Gulf conflict is in Dr. James Nanney, "Medical Support," vol. III: Logistics and Support, pt. II, pp. 201–31, and Thomas Keaney, Eliot Cohen, et al., *The Gulf War Air Power Survey* [GWAPS] (Washington, DC: Government Printing Office, 1994). Envisioned by the Secretary of the Air Force as a counterpart to the U.S. Strategic Bombing Survey of World War II, the authors interviewed key participants and had full access to pertinent classified documents. The quasi-official product is the departure point for all further research. Frank Best and Nancy Tomich, *Medicine in the Gulf War* (Washington, DC: U.S. Medicine, Inc., 1995), provide a comprehensive account of medical support based largely on interviews. Although unofficial, it was produced with the active encouragement of high DoD officials and the services' Surgeons General. The positive accomplishments of the medical services are stressed in Engelborg Sore, ed., Perspectives on the Gulf War (1993), a compilation of some ninety-one short articles by participants, and originally published in special issues of *The Journal of the Army Medical Department* during 1992. Throughout this chapter, the term MAC will be used to also denote TRANS.

9. With the advent of the 7th Corps, the numbers of U.S. forces committed went from approximately two hundred thousand to more than five hundred thousand. International Institute for Strategic Studies, Strategic Survey: 1990–1991 (London: Brassey's for the IISS, May 1991), p. 65. Some Army MTFs were probably not fully capable in the opinion of Col. Robert Ferguson, USAF MSC, the CENTCOM medical planner. Interview, Ferguson by Dr. James Nanney, Nov. 25, 1991, pp. 42–43.

10. The concept of the "golden hour"–although not necessarily precisely an hour–is prevalent in surgical circles and based on casualty analyses from previous wars in which U.S. forces were engaged. Although statistics on patient mortality or survival from the Vietnam conflict can be misleading, the ability of "dust off" helicopters to medevac casualties quickly to the many fixed hospitals throughout the country was an implicit validation of the "golden hour" concept. There are similar inductively derived periods of significance with respect to when burn patients can be moved and when microbes found in wounds take firm hold of casualties in the form of full-blown infections.

11. The term "patient movement" denotes transport of one patient between two points. Hence, the number of patient movements theoretically may well be greater than the number of actual casualties. Given the structure of the AE system in the AOR, that is, a series of C–130 "hubs" from which casual-

ties were transported in one flight to fixed medical treatment facilities in the rear of the combat zone, the number of patient movements should largely equate to the number of casualties. This should also be true of patient movements in the strategic aeromedical evacuation from the AOR to Europe because the approximately eight-hour flight was well within the C–141's unrefueled range. Casualty figures are from Lt. Col. Robert Brannon's "After Action Report/Operation DESERT SHIELD/STORM," AMC H/O. Brannon commanded the 1611th AMES during Desert Shield/Desert Storm, which included all elements assigned to the AE system. Eight years after the event, Edwin Tenoso, General Horner's Commander, Airlift Forces (COMALF), who assumed his position in mid-October, 1990, recalled being given a figure of ten thousand casualties per day for the first few days of combat to use in planning his AE requirements. This figure appears to be one calculated for the larger forces programmed after the November decision and does not necessarily disagree with the casualties estimates in Brannon's after-action report because Brannon cites average patient movement requirements per day as of December 15, 1990, for an unspecified period, presumably the duration of ground combat. According to Col. Robert Ferguson, who was CENTCOM medical planner, he received several revised casualty figures for planning, all of which were in his opinion absurdly high. In his opinion, the JCS medical planning module that was being used to calculate estimated casualties was inaccurate because its parameters were those associated with a NATO–Warsaw Pact combat in Europe. Telephone interview, Lt. Gen. (Ret.) Edwin Tenoso, USAF, Jan. 29, 1999. Interview, Col. Ferguson, USAF MSC, Jan. 7, 1999. Col. Richard Devereaux, USAF, a C–5 airlift pilot serving in the JCS J–3 Readiness Division, recalled in a recent interview having also heard (and been skeptical of) the estimate of ten thousand casualties per day. In his position as Horner's COMALF responsible for the AE system, Tenoso had to take such an estimate seriously for planning, whatever he may have thought of its realism.

12. Gen. Schwarzkopf describes the Iraqi defenses along the Kuwait–Saudi border in graphic detail. It Doesn't Take a Hero, p. 37.

13. In accordance with the total force concept, CENTCOM had included reserve formations in pre-crisis planning for possible operations in its AOR. Frank N. Schubert and Theresa L. Kraus, gen. eds., *The Whirlwind War* (Washington, D.C.: Center of Military History, U.S. Army, 1995), p. 57. In many cases, these reserve units had unique functional capabilities no longer found in the active force, which made their mobilization absolutely essential.

14. Currently, Title 10 United States Code (U.S.C) 12301d provides for the callup of reservists who volunteer for active duty for periods of time governed by funds availability and other conditions. Title 10 U.S.C. 12304, "Presidential Selected Reserve Call-Up Authority" (PSRC), provides for the call to active duty of up to two hundred thousand members of the selected reserve when the President determines that it is necessary to augment the active forces for any operational mission. Neither of these actions requires a presidential proclamation of a national emergency. At the time of the Gulf crisis, these authorities were contained in different sections of Title 10, which was revised in 1986. United States General Accounting Office (GAO), Reserve Forces: Proposals to Expand Call-up Authorities Should Include Numerical Limitations (Washington, D.C.: GAO/NSIAD-97-129, Apr., 1997), pp. 12–14. For a detailed study, see Lt. Col. James E. Lightfoot, ANG, *Mobilizing the Air National Guard for the Persian Gulf War: Lessons and New Directions* (Maxwell AFB, AL: Air University Press, Nov. 1994). An earlier useful perspective is Michael Killworth, *The Silent Call-up Option: Volunteerism in the Air National Guard*

(Maxwell AFB, AL: Air University Press, 1992).

15. Interview, Maj. Virginia Schneider, ANG NC, Jan. 26, 1999. Maj. Schneider was chief of the Medical Readiness & Training Division of the ANG air surgeon's office at the time of this interview. Nanney, "Medical Support," *GWAPS*, p. 201.

16. Nanney, "Medical Support," *GWAPS*, p. 200. The 1st Tactical Hospital deployed from Langley AFB, Virginia, and was operational with an initial fourteen-bed capability on August 15. A second, which had been prepositioned in the AOR, became operational with a similar initial bed capability on August 19. Lt. Col. Robert Ferguson, USAF MSC, "Operations Desert Shield and Storm: Air Force Medical Plans and Operations," unpublished paper, Nov. 25, 1991, p. 12. Colonel Ferguson was the CENTAF medical planner at Riyadh during the Gulf crisis. His paper was presented to the annual meeting of the American Military Surgeons of the United States on that date. I am indebted to Dr. James Nanney, historian, Office of the Surgeon General, USAF, for a copy of this paper.

17. The decision not to use these "roundout" reserve brigades appears to have been sound. According to the GAO, "Army National Guard combat brigades had significant training-related readiness problems." Consequently, after being mobilized, the Guard brigade devoted its training to achieving many fundamental skills for the first time rather than honing individual and collective skills that the members of the active duty brigades that were substituted already had. GAO, Military Training: Lessons Learned and Their Implications for the Future (Washington, D.C.: GAO/T-NSIAD-94-128, Mar. 10, 1994), p. 8. In a book written seven years after the Gulf war, the former Assistant Secretary of Defense for Reserve Affairs ignored the GAO's findings and attributed the decision not to deploy the roundout brigades to bias by the active duty Army leadership. See Stephen M. Duncan, *Citizen Warriors: America's National Guard and Reserve Forces & the Politics of National Security* (Washington: Presidio Press, 1997). Curiously, Duncan neither mentions the extensive mobilization of Air Force units for the Gulf crisis nor their contributions to CENTCOM's success, particularly in the major areas of airlift or aeromedical evacuation. Gen. Schwarzkopf discusses the controversy in his memoir and notes that the issue was resolved by sending one of the NG roundout brigades to the National Training Center where it was still not ready after sixty days of intensive training. *It Doesn't Take a Hero*, pp. 322–23.

18. The only active duty tactical AE squadron was the 1st based at Pope AFB, North Carolina. Three other active duty AE squadrons provided medical crews for the C–9s that conducted intratheater aeromedical evacuation within the European and Pacific commands and the domestic aeromedical evacuation system. These were the 2d based at Rhein-Main Air base, the 9th at Yokota Air base, Japan, and the 57th at Scott AFB. All these units and the associated flying squadrons were elements of the worldwide aeromedical evacuation system directed by MAC. A recent history of the Air Force Reserve notes the heavy involvement of AFRES medical personnel in Desert Shield/Desert Storm, but dismisses the subject with the comment that all AFRES medical units were called to active duty without saying anything at all about the major contribution made by AFRES aeromedical evacuation units. Gerald T. Cantwell, *Citizen Airmen: A History of the Air Force Reserve, 1946–1994* (Washington, D.C.: Air Force History and Museums Program, 1997), p. 366.

19. Telephone interview, Lt. Col. (Ret.) Philip Mahlum, USAF MSC, Feb. 9, 1999. Colonel Mahlum was assigned to Medical Plans (SGX) in the Command Surgeon's office at MAC/AMC, 1982–86 and 1990–94, and at the time of this interview was a consultant to TRANSCOM.

20. Lt. Col. Paul McGuire, USAF NC, ANG Liaison to the AMC surgeon, who was Maj. Schneider's predecessor in the ANG air surgeon's office, indicated that almost all of the ANG's aeromedical evacuation personnel served voluntarily in the AOR on a rotating basis for periods averaging forty-five days during Desert Shield prior to the mobilization of their ANG units. Telelphone interview, Nov. 25, 1998.

21. For a description of the then existing statutory authorities within Title 10, U.S. Code, see Killworth, *The Silent Call-up Option*. Those called up from the ARC were mobilized ultimately for 179 days, as 180 days was the maximum under the provisions of Title 10 at that time.

22. Maj. Dale Roberts, USAF MSC, Aeromedical Evacuation Planner's Guide (Scott AFB, IL: Office of the Command Surgeon, n.d.), p. 3. The Planner's Guide, issued as an unofficial publication, covers every aspect of aeromedical evacuation in detail and was widely distributed within the active and ARC AE communities. It is still considered an invaluable reference. Telephone interviews, Lt. Col. Kerrick Jan. 28, 1999; Feb. 9, 1999; Col. Bloomquist, Jan. 25, 1999. Mahlum interview, Feb. 9, 1999. Air Force medical UTCs begin with the alpha characters "FF."

23. Requests for additional personnel from Colonel Brannon were screened carefully at both the joint staff level and at AMC with an eye toward keeping the numbers of U.S. troops in Saudi Arabia. Mahlum interview, Feb. 9, 1999. In his memoir, Schwarzkopf reveals his sensitivity to King Fahd's undoubted concern at the reaction in his kingdom to allowing large numbers of foreigners into Saudi Arabia. *It Doesn't Take a Hero*, p. 305.

24. McGuire interview, Feb. 25, 1999; telephone interview, Col. James Fischelli, USAFR MSC, Feb. 9, 1999. For the dates of activation and deployment locations of all ANG and AFRES units mobilized during Desert Shield/Desert Storm, see *GWAPS*, *Vol. 5: A Statistical Compendium and Chronology* (Washington, D.C.: Center for Air Force History, 1993), pp. 97–115. The activation dates listed for AE units must be viewed with some caution because the data does not seem to differentiate between voluntary activations and involuntary call-up by UTC. However, mobilization dates for AE units in December 1990 are undoubtedly accurate because the expansion of CENTCOM's medical support was set in motion at that time. As noted, volunteers still in the AOR were recalled to their ARC aeromedical evacuation units, which were then mobilized and ordered to duty in the AOR. Schneider interview, Jan. 26, 1999; interviews, McGuire, Feb. 23, 1999; Fischelli, Feb. 9, 1999. Fischelli, now Director of Health Affairs at AFRES HQ, was Senior Air Reserve Technician (ART) and commander of the 37th AE Group at MacDill AFB, Florida, one of two AFRES tactical AE Groups. Another complicating factor was that some AE personnel in some ARC units had already been mobilized by UTC and were in the AOR when the decision was made to activate their units.

25. For discussions of the PSRC, see *Lightfoot, Mobilizing the Air National Guard*, pp. 26–30, and Killworth, *The Silent Call-up*, pp. 13–18. Killworth quotes the then relevant subparagraph in its entirety. Subparagraph 672(d) of 10 U.S.C. 672, which dated from 1952, specified that "at any time" the secretary of the service concerned was empowered to "order a member of a reserve component under his jurisdiction to active duty, or retain him on active duty, with the consent of the member." Originally, this power was qualified by the need to obtain the consent of the governor of the parent state of the Guard unit, but this was removed from the law in 1986.

26. Lightfoot, *Mobilizing the Air National Guard*, p. 34.

27. For example, the satellite photographs of Baghdad that the Air Force F–117s needed for their precision attacks on selected targets

were not available until October. Michael R. Gordon and Lt. Gen. (Ret.) Bernard E. Trainor, *The Generals' War: The Inside Story of the Gulf War* (New York: Little, Brown and Company, 1995), p. 99.

28. Interview, Col. Robert H. Brannon, USAF MC, by Dr. James Nanney, HQ, USAF/SGI, June 26, 1992.

29. Interview, Lt. Gen. (Ret.) Alexander Sloan, USAF MC, Aug. 20, 1997; telephone interview with Col (Ret.) Robert Brannon, USAF MSC, Feb. 16, 1998. Best and Tomich, *Medicine in the Gulf War*, p. 98.

30. Widely varying sources attest to the fear that existed that the Iraqis would employ chemical weapons. Colonel Brannon in his interview eighteen months after the war remarked that the threat of chemicals "really terrified people" and that the amount of fear was "remarkable." Nanney interview, June 26, 1992. The operations group commander of the ANG's 136 Tactical Airlift Wing whose C–130s were based at Al Ain in the United Arab Emirates made the same unsolicited observation in an interview many years after his service there. Discussing the TAES system in the AOR, the Air Guardsman volunteered that especially in conversations with the COMALF regarding AE techniques to use in transporting chemical casualties, he got the impression that there was extreme concern about the possible use of chemicals. Interview, Lt. Col. Ronald Hale, ANG, Jan. 11, 1999. The COMALF, Brig. Gen. Edwin Tenoso, also recently confirmed his concern about the possible impact on the AE system of casualties from Iraq's use of chemical warfare. Telephone interview, Lt. Gen. (Ret.) Edwin Tenoso, USAF, Jan. 29, 1999.

31. The then Col. Robert Belihar, the CENTCOM surgeon, noted in an interview shortly after the war that "we relied a great deal more on tactical air evac, C–130, than we thought we would, because we moved so fast [and] I think we have to reevaluate that aspect of it, as far as evacuation from the forward areas." Best and Tomich, Medicine in the Gulf War, p. 67. In a paper delivered at a USUHS conference on military medicine, Belihar was more explicit, saying flatly, "The evacuation distances...were too great for Army and U.S. Marine Corps helicopters." Quoted in "Desert Storm: CENTCOM Overview," Apr. 13, 1992, p. 136, from the multivolume transcript of the 7th Conference on Military Medicine "The Spectrum of Medical Support for Operation Desert Shield and Desert Storm," held at USUHS, Apr. 13–15, 1992. Hereinafter cited as 7th Conference on Military Medicine.

32. Sloan interview, Aug. 20, 1997.

33. Schubert and Kraus, *The Whirlwind War*, p. 86.

34. Best and Tomich, Medicine in the Gulf War, p. 98. Nanney, "Medical Support," *GWAPS*, p. 28. Tel. interview, Col. Gerald Andrick, USAF MSC. Col. Andrick, who was on the AFRES crisis action team during the Gulf conflict, cites along with many other sources Congressman Murtha of Pennsylvania as the instigator of this directive that responded to his injunction to avoid having large additional CHAMPUS charges.

35. Brannon, after-action report, Apr. 17, 1991. Brannon notes that the initial staff of the AECC was fifteen.

36. Mabry, Munson, and Richardson, "The Wartime Need for Aeromedical Evacuation Physicians," p. 943. This article is based in part on Dr. Mabry's War College thesis that was kindly provided to the author by Dr. Lt. Col. Munson. Nanney interview, Brannon, June 26, 1992. This action apparently was less linked to the Just Cause experience than the attempts by the Air Force' to ensure that all its medical personnel had clearly identified wartime roles as demanded by Dr. Mayer during his tenure as ASD/HA. According to a retired MSC officer who was assigned to the OASD/HA in the late 1980's during Dr. Mayer's tenure, UTCs for flight surgeons in aeromedical evacuation units had been created prior to Operation Just Cause,

although the roles they were to perform in the AE system had not been fully defined. Tel. interview, Col. Carroll Bloomquist, USAF MSC, Sept. 20, 1998.

37. The Mississippi ANG unit was equipped with C–141s and the New York ANG unit with C–5s. The ANG aeromedical evacuation squadron as a subordinate unit of the 186th Airlift Group at Meridian, Mississippi, which was equipped with C–141 aircraft, came under the operational control of MAC as a strategic aeromedical evacuation unit when activated in contingencies.

38. In the *GWAPS* chronological list of Air Force Reserve units that were brought on active duty for the Gulf crisis, the 72d is listed as "mobilized" on Aug. 8, 1990 which erroneously implies a unit activation. *GWAPS, Statistical Compendium and Chronology*, p. 98. Actually, as indicated, both AFRES strategic AE squadrons at McGuire provided volunteers who deployed to the Gulf on Aug. 10. The civilian-operated L–1011 aircraft were used because the capability of the C–141s of the 438th Military Airlift Wing at McGuire, like the rest of the MAC airlift fleet, was being fully utilized to move troops and their equipment to the AOR. Tel. interview, Col. (Ret.) Carl Merwin, USAFR MSC, Feb. 27, 1999. Col. Merwin served in the dual capacity of commander and senior air reserve technician (ART) for the 69th and its successor, the 514th AES, from 1971 until late 1998. He was also the AE representative on the 21st Air Force's crisis action team (CAT) during the bulk of the Gulf crisis. The 21st AF, located at McGuire, was the MAC unit that controlled the MAC strategic airlift wings on the East Coast.

39. *GWAPS, Vol. 3, Part I: Logistics*, p. 87.

40. Merwin interview, Feb. 27, 1999.

41. Tel. interview, Col. Brannon, Feb. 2, 1999. Nanney interview, Brannon, June 26, 1992. Interview, Lt. Col. Loren Flossman, ANG MSC, Dec. 8, 1998. Flossman commanded the 142d AES, ANG, stationed at New Castle, Delaware. Flossman's Delaware unit was one of five ANG AE units to which McGuire made the "what if" calls that prepared the ANG to respond affirmatively when the message arrived from MAC shortly after Brannon's call. Flossman recalled receiving a personal telephone call from Brannon on Aug. 4 to join him on the deployment as a volunteer. They had known each other while Flossman had been on active duty prior to going to the ANG and had later worked together. Flossman volunteered and directed the AECE at Rhein-Main Air Base during Desert Shield, then served as Brannon's chief of staff at the AECC in Riyadh during Desert Storm. Tel interview, Flossman, Feb. 1, 1999.

42. Tel. interview, Lt. Col. Paul Mcguire, USAFR NC, Jan. 29, 1999. McGuire received Brannon's secure telephone call. At the time of the Gulf crisis, McGuire, now ANG liaison to the Office of the AMC Command Surgeon, was Chief, Aeromedical Evacuation and Training, Office of the Air Surgeon, ANG, and served as the officer in charge of the medical/aeromedical cell in the ANG contingency support staff (CSS) that was activated for contingencies. As such, he handled taskings from MAC, which was the gaining command for mobilized ANG and AFRES AE units. In his Jan. interview, McGuire noted that, unbeknownst to him, the ANG air surgeon had previously received a "heads-up" call via a secure telephone that a classified tasking message would be forthcoming from AMC.

43. Nanney interview, Brannon, June 26, 1992. Tel. interview, Col. Gerald Andrick, USAFR MSC, Feb. 5, 1999; Fischelli interview, Feb. 9, 1999. Andrick was at AFRES HQ during the Gulf crisis.

44. Quotation is from Nanney interview, Brannon, June 26, 1992. In retrospect, Brannon thought the ANG was asked to fulfill most of this initial requirement because it had more volunteers than the AFRES did. Tel. interview, Brannon, Feb. 2, 1999.

45. For a detailed discussion of the ANG

response to the Gulf crisis under the then current provisions of Title 10, U.S. Code, see Lightfoot, *Mobilizing the Air National Guard for the Persian Gulf War*, pp. 22–27.

46. McGuire interview, Sept. 30 1998; Andrick interview, Feb. 5, 1999.

47. Tel. interview, Lt. Col. (Ret.) Philip Mahlum, USAF MSC, Feb. 4, 1999. Col. Mahlum was a medical planner at HQ, MAC, from Sept. 1990 through the end of the Gulf War. Among other things, the lack of validated TPYDD prohibited use of the JCS automated planning system, the Joint Operations, Planning and Execution System (JOPES), and required manual deployment planning. "Chronology", GWAPS, Vol. 5, Part II, p. 13. One of the CENTCOM planners told interviewers a year after the war that casualty estimates and requirements to handle them were essentially done with "a stubby pencil...and the seat of the pants" because the lack of computer terminals both in CENTCOM headquarters and at the component commands precluded the JCS medical planning model from being used in the AOR. According to him, some officials could not move beyond the planning module because "they were still thinking the deliberate planning process." Tomich and Best, *Medicine in the Gulf War*, p. 86.

48. Col. Kenneth G. Swan, "Heaton Lecture – Combat Casualty Care," *Perspectives on the Gulf War*, p. 5. Swan offers an insightful critique of the medical care available in the Gulf through comparison to the Vietnam conflict. He notes that in the latter one-third of the twenty-four in-country hospitals were evacuation hospitals that functioned as university hospitals or level 1 trauma centers because their staffs included all surgical subspecialties. Swan characterized them as providing "incredible, and probably never again to be seen, efficiency in the delivery of lifesaving care to the combat casualty of the Vietnam War while the US was there."

49. Tel. interview, Brig. Gen. (Ret.) Jerome Foust, USA MSC, Mar. 3, 1999. Foust was commander of the 44th Medical Brigade responsible for the medical support of the 18th Corps units as they rapidly advanced into Iraq through the desert west of Kuwait. At the end of hostilities, his medical units had penetrated 150 miles into Iraq, and he had established hospitals on the Euphrates River. The then Col. Robert Belihar, who had served as the CENTCOM surgeon during the Gulf crisis, also expressed concern about the limited range of medevac helicopters to provide effective evacuation support of these forces advancing directly into Iraq. Maj. Gen. (Ret.) Robert Belihar, Oral History.

50. Interview, Maj. Gen. Earl W. Mabry, USAF MC, Feb. 24, 1998. Gen. Mabry noted in his interview that there were eight Army five-hundred-bed hospitals within a twenty-five-mile radius of King Khalid Military City, which was relatively close to the Kuwaiti border. Mabry arrived in Riyadh in early Jan. 1991 from assignment to the MAC surgeon's office.

51. Dhahran received roughly five times more MAC strategic airlift sorties than did any of the next three major APODs during the period from Aug. 1990 to Feb. 1991. GWAPS, Vol. 3, Part I: Logistics, pp. 142.

52. Maj. Stephen Wintermeyer, Joseph Pina, Maj. James Cremins, and Capt. Jeffrey Heier, "The Inpatient Experience of a U.S. Army Combat Support Hospital in the Persian Gulf during Non-Combat and Combat Periods," *Military Medicine*, 159 (Dec. 1994): 747.

53. Various factors affect helicopter range and lifting capability. Range and speed estimates offered by different Army aviators who flew support helicopters differed widely: for Hueys from 170 to well over 200 nautical miles; for Blackhawks, 250–300 nm. Hueys cruised at 90–100 knots and Blackhawks at 130–150 knots. On internal tanks, each had a flight duration of approximately two hours. Tel. interviews, Maj. Deborah Snyder, USA, Feb. 19, 1999; CW4 (Ret.) Edward Merfut, USA, Feb. 25, 1999; CW3 Curtis Hoagland,

Mar. 3, 1999. Maj. Snyder flew helicopters during Desert Shield/Desert Storm from King Fahd International Airport and moved to Log Base C at Raffa two miles from the Iraqi border to support 18th Airborne Corps units in their western attack. At the time of the interview, Maj. Snyder was the S–3 (Operations Officer) of the 12th Aviation Battalion stationed at Fort Belvoir, Va., which was Mr. Marfut's unit of assignment until retirement. Mr. Hoagland is a member of the District of Columbia Army National Guard medevac unit. All interviewees noted that the range of both helicopters could be increased significantly with external or internal fuel tanks. However, auxiliary fuel tanks degraded their medevac capability by limiting the space available to carry either litters or ambulatory patients.

54. Lt. Col. Eldon Ideus, "Patient Evacuation and Regulation: Tactical and Strategic," 7th Conference on Military Medicine (Apr. 14, 1992): 16–18. Colonel Ideus pointed to the range limitations of the UH–1s as the primary problem but also noted that surgical patients tended to "queue" rapidly for evacuation and that a higher-capacity medevac vehicle than either the Huey or the Blackhawk was necessary. In fairness, it should be noted that the deputy CENTCOM surgeon, Ben Knisely, a former medevac pilot himself, gently disputed that locating FARPs was a problem in an telephone interview eight years after the event, although Ideus, who commanded the medical group supporting 18th Airborne Corps, characterized navigation for either ground or air evacuation vehicles as "difficult at best." Knisely interview, Mar. 25, 1999.

55. Best and Tomich, *Medicine in the Gulf War*, pp. 83–84.

56. Even in Vietnam, the limited range of the "Hueys" had initially posed a problem for moving patients from emergency treatment points to the Army's Eighth Field Hospitals at Nha Trang. Col. O'Neill Barret, "U.S. Medicine in Vietnam: The Early Years," in Brig. Gen. Andre Ognibene, and Col. O'Neill Barrett, Jr., (eds.), *Medical Department, United States Army: Internal Medicine in Vietnam. Vol. II: General Medicine and Infectious Diseases* (Washington, D.C.: Office of the Surgeon General and Center of Military History, 1982), pp. 26–27. As noted earlier, the CENTCOM surgeon, Col. Belihar, remarked about the unexpectedly greater use of tactical airlift for patient evacuation. Medicine in the Gulf War, p. 57.

57. The quotation is from the transcript of a discussion following a breakout session on "Medical Support to TO&E Units," 7th Conference on Military Medicine (Apr. 14, 1992): 131.

58. For example, in the same forum, Gen. Walter Boomer expressed his dismay at the lack of a sufficient number of helicopters to ensure that marine casualties could be transported from ground units at the front to Navy second-echelon MTFs. Capt. Jerry Crim, USN MC, "Organic Marine Corps Medical Support System," pp. 248–9. Captain Crim noted that medical evacuation was "a problem," and that even with the dedication of eight helicopters to medevac on the eve of conflict, there was so much smoke, swirling sand, and confusion at times during the ground war, that the helicopters might have been ineffective anyway in some locations, pp. 246, 249. Col. Reginald Moore, USA MC, who deployed with the 44th Medical Brigad, and then was reassigned to "Task Force Evac," a provisional unit of the reserve 332d Medical Brigade assigned to medical support of 7th Corps, indicated that medical evacuation was one of the greatest worries of the task force'. In spite of vigorous planning on how patients could be medevaced out of the 332d's hospital by helicopter, "there were seldom any helicopters available." The solution was to use C–130s at two existing airfields near brigade hospitals and at two new airfields constructed near its other evacuation hospitals. "Active Duty Reserve and National Guard Evac Hospital Group,"

"Fixed Hospital Units," 7th Conference on Military Medicine (Apr. 15, 1992): 10.

59. Commander Charles Hora, USN MC, in Tomich and Best, Medicine in the Gulf War, p. 86. The commander of the 44th Medical Brigade which had set up its first second-echelon treatment facility in the AOR in early September 1990, also stated flatly that the necessary medical support for operations was late in deploying. However, he added that he reported to the 18th Airborne Corps commander on the eve of the ground war that the necessary medical facilities were now in place. Tel. interview, Brig. Gen. (Ret.) Jerome Foust, USA MSC, Mar. 3. 1999.

60. Edward J. Marolda and Robert J. Schneller, Jr., *Shield and Sword: The United States Navy and the Persian Gulf War* (Washington, D.C.: Naval Historical Center, 1998), p. 106. Capt. David A. Snyder, USN MC, "USNS COMFORT in Desert Shield/Storm: Lessons Learned, Fixed Hospital Units," 7th Conference on Military (Apr. 15, 1992): 30–31. Snyder, a staff surgeon on Comfort during the Gulf crisis, points out that the advertised one-thousand-bed capability may be more theoretical than real in a combat environment because, statistically, 60 percent of combat-inflicted injuries are orthopedic and the wards are at the bottom of the ship. Patients would have to traverse six stairwells, a difficult access for patients who could not walk and a potential disaster if abandoning ship became necessary. Another veteran of the deployment also noted wryly the difficulty of providing nursing care to patients in the tiered bunks higher than shoulder high. Interview, Capt. Dennis Vidmar, USN MC, May 1, 1998.

61. Dr. Vidmar was Chief of Dermatology at the National Naval Medical Center at the time and was embarked on Comfort during Desert Shield/Desert Storm. The vessels' helicopter landing pads were capable of handling one Blackhawk or two smaller medevac helicopters at a time, thus limiting the influx of litter patients from each landing to perhaps a dozen. Interview, Capt. Dennis Vidmar, USN MC, June 5, 1998.

62. Tel. interview, Capt. Vidmar, Mar. 11, 1999. Capt. Charles Blankenship, USN MC, "Utilization of Hospital Ships," 7th Conference on Military Medicine, (Apr. 15, 1992): 114. Clearing the ships of patients to provide room for fresher casualties would have been virtually impossible. Capt. Blankenship estimated that it would have taken two and a half days flying round the clock with no mechanical malfunctions to offload a full load of patients.

63. Capt. Thakar Patal, USN MC, "Fleet Hospital Five," "Fixed Hospital Units," 7th Conference on Military Medicine (Apr. 15, 1992): 88. Marolda and Schneller state that Fleet Hospital 15 was airlifted from a storage site in Norway and set up at Awali, Bahrain. However, they are contradicted flatly by Lt. Commander Dana Covey USNR MC, who was an orthopedist on that hospital's staff and told the audience twice at the USUHS conference on medicine in the Gulf War that the hospital was in the desert, north and west of al-Jubayl, noting that Fleet Hospital 15 "was the one placed by General Boomer." "Fleet Hospital 15 in ODS," pp. 44–46. In a November staff meeting, Boomer had opposed putting a fleet hospital in Bahrain on the basis that "if the battle is in Kuwait, a fleet hospital in Bahrain is too damn far." Boomer quotation is from Shield and Storm, p. 130. According to Marolda and Schneller, a third fleet hospital was deployed to Bahrain on the orders of Admiral Arthur, NAVCENT commander.

64. Lt. Gen. Walter Boomer, Opening remarks at 7th Conference on Military Medicine (Mar. 13, 1992): 23–25. Boomer said that, although he had believed the medevac system would work as it had from his point of view in Vietnam, he had since come to the realization that it would not "in a campaign in which we have a large number of casualties."

65. Commander Richard R. Jeffries, "Medical Preparations, Accomplishments

and Concerns of the 1st Marine Division from Operation Desert Shield/Storm," 7th Conference on Military Medicine (Apr. 14, 1992): 30. Jeffries reported that Fleet Hospital Five requested help from the Army, which provided eight Blackhawks for medevac, of which neither Jeffries nor the Marine division to which he was attached were aware at the time. One motivating factor for the Army provision of medevac helicopters to Fleet Hospital 5 may have been the fact that, after the arrival of the first 7th Corps troops, many of them were treated at Fleet 5, according to its commander, Capt. Thaker Patel. Reflecting the uncertainties experienced during preparations for Desert Storm, Patel noted that the evacuation policy reached almost thirty days in November, and that his hospital functioned unofficially for several months as a general hospital. "Fleet Hospital 5," p. 89. Capt. Terrence Riley, former Force Surgeon for the II Marine Expeditionary Force (MEF) reported in a 1992 article that Marine helicopters had been "dedicated" to medevac during the Gulf War and that they had moved patients and casualties from front areas to second-echelon facilities and from the latter to the fleet hospitals. They were actually reserved for medevac because they did not carry the red cross markings, putting them under the Geneva Convention. In any event, they were too few to handle the marine casualties as indicated by what Navy medical officers at the fleet hospitals reported also in 1992. "Medical Services to the Marine Corps in Desert Shield and Desert Storm," *Perspectives on the Gulf War*, p. 46. Capt. Riley's generally positive presentation does not correlate with Gen. Boomer's comments cited in the text.

66. Covey, "Fleet Hospital 15 in ODS," 7th Conference on Military Medicine (Apr. 15, 1992): 44–46. Knisely interview, Mar. 25, 1999.

67. Covey, "Fleet Hospital 15 in ODS," p.48. The use of Air Force C–130s to evacuate second-echelon Marine MTFs was also not without problems. In one instance, patients were sent to the MASF with the agreement that they would be evacuated within six hours"," but it took three tries that involved two patients being operated on again after one returned to the sending MTF before the patients were evacuated. Capt. Frederick Burkle, USN MC, "Battlefield Casualties from Second Echelon Marine Facilities, Mobile Hospital Units and Detachments," 7th Conference on Military Medicine (Apr. 14, 1992): 62. Of course, one other advantage C–130s had over helicopters was the number of patients they could carry, an important factor when the number of casualties expected was so high.

68. Tel. interview, Capt. Vidmar, Mar. 12, 1999. Based on Comfort's experience, Vidmar was scornful of the "protection" afforded the hospital ships by the Geneva Convention in the Gulf. By contrast, he pointed out that the British generated and deployed to the Gulf a very capable hospital ship, Argus, which they kept unmarked and in battleship gray.

69. *Ibid.* Tel. interview, W. Hays Parks, Oct. 10, 1998. Dr. Parks serves in the International Law Division of the Department of the Army's legal staff. He cautions that the degree of protection afforded a hospital ship properly marked and operating under Geneva Convention procedures and protections is limited. A belligerent can seize such a vessel and remove the combatants aboard making them prisoners of war. However, under the convention, he would have to let the ship and the medical personnel aboard proceed without restraint.

70. Other limiting factors affecting hospital ships in any contingency include the draft of the vessels and the depth of the waters within which they operated. In Desert Shield, one vessel remained in the Gulf at all times, while the other remained just outside. During Desert Storm, both operated inside the Gulf. Interview, Capt. Dennis Vidmar, USN MC, May 1, 1998. Dr. Vidmar notes that the for-

ward position of USNS Comfort was obscured a good part of the time by smoke from the onshore oil installations that the Iraqi forces had set alight. The ships formal Geneva Convention status also precluded having classified communications capability on board, which presumably inhibited coordinating with Marine commanders.

71. Snyder, "USNS COMFORT in Desert Shield and Desert Storm," Apr. 14, 1992 p. 32. Capt. (Ret.) Taylor Cook, USN MC, "Component Command Surgeons and Planners – U.S. Naval Forces Central Command Combat Medical Support, Fixed Hospital Units," 7th Conference on Military Medicine (Apr. 15, 1992): 229; Burkle, "Battlefield Casualties from Second Echelon Marine Facilities," pp. 63–64.

72. Brannon's after-action report is a virtual roadmap for creating an aeromedical evacuation system capable of supporting another Gulf campaign. According to one of his coauthors who served under Brannon during Desert Shield/Desert Storm, this was done consciously on the assumption that the Gulf conflict was the model of the kinds of contingencies that the United States would face in the future. Nine years after the event, Brannon's former subordinate expressed some doubt about this assumption and the thrust it had imparted to their recommendations. Interview, Lt. Col. Farley Howell, USAF NC, Feb. 26, 1998. However, an analysis of its recommendations including adding UTCs to provide all the capabilities needed for the tactical AE system to function in areas like the Gulf AOR with its bare bases, relatively thin communications infrastructure, limited road network, and difficult climate certainly suggests that these recommendations have been relevant to those contingencies that the United States has faced since the Gulf crisis.

73. Brannon after-action report, p. 3. The ANG's 142d AES based at New Castle, Del., provided the personnel for the Incirlik AELT, and the 142d commander, Lt. Col. Flossman, directed the AECE at Rhein-Main during Desert Shield and served as Brannon's chief of sttaff during Desert Storm. Brannon notes that this was the first time AECEs had been deployed in a contingency. Flossman, a fellow MSC who had served on active duty with Brannon, was also a personal friend and had volunteered for active duty at Brannon's specific request. Interview, Flossman, Dec. 8, 1998. McGuire interview, Feb. 34, 1999.

74. Brannon after-action report, p. 3. An initial operational capability is defined as the time at which a unit is capable of performing at least one complete cycle of its assigned mission.

75. Brannon after-action report, pp. 2–3.

76. The refusal was apparently based on the fact that basing C–9s in the AOR would have required deploying new and separate maintenance and logistics capabilities to Gulf bases that, in any event, were already overcrowded. Additionally, C–9 maintenance was provided by civilian contractors whose availability might be questionable even if potential issues of liability were addressed in the contract. However, beyond these concerns was the fact that the readiness of the C–9 fleet had declined after its funding was shifted from the Airlift Service Industrial Fund (ASIF) to the Air Force Medical Program three years earlier, where it had to compete for increasingly scarce funds. CINCMAC laid out the problems with C–9 funding and readiness directly to the Air Force chief of staff in Sept. 1990 in a message described by an SG staff member as "an attention getter!" Msg. CINCMAC to CSAF, subj: Desert Shield – Operational Impact on C–9A Nightingale, Sept. 11, 1990. AMC Historical Office Files. Removing the C–9s from Germany would obviously have hampered continuing the level of care for troops and dependents left behind in Europe that EUCOM was seeking to provide. The loss of the C–9s would also eliminate one means for "leveling" hospital populations among MTFs in Europe if the casualty flow required it,

although the Germans had offered to help in this regard. Tel. interview, Maj. Gen. James Whinnery, ANG MC, Sept. 28, 1998. General Whinnery was mobilized and served at USAFE headquarters during the Gulf crisis working for General Roadman, the USAFE surgeon.

77. Brannon, after-action report, p. 3.

78. Brannon, after-action report, p. 1. The formation of the 1611th was part of a general reorganization of the various MAC units into a structure of provisional tactical airlift squadrons and supporting units. This was done largely because of General Horner's concern about the difficulties of administering military justice with personnel when the organizations retaining administrative and disciplinary over them were scattered throughout the United States. *GWAPS, Vol. 3: Intratheater Airlift,* p. 148.

79. The 5th MASH had to assume a similar general medical treatment role because "there was no one else to do it." Col. Kenneth Steinweg, "Innovation in the Desert: MASH Medical Packages for Desert Warfare," 7th Conference on Military Medicine (Apr. 14, 1992): 18. Col. Steinweg also noted that his unit had to deal with "a lot of automobile accidents," in the King Khalid Military City area during the period from December 1990 to January 1991 prior to moving forward to a staging point for the "left hook" assault. "Innovation in the Desert," p. 17. Moore, "Active Duty Reserve and National Guard Evac Hospital Group," p. 7.

80. During the early part of Desert Shield as U.S. forces were still increasing slowly, the Air Force had excess hospital capability in the air transportable hospitals (ATHs) that it had rapidly deployed to the AOR, and the evacuation policy was briefly set at thirty days. Interview, Colonel Leonard Randolph, USAF MC, by Dr. James Nanney, Apr. 29–30, 1992.

81. Brannon, after-action report, 21–22. There were patient movement requirements from sixteen different locations. Attachment 5 to the report lists the five samaritan channels established. Earlier, opportune airlift for aeromedical evacuation within the AOR had sufficed with the smaller number of personnel in the AOR.

82. *GWAPS, Vol. 3: Logistics*, pp. 145–49.

83. The concept of coordination and collocation of joint medical assets at strategic "hubs" is credited to Lt. Col. David Harper, USAF MSC, by Col. Robert Ferguson, the CENTAF surgeon's medical planner in the Gulf. Ferguson, "Operations Desert Shield and Storm: Air Force Medical Plans and Operations," Nov. 25, 1991, p. 16.

84. Brannon, after-action report, Table 2, p. 9, and Table 9, p. 22.

85. Brannon's after-action report addresses the communications problems in some detail (pp. 47–51). Maj. Gen. Randolph, the CENTAF surgeon at the time made a special point of identifying communications as his principal problem both in the immediate period following the Gulf War and eight years later in an interview with the author. Nanney interview, Apr. 29–30, 1992; Randolph interview, Apr. 5, 1999. Frequent references to communications problems can be found throughout the relevant literature. For example, Lieutenant Gary Rebholz, "Medical Logistics," 7th Conference on Military Medicine (Apr. 14, 1992): 96, 102–4. Rebholz noted that it was easier to call Fort Dietrick, Md., than it was to contact Fleet Hospital 5, "just up the street."

86. Tenoso interview, Jan. 29, 1999; Brannon interviews, Mar. 7, 1998 and Feb. 10, 1999. Randolph interview, Apr. 5, 1999. General Tenoso in turn was responsible to General Horner, the Joint Force Air Component Commander (JFACC), who according to Tenoso gave him a totally free hand to run the airlift forces and AE system.

87. The author's interviews with each of these officers indicate a continuing respect, and even affection, existing among them. Randolph was later to speak approvingly of the idea that there was a "comraderie of field

experience" in discussing relationships among the medics in the AOR. Support for this conclusion is also implicit in their collective acceptance of the ad hoc "fixes" to which they agreed and that crossed so many command lines and that, in many cases, transcended doctrine. Clearly, Brannon's role was key and viewed as such by his superior, Tenoso, who refused to accept the assignment of several Air Force full colonels with AE backgrounds to the 1611th unless they agreed to serve under Brannon, who was junior to them in rank. Those who agreed were assigned to Tenoso directly and then detailed to positions in the AE system under Brannon's command. Full colonels who refused such an arrangement were rejected. Tel. interview, Lt. Col. Farley Howell, USAF NC, May 13, 1999; interviews, Merwin, Feb. 26, 1999; Fischelli, Feb. 9, 1999; and Lt. Col. (Ret.) Philip Mahlum, USAF MSC, Mar. 21, 1999.

88. Mahlum interviews, Feb. 9 and Mar. 21, 1999. The formal requests were in the form of changes in the TPFFD, which after approval by both CENTAF and CENTCOM were sent to the JCS and then to MAC for "sourcing," that is, identifying where the resources would come from by the MAC surgeon's office. Frequent informal telephone conversations between Brannon and the MAC surgeon's planners preceded the formal requests.

89. Brannon, after-action report, pp. 8–9.

90. Ibid, p. 10.

91. See fn. 91. The commander of the 44th Medical Brigade had worked with Brannon at Howard AFB during Operation Just Cause and obviously admired the latter's role in the AE of casualties to San Antonio. Foust interview, Mar. 3, 1999. Foust indicated that he had expected AE to be conducted in the Gulf as it had been during the Panama operation. A highly trained clinician also rated as a flight surgeon who deployed to the AOR with assignment to the AE system characterized Brannon as liked and trusted by all elements of the CENTCOM medical support system. Tel. interview, Col. Londe Richardson, June 9, 1999. Others contacted echoed these positive judgments.

92. Brannon, after-action report, pp. 9–10.

93. Like the distribution of personnel from ARC units in groups rather than as integral units, the crosstraining reportedly created a certain degree of resentment.

94. Nanney interview, Col. Randolph, Apr. 29–30, 1991. According to the concept of operations, the Army was supposed to have a MEDSOM functioning by sixty days after forces deployed to the theater.

95. Foust interview, Mar. 3, 1999. The medical planner on the JCS staff reported in 1992 that 61,000 requisitions for medical supplies had been filled during the Gulf War at a cost of more than $47 million. Capt. Joseph Smyth, USN MC, "Medical Readiness Role on [sic] Joint Staff," "Component Command Surgeons and Planners," 7th Conference on Military Medicine (Apr. 13, 1992): 165.

96. ARC medical flight crews were generally told incorrectly that the necessary supplies were already in the AOR. According to Brannon, the only aeromedical equipment available for the first four months of Desert Shield was that brought by the MASFs and the crews from the 2d AES at Rhein-Main, and two ARC units, the 69th and 72d AES from McGuire AFB, which normally flew strategic AE missions on C–141s. Fortuitously, the reserve crews had assembled their equipment prior to receiving these assurances and decided to bring it anyway. Brannon, after-action report, pp. 7–8. Interviews, Schneider, Jan. 26, 1999; Fischelli, Feb. 9, 1999. Brannon is partially contradicted by Fischelli who said that he dispatched 112 volunteers to the AOR with their equipment from the AFRES 37th Medical Group, which he commanded during the first thirty days of Desert Shield.

97. Nanney interviews, Randolph, Apr.

29–30, 1999; Ferguson, Nov. 25, 1991.

98. *Ibid.* Lieutenant Rebholz, the Navy MSC who worked at the MEDSOM noted when discussing medical logistics the next year that, as with the government of Japan and NBC equipment and supplies, aeromedical evacuation equipment and supplies required "special management" to coordinate their receipt and distribution. Rebholz, "Medical Logistics," p. 96. The CENTCOM surgeon office was apparently not always enthusiastic about the approach of CENTAF to obtaining medical supplies outside prescribed channels. Interview, Col. Robert Ferguson, USAF MSC, Jan. 7, 1999. Ferguson was the CENTAF medical planner in the AOR. General Pagonis, who set up the CENTCOM logistics system in the AOR, makes no mention in his memoirs of any problems with medical supply support. When this was pointed out later to the Army chief of staff during the Gulf crisis, he remarked somewhat disingenuously that that must mean there were no problems with medical supply. Lt. Gen. (Ret.) William G. Pagonis, USA, with Jeffrey L. Cruikshanks, *Moving Mountains: Lessons in Leadership and Logistics from the Gulf War* (Boston, Mass.: Harvard Business School Press, 1992). Tel. interview, Lt. Gen. (Ret.) Frank Ledford, Nov. 12, 1997.

99. Brannon, after-action report, p. 6. Howell interview, May 13, 1999. An extremely large amount of medical supplies arrived in the AOR just prior to the beginning of the ground war. Interview, Maj. Robert Munson, Aug. 12, 1997.

100. Brannon, after-action report, p. 47. Knisely interview, Mar. 25, 1999.

101. GAO, *Operation Desert Storm: Problems with Air Force Medical Readiness* (Washington, D.C.: GAO/NSIAD-94-58, Dec. 30, 1993), p. 11.

102. Gen. Sloan recalls the then commander of the Army's Health Services Command, Major General Winkler, discussing in the early 1980s the concept of "clearing the battlefield" in contrast to the official Army medical doctrine of the time. Analyses of the Beirut evacuation of Oct. 1983 apparently figured in these discussions. Sloan interview, Aug. 20, 1997.

103. He also was clearly disappointed that the AE system in the Gulf had not operated as straightforwardly. Conditioning his perspective may have been the fact that the 44th provided medical backup to the various Army special forces units whose home station was also Fort Bragg. They generally relied on early tactical evacuation of their casualties because they deployed only "light" medical capabilities with troops in their operations. Although Foust's views were expressed long after these events, there is little reason to doubt that he was reflecting his contemporary attitudes, especially in view of the respect he manifested for Colonel Brannon during the interview. Foust interview, Mar. 3, 1999.

104. Brannon recalled a flight surgeon and an anesthesiologist accompanying the first load of casualties from Howard and a medical technician and another flight surgeon flying on the second; however, the latter was merely a passenger on the aircraft. Tel. interview, Col. (Ret.) Robert Brannon, USAF MSC, Feb. 16, 1998. He explicitly took issue with Mabry, Munson, and Richardson's article, "The Wartime Need for Aeromedical Evacuation Physicians," that asserts one physician accompanied each AE flight from Howard. It should be noted, however, that the authors relied on the same written source rather than first-hand knowledge as had Mabry in writing his unpublished paper.

105. Munson interview, Aug. 12, 1997. Interviews, Maj. Gen. Earl Mabry, USAF MC, Feb. 24, 1998 and Apr. 29 and May 3, 1999; Lt. Col. Farley Howell, May 10 and 13, 1994. As was perhaps natural given the confusion about U.S. intentions in the immediate wake of the Iraqi invasion, selectees in some cases were those least important to the activities that released them for service in the

AOR. Mabry, unpublished mss, "The Wartime Need for Aeromedical Evacuation Physicians," p. 8.

106. Mabry interviews, Feb. 24, 1998; Apr. 29 and May 3, 1999. Tel. interview, Col. Carroll Bloomquist, Feb. 29, 1998. Bloomquist was the medical planner at MAC during the crisis.

107. Brannon, after-action report, pp. 15–16. They also served as SMEs for the flight personnel at these sites. Tel. interview, Lt. Col. Farley Howell, USAF NC, June 18, 1999. Howell deployed from Pope after the initial deployment of personnel from the 1st AES, but worked closely with Brannon in organizing and administering the 1611th.

108. Mabry, who is universally credited with organizing the flight surgeons and using them in a meaningful way, said in an interview years later that he found the flight surgeons billeted in Riyadh essentially doing nothing. Mabry interview, Feb. 24, 1998. By contrast, it is apparent that Brannon and his staff saw little positive value for their operation from the presence of the flight surgeons'. According to Mabry, the group, which he dubbed "his little lost legion of flight surgeons" during the interview, sought his help in finding more meaningful roles to play. Tel. interview, Apr. 29, 1999. Lt. Col. Robert Munson, one of these flight surgeons, largely confirmed Mabry's account of the lack of a meaningful role played by the flight surgeons until Mabry's actions. Munson interview, Aug. 12, 1997. Colonel Munson is a rated Air Force pilot in addition to being a physician.

109. Army tactical medical doctrine called for keeping no more than 60 percent of the available beds in the field filled with patients so that they could absorb surges of fresh casualties within their available capacity. Tel. interview, Dr. Robert Joy, June 2, 1999. Mabry, Munson, Richardson, "The Wartime Need for Aeromedical Evacuation Physicians: The Air Force Experience During Operation Desert Storm," p. 944.

110. Mabry interview, Feb. 24, 1998. Tel. interview, Col. Londe Richardson, USAF MC, June 9, 1999. Richardson was in the second group of flight surgeons deployed to the AOR assigned to the AE system. He and Dr. Munson were both assigned to Brooks when ordered to the Gulf. Anticipating the kinds of patients they might encounter in the AE system, they took courses in ATLS and ACLS at Wilford Hall Hospital prior to deployment.

111. Mabry, unpublished mss, "The Wartime Need for Aeromedical Physicians," pp. 10–11. Mabry interview, Feb. 24, 1998. Mabry, Munson, and Richardson, "The Wartime Need for Aeromedical Evacuation Physicians," p. 944. Drs. Munson and Richardson flew to Germany to recruit flight surgeons for service in the AOR from among the thirty to fifty who had been assigned there for AE duty but were able to return only with four because of bureaucratic problems. Munson interview, Aug. 12, 1997; tel. interview, Munson, Feb. 12, 1998.

112. This liaison program was welcomed enthusiastically by Army physicians. Interviews, Mabry, Feb. 24, 1998, and Munson, Aug. 12, 1997; tel. interview, Col. Londe Richardson, USAF MC, June 8, 1999. Richardson deployed from Brooks AFB with Major Munson in the second group of flight surgeons. Both took courses in ATLS and ACLS at Wilford Hall Medical Center on their own initiative prior to deployment.

113. Mabry, unpublished mss., "The Wartime Need for Aeromedical Evacuation Physicians," p. 9. Mabry, Munson, and Richardson detail several episodes, "The Wartime Need for Aeromedical Evacuation Physicians," p. 944. The word "defer" was chosen because the sociology of medical flight crews that included augumenting flight surgeons involved certain obvious tensions: the known professional tensions between doctors and nurses as well as the obvious resentment flight nurses would almost certainly feel if they saw the physicians' presence as an implied comment upon their professional competence. Several interviewees

who served in the Gulf acknowledged these tensions.

114. *Ibid.*, p. 11. The apparent enthusiasm for volunteering among the flight surgeons who were assigned outside the AE system was such that the CENTAF surgeon, Colonel Randolph, had to issue a directive in mid-February to those assigned to the squadron medical elements (SMEs) prohibiting SME flight surgeons from augmenting aeromedical evacuation crews. Nanney, *GWAPS, Medical Support,* p. 222. The mid-February timing of this is somewhat curious in that the U.S. forces and their allies were on the verge of beginning the ground campaign. Because high casualties were predicted, a reasonable presumption would be that there would be a requirement to aeromedically evacuate more "green" patients with a corollary need for more physicians to augment the regular medical flight crews. On the other hand, SMEs might have been viewed as more critical to Air Force operations because close air support required operation within the envelope of many ground based weapons, and only one physician was assigned to each SME along with two medical technicians.

115. *Ibid.* Maj. Robert Munson, "Wartime Need for an Aeromedical Evacuation Physician," "Mobile Hospital Units (And Detachments)," Apr. 14, 1992, p. 95. 7th Conference on Military Medicine.

116. The commander of the 5th MASH noted that one of his predecessors had identified the airlift needed to deploy the MASH as 32 C–141s. Colonel Kenneth Steinweg, "Innovation in the Desert: MASH Medical Packages for Desert Warfare," p.25.

117. Lt. Col. Eldon Edeus, "Medical Mobility in the Desert," "Mobile Hospital Units and Detachments," Apr. 14, 1992, pp. 4–5, 7th Conference on Military Medicine.

118. Ideus, "Mobility in the Desert," p. 9; Steinweg, "Innovation in the Desert pp. 18–25;" 2nd Lt. Patrick J. Bennett, "Design and Implementation of the Forward Surgical Element (FSE)," pp. 8–9. The 5th MASH also broke out a forward surgical Team that was also more mobile than the MASH in its original configuration.

119. This role was taken on with apparent gusto by the USCINCEUR, Gen. Jack Galvin, USA, who was reported to have told his staff that the response to any request for support to CINCENTCOM was "The answer is yes. What is the question?" Col. Robert M. O'Brien, MS, USAF, and Lt. Gen. Alexander Sloan, MC, USAF, "Medical Support to Desert Shield/Storm: The USEUCOM Surgeon's Perspective," *The Journal of the US Army Medical Department* (Mar./Apr. 1992): 3. Gen. John Shaud, USAF, who was Galvin's chief of staff at Galvin's headquarters in his role as Supreme Commander of Allied Command, Europe, confirms that Galvin directed the fullest possible cooperation with any request made upon the European command and also acted as the advocate for securing any cooperation from the European allies needed to meet CENTCOM requirements. Tel. interview, Aug. 18, 1997.

120. O'Brien and Sloan, "The USEUCOM Surgeon's Perspective," p. 4.

121. *Ibid.*

122. U.S. Army doctrine identified "contingency hospitals" as those that became the subject of active interest only on the outbreak of hostilities. Sloan interview, Aug. 20, 1997. The target number of beds for the USAFE contingency system was originally 14,500, but this planning had been overcome by events in the Soviet Union. CINCUSAFE, Gen. Oaks, had placed a moratorium on the replacement of outdated war reserve materiel that meant that many of the dated potency items available were no longer useful when the Gulf crisis began. Nanney, *GWAPS, Medical Support,* p. 211.

123. Interview, LTG Charles Roadman, USAF, MC, Air Force Surgeon General, Jan. 20, 1998. Tel. interview, Gen. (Ret.) Robert Oaks USAF, Sept. 24, 1998. Nanney, "Medical Support," GWAPS, p. 211. Brig.

Gen. Charles Roadman, "Component Command Surgeons and Planners–USAFE Perspective," 7th Conference on Military Medicine, p. 263. At the time of this presentation, Roadman was serving as the MAC/TRANSCOM Command Surgeon. The lead medical personnel, 260 of the 332 required, did not depart David Grant Medical Center at Travis AFB, Calif., for their assignment at Nocton Hall until Jan. 20, 1991. 310th USAF Contingency hospital, RAF Nocton Hall, "Medical After-Action Report–Operation Desert Storm," Mar. 15, 1991. I am indebted to Maj. Gen. (Ret.) William Greendyke, MC, USAF, for a copy of this report. Apparently, the same type of deployment schedule was followed by the staffs assigned to the other three contingency hospitals. Nanney, *GWAPS, Medical Support,* p. 211.

124. Tel. interview, MG James Whinnery, MC, ANG, Sept. 29, 1998. At Gen. Roadman's request, Gen. Whinnery became 17th Air Force Surgeon, filling one of the three numbered air force surgeon's offices temporarily established by Roadman. This decentralization gave the USAFE Surgeon greater latitude to deal with larger policy issues regarding USEUCOM's medical support to CENTCOM.

125. H. T. Johnson interview, June 15, 1999.

126. Nanney, *GWAPS, Medical Support,* p. 209. Roadman, "Component Command Surgeons and Planners–USAFE Perspective," p. 268, 7th Conference on Military Medicine. Lt. Col. Joseph L. McGraw, MS, USAF, "The Gulf War in Europe: An Air Force Medical Review," Perspectives on the Gulf War, pp. 24–25. Sloan interview, Aug. 20, 1997. Sloan notes that the head of the German military medical service told him a telephone request would be met with an immediate positive response. Lt. Col. Christoph Veit, MD, and Maj. Stephan Schoeps, MD, "German Medical Assistance for US Forces During the Gulf Crisis: A Stock-Taking of Lessons Learned," Perspectives on the Gulf War, p. 58. Both German doctors were assigned to the Federal Ministry of Defence. Perhaps indicative of a certain wariness about the casualty figures that the Joint Staff's medical planning module was generating as well as his awareness of resource constraints, Gen. Sloan used the term "negotiate" long after the event when discussing how the bed requirements for USEUCOM were determined in discussions with CENTCOM. Tel. interview, Apr. 23, 1999.

127. Roadman interview, Jan. 20, 1998. Gen. Roadman said that he immediately called in the commander of the 2d AES, part of the worldwide AE system operated by MAC. The 2d provided the medical crews for the MAC C–9s assigned to Rhein-Main Air Base that in turn provided the airlift capability for the AE System within the EUCOM area of responsibility. Roadman's characterization of his role reflects the fact that the USAFE Surgeon had no formal control over either the flight crews or C–9s that belonged to MAC. Based on his queries of the 2d AES commander, Roadman identified a number of equipment deficiencies including a lack of ventilators available for aeromedical evacuation.

128. As described in Chapter 7, a wartime role for the MAC C–9 fleet had been agreed upon between USCINCEUR and the MAC commander in the mid-1980s as part of the program to upgrade the medical support for U.S. forces committed to NATO pressed vigorously by the DCINCEUR, Gen. Richard Lawson. Interview, Lawson, July 29, 1997. As noted earlier, the dispatch of C–9s to the AOR had been rejected by the MAC commander for several reasons. One not usually cited is the lack of sufficient range for the aircraft to have flown nonstop from the AOR to European bases. I am indebted to the former MAC commander, Gen. H. T. Johnson, USAF, for pointing this out. Tel. interview, June 15, 1999. If C–9s had actually been used

to evacuate patients from the AOR, a staging base such as Cairo West would have been necessary for refueling, and the additional stop would have injected another delay in the evacuation chain.

129. The Air Force Surgeon General, Lt. Gen. Monte Miller, reportedly was particularly concerned. Tel. interview, Lt. Gen. (Ret.) Alexander Sloan, Apr. 12, 1999.

130. Roadman, "USAFE Perspective," 7th Conference on Military Medicine, p. 269.

131. Knisely interview, Mar. 25. 1990; Nanney, *GWAPS, Medical Support,* pp. 211–12. The adoption of the "three day pass through" was apparently a recommendation of Gen. Roadman to Gen. Sloan. Ltr to the author, Mar. 5, 1999, from Col. Carroll Bloomquist.

132. Tel. interview, Maj. Gen. P. K. Carleton, MC, USAF, Jan. 27, 1999. Gen. Carleton established a contingency hospital at Seeb in the United Arab Emirates during Desert Shield using host nation facilities staffed chiefly by U.S. medical reservists. Also see the discussion of "delayed primary closure" by the very respected surgeon, Dr. Kenneth G. Swan, who deployed to the Gulf and unfavorably contrasted the surgical techniques he observed there with his experiences in Vietnam. Swan cites a five-day period following initial surgery and removal of dead and damaged tissue ("debridement") of the wound after which final closure should be accomplished. Swan was a very respected surgeon, professor of surgery, and Chief of the Section of General Surgery at Rutgers Medical School. Kenneth G. Swan, MC, USAR, "Heaton Lecture–Combat Casualty Care," Perspectives on the Gulf War, p. 7. Roadman interview, Jan. 20, 1998. In his discussion of this issue, Gen. Roadman focused on the clinical benefits to patients from quickly reaching hospitals in the United States where they could get final definitive care.

133. The initiative for dedicating missions seems to have been Brannon's, but it was supported by CENTAF and CENTCOM, and tacitly, at least, by a senior AE planner from MAC who had been deployed to the European theater and who, according to the Deputy CENTCOM Surgeon, helped stimulate support for the idea at the CENTCOM Surgeon's office unofficially–because it was contrary to MAC policy–from his post in Europe. Gen. Johnson reportedly approved reserving a portion of the airlift support allocated to CINCENT with the proviso that MAC would continue to provide aeromedical evacuation on a retrograde basis for the time being so as not to disrupt the flow of personnel and war materiel to the AOR. Tel. interview, Col. Ben Knisely, MSC, USA, June 20, 1999.

134. Interview, Col. (Ret.) Robert Joy, MC, USA, Mar. 15, 1999.

135. Senior medical officers in the AOR were intensely concerned to ensure that the aeromedical evacuation system was capable of moving large numbers of patients. Col. Ben Knisely, the Deputy CENTCOM Surgeon, recalled that Col. Tsoulos, the Surgeon of CENTCOM Army forces, expressed the view that the threat of chemical weapons that could generate large numbers of casualties quickly made it imperative to use aeromedical evacuation to the COMZ to reduce the patient population in the MTFs as rapidly as possible. He argued that he would even evacuate patients who would ordinarily have been held in the AOR pending recovery from minor wounds because clearing such patients from MTFs in the combat zone would provide the beds to deal with sudden surges in the number of casualties. Knisely interview, June 20, 1999. Mahlum interview, June 21, 1999. Mahlum prepared the final draft of the CONOPS in late December with, to his surprise, Gen. Johnson looking over his shoulder.

136. Contrary to GWAPS, the MAC Command Surgeon's representative to the command's crisis action team during Desert Shield/Desert Storm reports that ten AESS

were available. Mahlum interview, Mar. 21, 1999. This is confirmed by General Johnson, then the MAC commander who noted in an interview long after the event that he had pressured Boeing strongly to advance its delivery schedule. Tel. interview, June 15, 1999. Mahlum was a medical planner with long experience in AE serving in the MAC Surgeon's office during the Gulf crisis. The senior medical planner at Scott, Col. Bloomquist, confirmed Johnson's direction to get the shipsets in case they were needed, and that the contractor, E-Systems, and the MAC logisticians had ten sets ready to deploy well before the ground war began. Ltr to the author, Mar. 5, 1999. Interview, Col. (Ret.) Ronald Priddy, USAF, Sept. 20, 1997. Col. Priddy was assigned as Director of the CRAF at MAC Hqs from 1989 to 1992, and worked closely with Col. Bloomquist. As early as late November, activation of the AE segment of the CRAF had been proposed by CENTCOM. Knisely interview, June 20, 1999.

137. Roadman, "Component Command Surgeons and Planners–USAFE Perspective," 7th Conference on Military Medicine, pp. 270–71. Oaks interview, Sept. 24, 1998.

138. Nanney, *GWAPS, Medical Support*, p. 218. Ltr to the author from Col. Bloomquist, Mar. 5, 1999. Some twenty-four attendees were present. Brannon's after-action report contains a brief discussion of the conference decisions (pp. 22–23), but the only indication of the meeting in Medicine in the Gulf War is a picture on p. 67 of the conferees (photo provided by Col. Belihar).

139. Mahlum interview, June 23, 1999.

140. *Ibid.* Foust interview, Mar. 3, 1999. Fischelli interview, June 28, 1999. Col. Fischelli served as AE coordinator for the southern region at Torrejon Air Base, Spain, during Desert Shield/Desert Storm. The GAO also noted a number of deficiencies in medical regulating that its investigators had uncovered and that participants have discussed freely with the author. GAO, Operation DESERT STORM. Problems with Air Force Medical Readiness, p. 9. As the title suggests, this report is critical of many aspects of Air Force planning and execution of its role in medical support of CENTCOM forces. However, the report appears to be flawed in several respects, such as, investigators working a year or more after the end of Desert Storm cited the one-physician/two-medical technician manning of the AELTs as insufficient to maintain a twenty-four-hour operation on the basis of interviews with "Air Force officials." However, Brannon's after-action report, which the GAO report otherwise cites frequently, specifically notes the problem and indicates that additional personnel were assigned to AELTs or that AELTs were combined whenever possible to allow continuous operation. In fact, Brannon includes a table (Table 3) showing the strength of the nineteen AELTs deployed, and all appear to have been augmented. After-action report, p. 3. Additionally, in some cases, support for a critical finding appears to be anecdotal, the assertion of a single anonymous (at least in the unclassified version) individual.

141. Brannon, after-action report, pp. 27–28. Tel. interview, Mahlum, June 24, 1999. Brannon notes that he tried to get the EUCOM JMRO to go to a contingency regulating system in early December but was refused. When contingency regulating was in fact directed, Brannon asserts that the EUCOM JMRO required more information than was usual in contingency situations, presumably because of the tracking system that the USAFE Surgeon had established at the direction of Gen. Oaks. This interpretation accords with Gen. Roadman's complaints at the 7th Conference on Military Medicine in April 1992, about the dearth of personal information available on patients arriving from the AOR.

142. The "push" terminology is Col. Bloomquist's Ltr to the author, Mar. 5, 1999, from Col. Bloomquist. That both Bloomquist

and Brannon thought alike on the unreliability of medical regulating with DMRIS in the circumstances attendant to CENTCOM offensive operations may have also been due to informal discussions between Scott and Riyadh during December in message traffic or by secure telephone. In his presentation to the April 1992 conference at USUHS, Gen. Roadman noted that, because of the contingency regulating system, the first time any casualty from the AOR was known was when he was processed into one of the USAFE ASFs or medical facilities. "Component Command Surgeons and Planners: USAFE Perspective," 7th Conference on Military Medicine, p. 271. It should be noted that neither Belihar, Randolph, Roadman, nor, for that matter, Tenoso, had any but tangential experience with aeromedical evacuation prior to the Gulf crisis.

143. Brannon, after-action report, pp. 22–24. King Khalid Military City was to be the strategic hub for XVIII Corps, King Khalid IAP the strategic hub for VII Corps; and King Fahd IAP, Jubail IAP, and Muharraq IAP were to share responsibility as strategic hubs for the Marine Expeditionary Forces (MEFs).

144. Sloan interview, Feb. 18, 1998; Brannon interview, Feb. 2, 1999; interview, Lt. Col. (Ret.) Philip Mahlum, June 24, 1999.

145. Ten missions were also dedicated to strategic AE from Europe to the ZI. Mahlum interviews, June 23 and 24, 1999. Also see Nanney interview, Brig. Gen. Roadman, May 29, 1992. In an interview in June 1992, Brannon stated that he had authority for ""fifteen C–141s preconfigured for AE; however, he refers to eleven in his after-action report. Nanney interview, Col. Robert Brannon, MSC, USAF, June 26, 1992, p. 42.

146. Tenoso interview, Jan. 29, 1999. Mahlum interview, June 23, 1999. In this interview, Gen. Tenoso said that he had intended to "dedicate" the aircraft in the precise sense, putting red crosses on their tails and thus under Geneva Convention protections.

147. Interviews, Sloan, Feb. 2, 1999; Mahlum, June 24, 1999; Brannon, Feb. 18, 1999. Bloomquist, Ltr to the author, Mar. 5, 1999. Brannon, after-action report, p. 29. According to Sloan, there was also a possible misunderstanding whether the hub-to-hub system was to go into effect immediately when hostilities began or at an agreed-upon level of casualties. EUCOM and MAC believed the latter. However, the driving factor in the denial of the use of preplanned AE missions was clearly the concern of MAC to maintain the airlift priorities for operational support to CENTCOM forces unless there was an actual evacuation "emergency." Brannon still evidenced some frustration as he recalled the situation many years later during the cited telephone interview with the author and in an earlier interview with Dr. James Nanney, June 26, 1992, pp. 41–43.

148. Nanney, *GWAPS Medical Support*, pp. 220–21.

149. *Ibid.*

150. Brannon, after-action report, pp. 20–21, 58. Best and Tomich, Medicine in the Gulf War, pp. 59–60. Tel. interview, Col. Brannon, Feb. 16, 1998.

151. Brannon, after-action report, p. 25.

152. A joint task force composed of personnel from EUCOM and USAFE under the leadership of the Deputy Command Surgeon, Col. David Lam, MC, USAF, deployed to Incirlik on Jan. 15, to organize medical support. Lam returned to EUCOM HQ on Mar. 8, but the joint task force revived when Provide Comfort began. Best and Tomich, Medicine in the Gulf War, pp. 116.

153. Lt. Col. Joseph M. Harmon, III, "Operation Provide Comfort: A Cry for Help–The Military Role in Humanitarian Aid," Perspectives on the Gulf War, pp. 31–32. Dr. Joseph Leland, "Background Paper, subj: Operation Provide Comfort, June 19, 1992, AMC/HO.

154. Cols. Stephen A. Jennings, MC, USAF, and Daniel L. Cohen, MC, USAF, and Lt. Col. Laura K. Corrow, et al.,

"Deployment of an Air Transportable Hospital in Support of Allied Forces during Operation Provide Comfort: April 29 to July 12, 1991," *Military Medicine*, 158 (Mar. 1993): 136.

155. Best and Tomich, *Medicine in the Gulf War*, p. 117.

156. Tel. interview, S/MSG Mark Johnson, 439th AES (formerly the 74th AES), June 28, 1999. Sgt. Johnson, an AE medical technician assigned to the 74th AES, AFRES, at Westover AFB, Mass., deployed to the AOR on Feb. 3, 1991, and subsequently served for a month at Incirlik flying aeromedical evacuation missions during Provide Comfort. His deployment was confirmed by the 439th ART, Maj. David Zamorski, in a telecon, June 28, 1999.

157. *Ibid.* Harmon, "Operation Provide Comfort: A Cry for Help," pp. 34–35. Interview, Maj. Robert Hayhurst, MSC, USAF, Mar. 11, 1998. Hayhurst had served as AE liaison to the Navy at Bahrain, but was detailed to Turkey by Brannon in late May to provide the liaison function for Army forces deployed into Iraq.

158. Msg., Personal from Gen. Galvin, CINCEUR, for Gen. Johnson, CINCMAC, subj: Provide Comfort, Aug. 14, 1991. Tel. interviews, Maj. Wayne Olsen, MSC, USAFR; and Maj. David Zamorski, MSC, USAFR, June 28, 1999. Maj. Olsen was at the time the senior ART of the 32d AEG based at Kelly, and Maj. Zamorski held the similar position for the 74th AES based at Westover AFB, Mass., which provided the medical flight crews.

159. Quote is from Knisely interview, June 20, 1999.

160. GAO, Operation Desert Storm: Problems with Air Force Medical Readiness, Dec. 30, 1993; GAO, *Operation Desert Storm. Full Army Medical Capability Not Achieved* (GAO/NSIAD-92-175, Aug. 18, 1992); GAO, *Operation Desert Storm. Improvements Required in the Navy's Wartime Medical Care Program* (GAO/NSIAD-93-189).

161. Interview, Dr. Robert Joy, Apr. 19, 1999.

162. Quoted in GAO, *Operation Desert Storm. Problems of Air Force Medical Readiness*, p. 9.

163. Ferguson interview, Jan. 7, 1992; Sloan interview, Feb. 18, 1998; Bloomquist ltr to the author, Mar. 5, 1999.

164. Nanney interview, Roadman, May 29, 1992, p. 14. Gen. Roadman expressed the belief that there could have been a shortage of aircraft that, by implication, could have caused the AE system to "backlog," if not to "fail." Interestingly, Roadman brought up the opening scene of Gone with the Wind with thousands of wounded Confederate soldiers lying in the streets of Atlanta on litters, p. 8.

Chapter Ten

1. Many of the senior participants saw the post–Gulf War period as a fruitful opportunity to establish "jointness" more fully in the U.S. armed forces. In 1992, the author attended a briefing at the Johns Hopkins Research Laboratory by a group of veteran analysts employed by the Center for Naval Analysis (CNA) to analyze the Navy's performance during Desert Shield/Desert Storm. One of them commented that there appeared to be a consensus among senior officer veterans of the Gulf War who CNA had interviewed and who favored more interservice joint activity on the basis of their Gulf experience. According to the analyst, these officers opined that these operations had opened a significant chance to "push" jointness in the services, but that the "window" for success was only about five years long. This was because, after that time, those leading the services would more strongly reflect the service "parochialism" that they had acquired serving with their services as junior officers during the Gulf crisis. Symptomatic of the increased emphasis on jointness was Gen. Powell's sponsorship of The Joint Forces

Quarterly, which began publication in 1992 at the National Defense University where the author was on staff.

2. These assertions were particularly prevalent in comments quoted in Best and Tomich, *Medicine in the Gulf War*, but also implicit in some of the comments in the presentations by medical corps veterans in 7th Conference on Military Medicine.

3. See Chapter 9. The comments were made before medical veterans of the Gulf from all services at the 7th Conference on Military Medicine a year after the war.

4. Tel. interview, Capt. Gary Breeden, MSC, USN, Aug. 30, 1999. Other aspects of the tactical AE system had their critics. The commander of Fleet Hospital Five in the AOR was one of those hospital commanders who faulted the Air Force for requiring MTFs to provide an accompanying medical attendant if medical or operational circumstances compelled an MTF to seek aeromedical evacuation of patients who were not completely stable. His somewhat exasperated comment to fellow conferees at the 7th Conference on Military Medicine apropos this Air Force policy was that "if the Air Force is responsible for medevacs, they should do medevacs!" Capt. Thaker Patel, MC, USN, "Fleet Hospital Five," 7th Conference on Military Medicine, p. 88.

5. Tel. interview, Jan. 29, 1999. Tenoso's comment was offered at the end of the lengthy interview and a specific discussion of how he had planned to handle the projected heavy initial wave of casualties requiring tactical aeromedical evacuation. His spontaneous recollection has been confirmed by the then Deputy CENTCOM Surgeon, Col. Knisely, who reports that extensive discussions preceded Tenoso's acquiescence in reserving a substantial part of the tactical airlift fleet for AE during the initial ground attack. According to Knisely, it was predominantly the issue of the possible need to evacuate large numbers of casualties resulting from Iraqi chemical attacks that caused the reservation of some thirty-five C–130s at the beginning of the ground war. He confirms, however, that operational requirements caused these aircraft to be assigned to other tasks almost immediately. Tel. interview, Sept. 26, 1999.

6. General Boomer's comments regarding the inadequacy of Marine medevac capability were offered with some vigor according to the record; those of the Deputy CENTCOM Surgeon regarding CENTCOM'S plan to use Air Force C–130s for evacuating marine casualties in a recent interview reflected a total lack of faith that Marine opportune airlift could accomplish the required medevac.

7. Perhaps the best illustration of the difficulties inherent in relying on retrograde airlift is embodied in the so-called Grow Escadrille of 1944. Without the U.S. Strategic Air Forces (USSTAF) Surgeon, General Malcolm Grow, being able to press into service fortuitously uncommitted single-engine "Norsemen," a dangerous backlog of patients on the east bank of the Rhine during the invasion of Germany could not have been eliminated. The troop carrier C–47s that had been performing aeromedical evacuation had all been committed to the support of the advancing allied ground forces. (See Chapter 5.)

8. Tel. interview, Lt. Gen. Tenoso, July 31, 1999. Tel. interviews, Maj. Gen. James Whinnery, ANG, Sept. 29, 1998, and July 31, 1999. General Whinnery is married to an ex-flight nurse. Tenoso indicates that these discussions produced no directives or policy changes. Not unreasonably because very few battle casualties evacuated by air required that a physician attempt any really serious emergency medical interventions while in flight during Desert Storm, some observers whose attitude was generally conditioned by the flight nurses' greater experience and knowledge of aeromedical evacuation than the AE flight surgeons assigned to the AOR questioned the very need for carrying physicians. Howell tel. interview, May 10, 1999.

Although not questioning the presence of the flight surgeons on board, General Tenoso noted in the just cited interview that he tended to sympathize with the flight nurses for the same reasons.

9. Tel. interview, Lt. Col. Margaret Richey Raffa, NC, USAF, Aug. 23, 2000.

10. After-Action Report Operation RESTORE HOPE, p. 2. Intratheater airlift was generally performed by C–130s but New Zealand C–748s, which were equipped with litter brackets, were occasionally also used when it was impossible to generate a C–130 for an AE mission; Howell interview, Apr. 1, 1998. Tel. interview, Lt. Col. John Felins, MSC, USAF, Feb. 2, 1999. Felins deployed to Mogadishu with the 1st AES. Interview, Col. Courtney Scott, MC, USAF, Feb. 24, 1998. Operation RESTORE HOPE Theater AE System Briefing, [Dec. 4, 1992; date of the briefing is cited in the after-action report]. The definition is from AMC Regulation 164-1, which cited a definition promulgated by the JCS Medical Steering Committee in 1985 for wartime movements of patients. The AMC regulation is quoted by Thomas Chester, Aeromedical Evacuation After Action Report, Exercise Knightly Rogue, June 1, 1994, Attachment 6. I am indebted to Lt. Col. Susan Konczal for a copy of this report.

11. The twelve categories and the restrictions on patients with those conditions are briefly described in Lt. Col. Carl J. McCann, MSC, and Capt. Catherine D. Young, NC, "A PDR to Conus Aeromedical Evacuation," *USAF Medical Service Diges*t (March–April 1982): 3–4.

12. Tel. interview, Col. (Ret.) Sarah Wright, NC, USAF, Sept. 5, 2000. Col. Wright directed the AE cell in the TACC from Feb. 1992 to June 1995. Also see Lt. Col. Phyllis J. Hansen, NC, USAF, "Safe Practice for Our Aeromedical Evacuation Patients," *Military Medicine*, 152 (June 1987).

13. Until Oct. 1, 1988, MAC retained the status it had been given in 1994 of a "specified command," that is, a single service command performing a joint function whose commander was a co-equal "CINC" with the commanders of overseas joint theater commands such as USEUCOM or USPACOM. After Oct. 1, 1988, the commander of MAC and its successor, AMC, were technically no longer CINCs, although the term appears to have been used throughout Gen. Johnson's tenure in regard to his status as MAC/AMC commander. Betty Kennedy, Point Paper, Nov. 8, 1996, Subj. Evolution of Roles and Missions Authorities in AMC/USTRANSCOM, 1941–1994. AMC/HO.

14. HQ MAC, Scott AFB, Illinois, Anne J to CINCMAC OPORD 01-EX, "Command Relationships," copy, n.d. AMC/HO. The document notes that the command relationships described are effective Oct. 1, 1988, with the U.S. Transportation Command as a unified command and Military Airlift Command as a service component. After that date, MAC no longer was a "specified command," like the U.S. Army Forces Command (FORSCOM).

15. Maj. Thomas Fraley, HQ MAC/XOC, Point Paper, subj: Civil Reserve Air Fleet (CRAF) Aeromedical Evacuation (AE) Segment, Mar. 11, 1992. Files: AMC H/O.

16. Some seven years later, Col. Brannon still expressed frustration with the way medical regulating had been conducted during Desert Storm. Tel. interview, Feb. 16, 1998. Concerns with medical regulating during Desert Storm were not confined to the Air Force, as the critical comment by the commander of the 44th Medical Brigade cited in the last chapter indicated. In a recent interview, the former Deputy CENTCOM Surgeon stated that, in his opinion, the inadequacies of medical regulation were the most serious issue that surfaced with regard to aeromedical evacuation during the Gulf crisis. Tel. interview, Col. (Ret.) Benjamin Knisely, MSC, USA, Sept. 26, 1999.

17. Tel. interviews: Col. Bloomquist, July

1999; and Lt. Col. Mahlum, Aug. 20, 1999. Breeden interview, Aug. 30, 1999. According to Captain Breeden, the TRANSCOM SG staff analysis of the USEUCOM JMRO medical regulating during Desert Storm showed that 60 percent of the patients went to a different aerial port of debarkation (APOD) in the COMZ than that serving the MTF designated to receive them and that 50 percent of them were delivered to APODs in the wrong country. Tel. interview, Sept. 2, 1999. Bloomquist indicated that, in retrospect, when the "push" system was agreed upon in Riyadh in early January, the participants departed without a firm enough understanding when it was to go into effect vice the DMRIS normal contingency procedures.

18. Interview, Lt. Gen. (Ret.) Alexander Sloan, MC, USAF, Aug. 20, 1997.

19. Military Airlift Command, Calendar Year 1990, Vol. I: Narrative and Appendices (Scott AFB, Ill: Office of History, MAC, Dec. 19, 1991), pp. 71–75. AMC H/O.

20. With broad responsibilities for TRANSCOM's varied operations that transcended those of his parent Air Force command, MAC, Gen. Tenoso recalled only once in his tenure as J–3 involving himself with AE matters, and this was largely by chance. During a routine review of a proposed budget submission from TRANSCOM's airlifters, Tenoso noted that no money had been allocated for MASFs, the essential holding element through which patients of all services engaged in contingency operations entered the Air Force aeromedical evacuation system, and he caused the budget to be revised to include the necessary funds. Tenoso tel. interview, July 30, 1999.

21. In a recent interview, Col. Knisely, the Deputy CENTCOM Surgeon, noted that the then Col. Carleton was an important participant in discussions of AE with the CENTCOM and CENTAF surgeons. Tel. interview, Sept. 26, 1999. During the post-Gulf deliberations on how to improve AE at TRANSCOM, Carleton was asked to comment on an assessment of the AE system by the senior MAC staff director charged with its development by Gen. Johnson. Ltr, Carleton to Col. Charles E. Maloom, HQ MAC/QSR, Sept. 16, 1999, copy to Roadman. It seems probable that Roadman, new in his job, had asked Maloom to send a copy of the assessment to Carleton for his comment. I am indebted to Carroll Bloomquist for a copy of this letter.

22. Tel. interview, Lt. Col. Philip Mahlum, June 24, 1999.

23. Tel. interview, H. T. Johnson, Sept. 2, 1999. Breeden reports that Johnson briefed him and other members of the TRANSCOM Surgeon's office after Breeden's arrival in July 1991 that he was bringing an outstanding officer on board within several months to direct their efforts. Tel. interview, Breeden, Aug. 8, 1999.

24. Several members of the MAC Surgeon's staff during Desert Shield and Gen. Johnson himself have indicated that one reason he dispatched the MAC Deputy Command Surgeon, the then Col. Mabry, to Riyadh to serve as an AE advisor to the CENTCOM Surgeon was to provide Johnson with a direct informal source of information on how the AE system was functioning.

25. Johnson interview, Sept. 2, 1999.

26. Rutherford's comment is part of an annotation he made on a memo for CINCMAC from Roadman, subj: Aeronautical Assessment Report, Sept. 17, 1991, in which the Vice CINC indicated the importance Johnson attached to the subject and that "we may need to discuss the subject." I am indebted to Carroll Bloomquist for a copy of this report, which shows Johnson's initial.

27. Ltr, subj: USTRANSCOM Joint Casualty Evacuation Working Group (JCEWG). Attendees included representatives from the USAF SG, the theater commanders, the JCS–J4 Medical Readiness Division, ASMRO, and the theater JMROs.

28. Cdr. Gary Breeden, Point Paper, subj: Results of Joint Casualty Evacuation Conference, Oct. 25, 1991. AMC H/O Files. Breeden interview, Aug. 19, 1999.

29. Breeden Point Paper, Oct. 25, 1991. Tel. interview, Knisely, Sept. 27, 1999. Knisely confirms the conferees' positive response to the TRANSCOM proposal to assume responsibility for medical regulating, which he applauded. The "incestuous" comment seems curious because the Gulf experience with which all present were certainly familiar cried out for better integration of the two functions.

30. "Staffing" a proposal involves securing agreement and/or comments on a proposed course of action from those who it may affect or senior officials whose approval is required before the official with authority to make the final decision does so.

31. *Ibid.*

32. Staff Summary Sheet (SSS), Feb. 24, 1992, Subj. Draft MedReg Proposal for Preliminary Coord Release to Geo CINC Sgs, Roadman to Gen. Johnson. Roadman recommended that the CINC approve transmitting copies of the draft proposal to the geographic CINC SGs and the Forces Command (FORSCOM) SG for "preliminary screening and any comments" as TRANSCOM had agreed to do at the earlier conference hosted by J–4. Breeden prepared the SSS. Breeden papers.

33. Ltr, Lt. Gen. Dane Starling, USA, DCINCTRANS, to Lt. Gen. Henry Vicellio, Dir. Joint Staff (DJS), Apr. 13, 1992, Subj. USTRANSCOM Proposal To Improve Intertheater Medical Regulating. Breeden papers. The USAF served as the administrative executive agent for the JCS, who, according to Gen. Roadman, had not exercised OPCON over ASMRO allowing the USAF SG to take over OPCON by default. Ltr, Roadman to RADM Joseph Smyth, USN, MC, Dep. Dir. for Medical Readiness, J–4. Breeden papers.

34. Ltr, Roadman to Smythe, June 1, 1992, subj: ASMRO Ownership; Ltr, Roadman to Smythe, June 1, 1992, subj: Response to USAF Planner's Memo #357-92. Breeden papers.

35. *Ibid.*

36. Joint Staff Action Processing Form prepared by Maj. Kirschner for the DJCS, Lt. Gen. Henry Vicellio, USAF, June 30, 1992, subj: USTRANSCOM Proposal to Improve Intertheater Medical Regulating Worldwide; DJCS Memo for DCINCTRANS, July 6, 1992, subj: USTRANSCOM Proposal to Improve Intertheater Medical Regulating Worldwide. Breeden papers. The TRANSCOM DCINC Gen. Starling, had specifically requested that the JCS approve the TRANSCOM proposal "in concept" once concurrence had been obtained from the services and theater commands so that joint working groups could begin the necessary work of drafting new DOD directives and make out-of-cycle manpower requests that the ASD/Health Affairs had already indicated he would support. Ltr, Starling to Lt. Gen. Vicellio, DJCS, April 13, 1992, Subj. USTRANSCOM Proposal to Improve Intertheater Medical Regulating Worldwide. Breeden papers.

37. Betty R. Kennedy, Point Paper, subj: Aeromedical Evacuation Historical Precedents, April 6, 1998, AMC/HO. Point paper, n.d., Subj. Significant Conversational Issues, 3rd Qtr FY 96, AMC/HO. Breeden Interview, Aug. 19, 1999. According to Breeden, the term "execution" was inserted into the system's title to preclude development of TRAC2ES being assigned to the Defense Information Systems Agency (DISA), to whose jurisdiction the ASD/C3I had decided to assign all new C3I systems development in keeping with the objectives of Strassman's Corporate Information Management initiative. Breeden interview.

38. Tel. interview, Lt. Gen. Charles Roadman, Aug. 5, 1999. When the author queried Gen. Roadman about the detailed development of the TRAC2ES Program, Roadman directed the author immediately to Capt. Breeden. According to one of Roadman's experienced staff officers who participated in the initiative, the general

called Breeden and the small group of staff members he directed as "the Wolf Pack," because he could turn them loose to do a job with minimal supervision. Tel. interview, Lt. Col. Mahlum, Aug. 20, 1999. In a separate interview, Breeden lauded the aggressiveness of his group in pursuing the general's agenda and also cited the command surgeon's use of this nickname for the group. Interview, Capt. Gary Breeden, Aug. 19, 1999. For a brief description of the Corporate Information Management initiative by its author, see Paul A. Strassman, "Corporate Information Management: Streamlining A Cottage Industry," Defense (Nov.–Dec. 1991): 18–20. Prior to his appointment in the Defense Department, Strassman had been an extremely successful executive at Xerox.

39. Dr. James K. Matthews, and Dr. Jay H. Smith, interviewers, Oral History, General Hansford T. Johnson, USAF, CINC, U.S. TRANSCON and AMC (Scott AFB, Ill: Offices of History, TRANSCOM and AMC, Dec. 1992), pp. 77–78. According to one of the members of Roadman's staff, he appeared to arrive with a commitment to TQM, which he demonstrated in a number of ways. Not the least of these was funding classes for some of his staff to learn about this management system, but also by his continuous emphasis on it during his tenure as the dual-hatted command surgeon. Tel. interview, Lt. Col. (Ret.) Philip Mahlum, Jan 31, 2000. Mahlum's view of the SG's commitment to TQM is confirmed by Roadman's senior MAC staff officer responsible for AE who said in a recent interview that he had not heard much about the movement until Roadman was assigned and "brought TQM to the forefront of the TQM activities [in the Command]." Tel. interview, Carroll Bloomquist, Feb. 1, 2000.

40. TQM was a management system developed by W. Edwards Deming, an American whose ideas were first put into practice in Japan. Demings' ideas began to be adopted widely by top U.S. companies in the 1980s, notably first by the Ford Motor Corporation, as it began to search for better ways to compete against what came to be known ruefully as "Japan, Inc.," because of the Japanese government's directing role in the Japanese economy. Deming formulated "fourteen points" with what one biographer characterized as the "modest goal" of creating a management equivalent of the Ten Commandments. These have been boiled down to five by some successful management consultants. The words "process" and "quality" are key words found in discussions of TQM. Good discussions of TQM are to be found in *The Man Who Discovered Quality: How W. Edwards Deming Brought the Quality Revolution to America–The Stories of Ford, Xerox, and GM* (New York: Random House Times Books, 1990), and Warren H. Schmidt and Jerome P. Finnigan, *TQManager: A Practical Guide for Managing in a Total Quality Organization* (San Francisco: Jossey-Bass Publishers, 1993).

41. Breeden interview, Aug. 19, 1999. Staff Summary Sheet, Gen. Roadman for CINC TRANS (Fogleman), Subj. Approve Recommendations to Establish GPMRC-ASMRO, AECC, & Parts of AMC SG, Apr. 18, 1994, with Gen. Fogleman's signature of approval. AMC/HO. Gen. Johnson also had his senior staff sit through TQM classes as part of his program to impart "quality" to the TRANSCOM mission, and his successor, Gen. Ronald Fogleman, organized the Joint Transportation Corporate Management Information (CIM) Center (JTCC) within TRANSCOM to use CIM techniques to guide evolution of the defense transportation system. Mahlum, tel. interview, Jan. 31, 2000. General Ronald R. Fogleman: An Oral History (Scott AFB, Ill: TRANSCOM Research Center, Mar. 1995), p. 71. One of Johnson's senior staff during Desert Shield/Desert Storm, Gen. Walter Kross, Johnson's J–3/4, and later CINCTRANS from 1996 to 1998, was still strongly supportive of the JTCC in a lengthy interview in

1998 during which he also repeatedly stressed the need for continuous process improvement and the use of the proper "metrics," that is, the measurement standards that derive from the continuation of the TQM approach that began with Johnson, to evaluate process changes. General Walter Kross, Oral History (Scott AFB, Ill: TRANSCOM Research Center, Oct. 1999), pp. 66–67, 96–99. Money to support the TRAC2ES workshops was obtained from a number of different agencies in addition to that obtained from Strassman's office. Mahlum, tel. interview, Jan. 31, 2000.

42. Reports of the three CIM workshops were bound together and published under the title *Corporate Information Management (CIM): Administrative Support of Medical Evacuees. Regulate and Evacuate Patients Workshops* (Arlington, Va.: SRA Corporation, 1993). SRA Corporation conducted these workshops for the TRANSCOM Staff. Breeden documents.

43. Executive Summary, Administrative Support of Medical Evacuees Business Process Improvement Baseline Workshop, Regulate and Evacuate Patients Baseline Workshop Report (Arlington, Va: SRA Corporation, CIM-92-787-016-002, Dec. 31, 1992), p. 1–1.

44. Point Paper, "Significant Conversational Issues, 3rd Qtr FY 96," p. 28. Breeden interview, Aug. 18, 1999.

45. Inspection Report 93-INS-13, Medical Mobilization Planning and Execution, Sept. 30, 1993, pp. 160, 162.

46. Lt. Col. Clayton Chapman, Chief, Special Ops Planning, DCS/Quality Support and Readiness (QS&R), Aeromedical Evacuation Assessment Report to CINCMAC, transmitted to CINCMAC by a Staff Summary Sheet (SSS) signed by Brig. Gen. Donald Loranger, DCS/QS&R, Sept. 17, 1991. Gen. Johnson has annotated the SSS as well as the report itself with comments in pen. I am indebted to Carroll Bloomquist for a copy of the report and a covering memo dated Sept. 27, 1991, to Johnson responding to the CINC's comments on the SSS. Indicative of Johnson's objective of changing attitudes within his command and "instilling quality" performance throughout, he had redesignated the MAC Inspector General as the DCS/QS&R. The charter for the IG called for him to visit MAC units to evaluate their ability to perform their missions, and Johnson wanted him to act as the "catalyst" for quality on his visits. The name change was shrewd because the MAC IG conducted operational readiness inspections (ORIs) for the MAC commander, which meant that the IG was traditionally viewed warily by MAC wing commanders because they could be relieved of their commands if their wing failed an ORI. Oral History, General Hansford T. Johnson, pp. 75–77. (The attitude is exemplified by the wry joke that circulated in the command section of the 60th MAC Wing when the author was DCO for operations. This identified the two biggest lies ever told as the IG's comment to the wing commander when he lands with his ORI team that "we're here to help you," and the latter's response of "we're glad to have you here.") While presumably sharing Johnson's interest in quality, Headquarters USAF, took a dimmer view of the name change, and, effective Aug. 1, 1992, the QS7R once again became the (now) AMC IG.

47. A specially constituted self-inspection team from the 375th AAW, which, prior to the autumn 1990 reassignment of the mission to the MAC Surgeon, had controlled MAC's AE forces worldwide.

48. AE Assessment Report, Executive Summary. The medical planners were Maj. Philip Mahlum, MSC, and Maj. Theresa Heckman, a flight nurse, both of whom worked for Col. Bloomquist who was dual-hatted as a member of the Surgeon's staff of both TRANSCOM and MAC. Dr. James Nanney interview of Col. Bloomquist, May 28, 1992. S/G HO Files.

49. Comments are handwritten on the

Sept. 17, 1991, SSS transmitting the assessment report.

50. *Ibid.* Johnson printed "THE REQUIREMENT" in capital letters followed by an exclamation point. Ledford, the Army Surgeon General, had expressed the fear that the Air Force's successful evacuation of critical patients from Howard AFB immediately after receiving emergency surgery might appear to be an acceptable model for medical support of future contingencies. He feared that this misapprehension could then cause an unwarranted reduction in deployed higher echelons of care when their absence at Howard AFB was really dictated by operational considerations that overrode good medical practice. See Chapter 8.

51. *Ibid.*

52. Self-perception of greater status because of the work that one person does compared to that performed by colleagues within the same organization is certainly not uncommon within bureaucratic organizations. Because the vast majority of MAC AE units comprised reservists of various sorts, those concerned with the command's primary mission of strategic airlift probably were indifferent if not mildly biased toward them. When the author was discussing his first assignment to MAC with the colonels' assignment officer in the Pentagon, the latter made it plain that assignments to MAC' strategic airlift wings were more desirable because they were part of what he termed "Big MAC." There, he asserted, opportunities for the command of operational units and promotions were better than in "Little MAC," the various nonairlift organizations that were part of the airlift command. The 375th was removed from the MAC AE squadrons' chain of command on Oct. 1, 1990, during Desert Shield. However, Gen. Johnson's concerns predated the Gulf crisis. MAC History Office, MILITARY AIRLIFT COMMAND, CALENDAR YEAR 1990. Vol. I: Narrative and Appendices, Dec. 19, 1990, p. 71. AMC Archives. Mary D. Hebert, History of the 375th Military Airlift Wing (MAC); 1 July–31 December 1190, Vol. I: Narrative, p.5.

53. Memo for CINCMAC from Brig. Gen. Charles Roadman, subj: Aeromedical Evacuation Assessment Report, Sept. 27, 1991.

54. *Ibid.*

55. The CMMS is discussed in MAC Office of History, Anything, Anywhere, Anytime, pp. 171–79.

56. Lt. Gen. Henry Viccellio, USAF, "Mobility Requirements Study Briefing," Mar. 13, 1992. Viccellio's presentation was part of a session of the Washington Strategy Seminar on "Power Projection and the Gulf War." A copy of Viccellio's briefing slides and a summary of his oral presentation is in the possession of the author who attended the session. The projection was to be for the 1999 timeframe with the intent of affecting the FY 1993 budget.

57. A Strategic Plan for the United States Transportation Command Surgeon's Office (Scott AFB, Ill: TCSG, May 1, 1993), p. 1.

58. ASMRO would soon be combined with the AECC at Scott to form the global patient movement requirements center (GPMRC). The deployable regulators were part of the joint transportation reserve, and they were eventually molded into a UTC for TPFDD tasking. Ltr, Col. Bloomquist, Feb. 4, 2000.

59. *Ibid.*, pp. 2–3. Included in the required exercises were those that supported FORSCOM if the Integrated CONUS Medical Mobilization Plan was implemented. A memo for the service secretaries and the Chairman JCS, among others, from Secretary of Defense Cheney, Subj.: Strengthening Department of Defense Transportation Functions, was issued on Feb. 14, 1992, giving CINCTRANS combatant command over the TRANSCOM components in peace as well as wartime. DOD Directive 5158.4, Jan. 8, 1993, subsequently confirmed the new authority of CINCTRANS.

60. *Ibid.*, p. 2.

61. Tel. interviews, Philip Mahlum, Jan. 31 and Mar. 28, 2000.

62. The quotation is from a book extolling TQM written by General Creech who after retirement served as a successful management consultant. Creech, *The Five Pillars of TQM*, p. 121. Included in the front of the book are words of praise from experts like Peter Drucker, Tom Peters, Rosabeth Moss Kanter of the Harvard Business School, as well as General McPeak who wrote that the "overarching factor in our great success in the Gulf War" was the Air Force having followed Creech's TQM concepts. As Gen. McPeak's comments suggest, the Air Force heavily subscribed to TQM during his tenure as chief of staff, and a TQM "center" was established at Maxwell AFB, which is home of the Air Force's Air University.

63. Johnson Oral History, p. 77. Johnson's successor as CINCTRANS/ Commander AMC, Gen. Ronald Fogleman, characterized his predecessor as a "true believer" regarding the value of applying TQM principles, and, while Fogleman had continued the TQM emphasis of his predecessor to help shape improvements in his dual commands during his tenure, he had sought to "operationalize it." Tel. interview, June 28, 2000.

64. Lt. Gen. Alexander Sloan, the former USEUCOM Surgeon during Desert Shield/Desert Storm who served as Air Force Surgeon General from late 1991 until 1994, indicated in a recent interview that he also stressed TQM during his tenure. Tel. interview, June 30, 2000. TQM principles were also put into play in other venues, including the line units of the ARC. Queried about his knowledge of TQM, one ANG operations group commander who had taken his C–130 unit to the Gulf War, stated in a recent interview that every commander in the early 1990s had to deal with the emphasis on TQM. Tel. interview, Col. Ronald Hale, ANG, Mar. 7, 2000. In another recent interview, an Air Force nurse practioner stationed at Minot AFB in the mid-1990s reported that TQM principles were applied to the operation of the Air Force Medical Service in the field and were even part of the accreditation process by a visiting hospital accrediting organization at a northern SAC base to which she had been assigned. Interview, Capt. Barbara Tuitele, NC, USAF, Feb. 2, 2000.

65. The timing of General McPeak's actions more than the fact that there would be changes in the Air Force's major command structure was somewhat unexpected. The creation of two new commands had been discussed among the Air Force's three- and four-star officers in the early spring of 1991, but were envisioned as occurring in 1995. Air Mobility Command (Provisional) History, 15 January–31 May 1992, Vol. 1: Narrative and Appendices (Scott AFB, Ill: Office of History, Air Mobility Command, June 29, 1993), pp. 5–6.

66. McPeak vigorously denied in his end-of-tour interview that the end of the Cold War, per se, was the catalyst for Air Force reorganization in his mind. He asserted that what he wanted to do "was to take a very good, world-class organization, the best Air Force in the world, and notch it up, keep it climbing." General Merrill A. McPeak End of Tour Interview (Bolling AFB: AF History and Museums Program, 1995), pp. 3–4.

67. Lt. Col. (Ret.) Mark Hamilton, MSC, USAF, former AMC SGX, agreed with this interpretation in a tel. interview Feb. 25, 2000.

68. Air Mobility Command (Provisional) 15 January–31 May 1991, pp. 2–3.

69. It is apparent from the early discussions within the provisional AMC staff that they were confused about exactly what responsibility for AE the new command would retain when it was "stood up" as the MAC successor. For example, Betty Kennedy, Interview of AMC (P) Commander and key staff, Subj. "Combatant Command (COCOM) and Force Assignment," Mar. 11,

1992. AMC/HO. Generals Johnson and Roadman had briefed the (COFS the week before on March 4. The materials that were presented to him included an executive summary of the first AE strategic plan and an AE "white paper." I am indebted to Col. Bloomquist for a copy of the complete staff "package," which includes draft slide copies for the Mar. 4 briefing attached to a Staff Summary Sheet, Gen. Roadman for the AMC Commander, Subj. Aeromedical Evacuation (AE)–The Future (AE Strategic Plan), Feb 17, 1992.

70. Lt. Col. Mark Hamilton, Position Paper on Fixed-Wing Aeromedical Evacuation and Proponency, copy n.d. (ca. Jan. 1996). I am indebted to Carroll Bloomquist for a copy of this memo. Hamilton had replaced Bloomquist on the AMC SG staff. Bloomquist, tel. interview, June 25, 1998. Generals Johnson and Roadman went to Washington on Mar. 4, 1992, to brief the CSAF on the AMC case for retaining administrative command of the aeromedical airlift and evacuation squadrons, which he rejected. They had been advised by their staffs that the USAFE and PACAF commanders had indicated that they did not want administrative command, which would carry with it responsibilities for training, policy and doctrine, equipment, evaluation, and contingency planning. Air Mobility Command (Provisional), pp. 6-9–6-10. Notes, Wednesday Staff Meeting of Lt. Gen. Kross, Provisional AMC Commander, Mar. 4, 1992. AMC/HO. Tel. interview, Carroll Bloomquist, Dec. 29, 1998. Col. Bloomquist developed the AMC position and accompanied Johnson and Roadman to Washington.

71. Betty R. Kennedy, Background Paper, subj: Evolution of Roles and Missions Authorities Vested in AMC and USTRANSCOM, 1941–1994, Nov. 30, 1994, AMC/HO.

72. The UCP in effect "defines" the system of U.S. joint unified and specified commands, delineating the mission of each, as well as the area of responsibility and the component commands that compose it.

73. Fogleman Oral History, pp. 22–23. Some of the AMC staff believe that Gen. McPeak was behind Fogleman's initiative. Hamilton tel. interview, Feb. 25, 2000.

74. The transfer of AMC C–130s was effective Oct. 1, 1993. Betty R. Kennedy, Background Paper, Subj. Evolution of Roles and Missions Authorities Vested in AMC/USTRANSCOM, 1941–1994, Nov. 8, 1996, AMC/HO.

75. Interview, Brig. Gen. (Dr.) Thomas D. Gensler, USAF, MC, USAF Medical Digest 44 (Fall 1993): 6. Dr. Gensler was the ACC Command Surgeon and discusses the ACC medical service including its forthcoming assumption of the tactical AE mission. For the success of his medical service, he stressed the need for "a Total Quality (TQ) culture."

76. Tel. interview, Col. Richard Devereaux, USAF, Feb. 9, 1999. Col. Devereaux, Chief of the Joint Staff J–3 (Operations) Readiness Division, at the time of the interview, had a background in AMC as a C–5 pilot and squadron commander. He wrote a study while at the School of Advanced Airpower Studies at the Air University expressing concern that DIRMOBFORs might be appointed without airlift experience and would not have the "clout" with the JFACC to ensure that the JFACC understood the issues involved in his airlift support. See Lt. Col. Richard T. Devereaux, *Theater Airlift Management and Control: Should We Turn Back the Clock to be Ready for Tomorrow?* (Maxwell AFB, Ala.: Air University Press, 1994). When TRANS/AMC commander, Gen. Fogleman sought to ensure the requisite expertise by establishing the Air Mobility Warfare Center at Fort Dix, N.J., for the Advanced Study of Air Mobility (ASAM) which had as one of its "core" courses a DIRMOBFOR seminar. I am indebted to Ms. Ellen Galloway, secretary to the ASAM dean of education, for a copy of the descriptive brochure on ASAM and its current class of 2000.

77. The chief of staff required AMC to define "proponency" and was not pleased with the command's initial statement because he did not think it expansive enough. McPeak told the provisional AMC Commander, Gen. Kross, who briefed him in the Pentagon in April, that AMC's proponency statement "did not go far enough into requirements and inventory/fleet management." Memo for the [USAF] Deputy. Chief of Staff, Plans and Operations, from Col. Michael M. Dunn, Subj. ACC/AMC Brief to CSAF, Apr. 30, 1992, AMO/HO

78. Position Paper on Fixed-Wing Aeromedical Evacuation and Proponency. Emphasis in the original. The paper's origins lay in a query from the new AMC Command Surgeon, Gen. Hoffman, to his senior medical planner, Lt. Col. Mark Hamilton, whether the AMC SG controlled the aeromedical evacuation system. Hamilton had succeeded Col. Bloomquist in the planner's position. Hamilton tel. interview, Feb. 25, 2000.

79. *Ibid.*

80. *Ibid.*

81. *Ibid.*

82. *Ibid.*

83. *Ibid.*

84. *Ibid.* Emphasis in the original.

85. The staff officer in question made this assertion followed by the injunction in extremely large type "Recentralization of the Aeromedical Evacuation System is an Imperative" in concluding Position Paper on Fixed-Wing Aeromedical Evacuation and Proponency.

86. *Ibid.*

87. Joint Pub 4-02.2 was published Dec. 30, 1996. Joint publications were initiated under the direction of the Chairman, JCS, Gen. Colin Powell, in Nov. 1991, with the publication of Joint Pub 1, Joint Warfare of the Armed Forces (Fort Lesley J. McNair: National Defense University Press, Nov. 11, 1991). According to participant Lt. Col. (Ret.) Philip Mahlum, Joint Pub 4-02.2 was developed at a joint drafting session held at TRANSCOM headquarters under AMC SG leadership and the draft took more than six months to coordinate at the headquarters level and to secure final approval. Tel. interview, Feb. 22, 2000.

88. Joint Tactics, Techniques, and Procedures for Patient Movement in Joint Operations, p. II-2.

89. For example, the interservice controversies of the late 1950s and 1960s about which service, Army or Air Force, moved casualties from forward echelons of care to rear-area MTFs, were supplanted by the flexible approach used in Desert Storm that recognized the need to supplement integral service component commands' AE capabilities with support from other services as needed or a joint AE common-user system. See Joint Tactics, Techniques, and Procedures for Patient Movement in Joint Operations, pp. II-7–II-8. This joint publication as evidenced by its number, Joint Pub 4-02.2, is a subset of the basic joint doctrine publication regarding medical support of joint operations published the year before in whose drafting AMC had participated. See Joint Pub 4-02, Doctrine for Health Service Support of Joint Operations, Apr. 26, 1995. A recent interview with Col. Sarah Wright, the first flight nurse assigned to the C–3 cell in the TACC who served from June 1992 to Nov. 1995, indicates that the system envisioned in Joint Pub 4-02.2 has not yet been fully implemented. Tel. interview, Col. (Ret.) Sarah Wright, NC, USAF, May 31, 2000.

Chapter Eleven

1. Memo, for Sgs at AMC, ACC, USAFE, AFRES, ANGRC, TRANSCOM, CINCENT, and AMC TACC, et al., from Col. Thomas A. Chester, MSC, USAF, Commander 1st AES, Subj.: Aeromedical Evacuation After Action Report–Operation Restore Hope/Somalia, June 15, 1993. I am indebted to Lt. Col. John Felins, MSC,

USAF, for a copy of this report, which he drafted and copies of the Concept of Operations for the Theater AE System Briefing and pertinent extracts from CONOPLAN 1292 itself prepared for the Somalia operation. The then Capt. Felins deployed to Mogadishu with the main body of the 1st AES in late December, 1992. He was the Chief of the Theater Aeromedical Evacuation Operations Policy Development and Deployment Team that later prepared the ACC general CONOPS for deploying and operating theater AE systems after the 1st AES transferred to ACC. Memo for HQ USAF DO/SG, USTRANSCOM GPMRC, AMC TACC, USACOM, HQ ACC, et al., Subj. ACC Concept of Operations (CONOPS) for Theater Aeromedical Evacuation System Assets, Gen. Thomas Gensler, ACC Command Surgeon, February 28, 1995, AMC/HO.

2. The offer of 20,000 to 30,000 U.S. troops to support relief operations in Somalia was made on Nov. 26th by Acting Secretary of State Lawrence Eagleberger, but the subsequent TACC query of the Pentagon revealed that the Pentagon had no plans underway for such an undertaking. Kent M. Beck and Robert deV. Brunkow, Global Reach in Action: The Air Mobility Command and the Deployment to Somalia, Vol. I (Scott AFB, Ill.: Office of History, AMC, Feb. 15, 1994), entry for Nov. 26, 1999, p. 26. Global Reach is a chronological narrative of the principal events of each day. However, according to the then AMC commander/CINCTRANS, Gen. Fogleman, he had gotten a sense from conversations with Chairman Powell that the United States might get directly involved and had taken steps to position mobility forces in anticipation of a possible U.S. deployment. Fogleman Oral History, pp. 12–13.

3. Howell, tel. interview, Apr. 1, 1998. After Action Report, Operation Restore Hope/Somalia, p. 8.

4. Tel. interview, Lt. Col. Farley Howell, NC, USAF, Apr. 1, 1998. Howell relates that he was at Pope AFB when alerted to deploy and got information about the new doctrine regarding the AME via facsimile and which he felt was not very clear. He subsequently discussed his role with Lt. Col. Philip Mahlum of the AMC Command Surgeon's office by telephone, but Mahlum could not further clarify the AE liaison's role in the AME or Howell's specific responsibilities in the AME and recommended that Howell just do the best he could. Howell's characterization of the planning documents made available to the AE planners at Pope AFB is supported by the 1st AES commander's after-action report on Restore Hope, which stated that these documents "were often contradictory in nature and failed to include mission essential data and intelligence" (p. 12). It should be noted that Howell's departure occurred only five days after the President's action, and the CONOPS was being hastily prepared at CENTCOM HQ at MacDill AFB, Fla., during that same short period. Howell went directly to McGuire AFB from Pope and was airlifted with other members of the AME to Rhein-Main on a C–5 via Cairo West, which was the primary refueling point for airlift flowing from the United States to the AOR.

5. The quoted characterization is from LTC (P) Iris J. West, NC, USA, and Maj. Christopher Clark, NC, USA, "The Army Nurse Corps and Operation Restore Hope," Military Medicine 160 (Apr. 1995): 179. These authors drew upon more than ninety oral history interviews with Army nurses who served in Somalia who reported that they were confined to the hospital compound because of the chaos and danger outside, which was quite unlike their Saudi Arabian experience. They relate a case in point (pp. 181–82) of a young Irish nurse working with one of the humanitarian operations in Mogadishu who was killed by Somali bandits on her way with several colleagues to a reception in the Somali capital.

6. A concise background on the U.S. deployment to Somalia can be found in Memo for Senator Thurmond and Senator Nunn from Senator Warner and Senator Levin, Subj.: Review of the Circumstances Surrounding the Ranger Raid on October 3–4, 1993, in Mogadishu, Somalia, Sept. 29, 1995, published by U.S. Senate Committee on the Armed Services.

7. *Ibid.* The best work from a political-military policy perspective informed by their roles in the crisis is John L. Hirsch and Robert B. Oakley, *Somalia and Operation Restore Hope: Reflections on Peacemaking and Peacekeeping* (Washington, D.C.: United States Institute of Peace, 1995). Oakley was the former ambassador to Somalia and Hirsch the former Deputy Chief of Mission in Mogadishu. Oakley was called upon by President Clinton to return to Mogadishu to attempt to secure an agreement with Mohammed Aidid following the October Rangers raid that ended so disastrously. The book includes appendixes containing relevant UN Security Council resolutions and other appropriate documents.

8. Col. Thomas Chester, after-action report of Operation Restore Hope/Somalia. The report was actually written by Capt. John Felins, who deployed to Somalia with the main body of the squadron. He had commanded the Headquarters Squadron Section of the 1611 AES for Col. Brannon during Desert Shield/Desert Storm. Tel. interview, Feb. 2, 1999. Also see the Warner–Levin report cited previously. Mark Bowden's *Black Hawk Down: A Story of Modern War* (New York: Atlantic Monthly Press, 1999), an unofficial account based in part on interviews with both U.S. and Somali participants, won its author the Overseas Press Club's Best Foreign Reporting on the Battle of Mogadishu award for The Philadel phia Inquirer. However, Bowden does not relate the key role played at the Mogadishu airport by USAF AE personnel in the emergency treatment of Ranger casualties that was suffered in conflict with Somalis in early October 1993.

9. Chester, After-Action Report Operation Restore Hope, p. 8. Howell tel. interview, Mar. 24. 2000. North was appointed AFFOR Surgeon upon arrival in Mogadishu; msg., AECC, Mogadishu [signed Howell] to HQ, AMC (SGX), subj: Djibouti/Cairo West Trip Report, Dec. 30, 1992, AMC/HO.

10. *Ibid.* Howell interview, Apr. 1, 1999. Howell recalled the flight surgeon as both eager and willing but understandably lacking in experience with tactical aeromedical evacuation because he had been detached from the Strategic Air Command to deploy to Somalia.

11. Brannon's 2d AES, now under command of the European theater commander, was in the midst of shifting operations to Ramstein Air Base as the U.S. forces in Europe continued their drawdown, which included the Air Force hospital at Wiesbaden near Rhein-Main Air Base. The flight nurse and medical technicians were Brannon's personnel who had already shifted their place of assignment.

12. Howell interview, Apr. 1, 1998. This interim system focused on the USS Tripoli had been described to the 37th AEG, AFRES, from which the OIC of the AEOT to be deployed to Cairo West was to be drawn, by the AMC medical planner, prior to Howell's arrival in Mogadishu. Fax msg, Maj. Philip Mahlum, AMC/SGX, to 37th AEG/SG, Subj.: Somalia AMC Medical Support CONOPS, Dec. 12, 1992. Colonel Hadbavny was to become the DIRAEFOR at Cairo West in late July 1993. I am indebted to Colonel Eileen Hadbavny, NC, USAFR, for a copy of this msg. Documents that I have used from among those in her possession are hereinafter cited as Hadbavny papers.

13. The Samaritan missions began in early January after patients had begun to arrive at Mogadishu from outlying stations without medical attendants. Msg., AECC Somalia to TACC, Scott AFB, Subj:

MEDRED-C to Operation Restore Hope, Jan. 5, 1993, AMC/HO.

14. Tel. interview, Major Edward Gruber, NC, USAFR, Mar. 24, 2000. Maj. Gruber is an Air Reserve Technician, assigned to the AFRES 315th AES at Charleston AFB. Tel. interview, Col. (Ret.) Walter Evans, USAF, Mar. 29, 2000. Evans was the DIRMOBFOR for Operation Restore Hope.

15. This individual seems to have been the worst operational casualty during the U.S.–controlled first phase of Restore Hope. Several interviewees in discussing variations in the usual Samaritan mission itineraries mentioned the obviously same severely injured victim of an accident involving an overturned Army vehicle who had been flown directly to Mogadishu and subsequently to Mombasa. The capabilities of the civilian medical facilities in Kenya are detailed in Col. Robert L. Ditch, MSC, USAF, UNOSOM II End of Tour/Annual Medical Operations Report, 4 May 1993–1 Jan 1994. Col. Ditch served as the Chief Medical Officer for UNOSOM II. I am indebted to Col. Ditch for a copy of his report.

16. After-Action Report Operation Restore Hope, p. 2. Intratheater airlift was generally performed by C–130s, but New Zealand C–748s that were equipped with litter brackets were occasionally also used when it was impossible to generate a C–130 for an AE mission; Howell interview, Apr. 1, 1998. Tel. interview, Lt. Col. John Felins, MSC, USAF, Feb. 2, 1999. Felins deployed to Mogadishu with the 1st AES. Interview, Col. Courtney Scott, MC, USAF, Feb. 24, 1998. Operation RESTORE HOPE Theater AE System Briefing, [Dec. 4, 1992; date of the briefing is cited in the After-action report.] The definition of a stable patient is from AMC Regulation 164-1, which cited a definition promulgated by the JCS Medical Steering Committee in 1985 for wartime movements of patients. The AMC Regulation is quoted in Thomas Chester, Aeromedical Evacuation After Action Report, Exercise KNIGHTLY ROGUE, June 1, 1994, Attachment 6. I am indebted to Lt. Col. Susan Konczal for a copy of this report.

17. Felins tel. interview, Feb. 2, 1999.

18. After-Action Report Operation Restore Hope, p. 4. Felins tel. interview, Feb. 2, 1999. During the UNOSOM II period of activity, refueling was carried out at Mogadishu airport from fuel cells. However, there was a restriction to the maximun aircraft on the ground (MOG) at one time of four.

19. Gen. H. T. Johnson (see Chapter 9) and Col. Evans both indicated in separate interviews that Gen. McPeak wanted no Air Force officer with the title of "commander" other than the Air Force component commander deployed in accordance with his "one boss" organizational philosophy. Tel. interview, Col. Evans, Mar. 28, 2000.

20. The issue of who controlled the strategic AE crews is discussed in Chester, After-Action Report Operation Restore Hope, pp. 12–13. Indications of friction within the deployed AE system reportedly caused Gen. Roadman to dispatch messages to the AMC AE elements in the field during Restore Hope urging greater cooperation. Tel. interview, Philip Mahlum, Mar. 29, 2000. The issue was discussed at some length in an e-mail msg. from Maj. Mahlum to the AEOT OIC, Col. Ross, Subj. AE Intertheater AE Missions, Jan. 25, 1993. Reading Message 15, Hadbavny papers.

21. Given the relatively limited numbers of medical flight crews available in the Somalia operation, the ability to interchange C–141 and C–130 crews was both useful and necessary because the AECMs were volunteers from a variety of ANG and AFRES units that had either tactical or strategic AE missions. With regard to the difficulties in mixing AECMs with tactical and strategic backgrounds that Col. Brannon had experienced during Desert Shield, one of the flight nurses with experience in the Gulf War indicated on the basis of her experience during

UNOSOM II that those sorts of difficulties had been largely overcome. She pointed to the fact that, during her active duty in the AOR, strategic missions during Continue Hope were flown by medical flight crews with mixed tactical and strategic AE backgrounds. Tel. interview, Maj. Jill Von Rothe, NC, USAFR, June 4, 2000. However, the AECC chief at Cairo West during this period with considerable experience as a flight nurse exclusively on C–141s, at least initially, had a less than sanguine view about the effectiveness of using mixed crews after observing that C–130 qualified members knew nothing about C–141s. Tel. interview, Lt. Col. Eileen Hadbavny, NC, USAFR, June 7, 2000. Col. Hadbavny was AECC chief and director of AE forces at Cairo West from mid-July to early November 1993. In her after-action report, Col. Hadbavny did report that the integration of the C–130 and C–141 crews on a routine C–141 AE mission to Cairo "seemed satisfactory," but her judgment came only after the C–130 qualified nurses had received a review of the C–141s emergency exits and equipment prior to departure. Col. Hadbavny also described tensions that existed between the AECMs located in Mogadishu and the AECC at Cairo West. Although personality differences may have played some role, the problem seems to have had its roots in the different AE milieus, strategic or tactical, from which she and tactically trained flight nurses came. Her associate reserve unit at Charleston flew regular intertheater (or strategic) missions, which meant that she was intimately familiar with USAF-prescribed ways of conducting missions and documenting them. In 1993, the live movement of patients was not something routinely done by ARC AE personnel who many times had more years of experience with clinic aspects of in-flight care aboard specific airlift aircraft than did active duty AE personnel who usually had only one assignment as AECMs but less direct experience with the worldwide AE system. She records that, when the OIC of the MASF at Mogadishu changed, a previously cooperative relationship diminished "and one of distrust of the Cairo 'establishment' occurred." Lt. Col. Eileen S. Hadbavny, USAF Aeromedical Operations for Operation Restore Hope/Continue Hope–Somalia, 19 July to 8 November 1993. June 13, 1994, p. 16. I am indebted to Col. Hadbavny for a copy of her after-action report. One of the medical technicians in a recent interview also attributed what were readily apparent differences in perspective between the OIC of the crews on alert at Mogadishu and the AECC chief in Cairo to the fact that the former came from a tactical AE background and Col. Hadbavny from a strategic AE background. Brown tel. interview, June 7, 2000.

22. As early as Dec. 31, C–9s were being deployed to Cairo to meet retrograde AE missions originating in Mogadishu. Msg. AECC to TACC, Scott AFB, et al., subj: MEDRED-C to Operation Restore Hope, Dec. 31, 1992. AMC/HO.

23. After Action Report Operation Restore Hope, p. 4. Howell interview, Apr. 1, 1998.

24. Gruber tel. interview, Mar. 24, 2000.

25. Staff Summary Sheet (SSS), CINCTRANS/AMCCC from Gen. Roadman, subj: Enhanced Aeromedical Evacuation Communication/Automation Demonstration in Support of Operation Restore Hope, Dec. 12, 1992. AMC/HO. Roadman annotated the original SSS by writing in ink that the proposal had been coordinated with CENTCOM and the JCS who all supported the initiative. He added a fragmentary comment: "a necessary test for our future capability."

26. *Ibid.* According to 1st AES personnel who were in Mogadishu, the notebooks proved to be of very limited value because the dusty conditions soon made them inoperative. However, the PACER BOUNCE communications system continued to have a limited manual data-transmission capability. The keyboard for the data input device was so

small that it was difficult to use, and the transmission system tended to "freeze" if large amounts of data were imputed. Tel. interviews, Col. Farley Howell and Lt. Col. John Felins, respectively, Mar. 24 and Mar. 23, 2000. Tel. interview, Maj. Edward Gruber, NC, USAF, Mar. 24, 2000. Maj. Gruber served in Mogadishu during Somalia operations. Tel. interview, Col. (Ret.) Sarah Wright, NC, USAF, May 31, 2000. Col. Wright directed the AE cell in the TACC at AMC HQ during the Somalia operations, and was the point of contact for AE requests originating in the AOR. Msg, AECC to TACC, Scott AFB, Subj: MEDRED-C Operation Restore Hope, Dec. 29, 1992. Personal computers with data modems were widely used in the Gulf AOR to communicate directly with CONUS-based facilities. This largely unanticipated usage tended to cause performance problems in the common user communications systems used by the U.S. forces in the AOR. L. K. Wentz, C. H. Harris, et al., Perspectives on C3I Performance in Desert Shield/Desert Storm, Annex H: Communications (McLean, Va.: The MITRE Corporation, Oct. 1991), pp. 38–39.

27. Col. A. Felix Meyer III, 24th Medical Group after-action report: Operation Just Cause', copy n.d. I am indebted to Col. Meyer for a copy of this report. Col. Meyer is a former commander of the 24th who was one of the primary planners for that operation. 21st AF/LGM to 437 LSS, Charleston AFB/LG, Info: HQ AMC/LGA, HQ AMC/TACC, HQ 22AF/LGM, HQ 60 AW/LG, et al., Subj: Request for One Time Inspection, Dec. 4, 1992. AMC/HO. The 437th Wing Commander, Brig. Gen. Mikolacjik, deployed to Somalia as the AFFOR.

28. Msg, 21st LGM to 437 LSS, Subj.: Request for One Time Inspection.

29. After Action Report Operation Restore Hope, p. 2. The need for an AELT presence on Navy ships that received substantial numbers of casualties had first emerged nine years earlier during Urgent Fury, the invasion of Grenada. Based on his experiences trying to coordinate patient movement from the U.S. aircraft carrier, USS Independence, the then 1st AES Commander, Lt. Col. Felix Meyer, had concluded that there was no good convenient way of interfacing with the Navy and indicated he would advocate placing at least one AELT member on such vessels in future contingencies. Remarks to the 91st Annual Meeting of the Association of Military Surgeons of the United States [1984]. I am indebted to Col. Meyer for a transcript of his remarks.

30. After Action Report Operation Restore Hope, pp. 4–6. Howell interview, Apr. 1, 1998. A prior attempt to deploy an Army hospital to Mogadishu by ship was unsuccessful for reasons that apparently involved the draft of the vessel and the shallow water off the coast of the capital. Tel. interviews, Lt. Col. John Felins, Mar. 22, 2000, and Col. Farley Howell, Mar. 24, 2000. Msg., AECC to TACC, Subj: MEDRED-C to Operation Restore Hope, Jan. 5, 1992. AMC/HO. The first intertheater AE mission that was staged directly from the 86th Evac. Hospital was launched on Jan. 14, 1993, and was judged to be a success, which bolstered the planned redeployment of the MASF. Msg., AECC to TACC, Subj: MEDRED-C to Operation Restore Hope, Jan. 14, 1993. In late Feb., the AMC/SG planners feared that the TACC was going to establish a force rotation policy of 179 days, which strengthened their desire to fill ongoing AE taskings with ARC personnel rather than use those from the 1st AES because of continuing support requirements elsewhere including potential requirements "for Yugoslavia support." Maj. Philip Mahlum, Point Paper, Subj.: Somalia Force Requirements Post-Rotation, Feb. 25, 1993. Hadbavny papers. This point paper was faxed to the AEOT OIC the same day.

31. The Djibouti refueling stop was eliminated after fuel cells were set up at the Mogadishu airport.

32. Major Howell and a survey party flew

to Djibouti shortly after the arrival of the 1st's main body in the AOR to evaluate the medical facilities available in the former French possession. The French hospital, the Centre Hospitalier des Armees "Bouffard," located fifteen minutes from the Djibouti airport was deemed "ideal" by the survey team for emergency treatment of AE evacuation patients and as an emergency patient holding facility. It also had an INMARSAT terminal that would allow it to communicate with the U.S. Army hospital at Mogadishu. Msgs., AECC to TACC, Subj.: MEDRED-C to Operation Restore Hope, Dec. 20, 1992 and Jan. 5, 1993. AMC/HO. Felins tel. interview, Mar. 22, 2000. A complete description of the "Bouffard" Hospital's medical capabilities can be found in the UN Chief Medical Officer's (CMO) after-action report, III.6. See Major Robert L. Ditch's UNOSOM II End of Tour/Annual Medical Operations Report.

33. After Action Report Operation Restore Hope, p. 2.

34. Memo for AEOT [Cairo West] from Maj. Farley J. Howell, Director, AE Forces (DIRAEFOR) [Mogadishu], Subj.: AECC Relocation, Feb. 23, 1993. Hadbavny papers. Howell had replaced Col. Chester as DIRAEFOR upon the latter's departure. He made an oblique reference to the conflict between the AEOT OIC, Lt. Col. Ross, and the AECC in Mogadishu by noting as one of the advantages of his proposal that "absorbing AE coordination functions into the Cairo Operation will eliminate any confusion over mission responsibility." This comment undoubtedly helped commend his proposal to Col. Ross with whom Howell had initially had disagreements on precisely that issue. Howell tel. interview, Apr. 1, 1999.

35. Howell memo for AEOT, Feb. 23, 1993.

36. *Ibid.* General Fogleman told his staff in late December that he expected Restore Hope airlift to begin tapering off about Jan. 7 because the first redeployment mission was set for Jan. 2. He expected the first marines to follow by Jan. 20, and foresaw a move toward a UN force, possibly within a month, with further withdrawals of Americans leaving only a small number to supply command and control and as staff officers for the UN peacekeeping force. Kent M. Beck and Robert deV. Brunkow, Global Reach in Action: The Air Mobility Command and the Deployment to Somalia (Scott AFB, Ill.: AMC Office of History, Feb. 125, 1994), p. 107. Global Reach is a chronology that lists by day relevant information drawn from situation reports and other messages from the field, memoranda, notes of meetings (particularly with Gen. Fogleman), and pertinent information from outside sources that are relevant to the situation.

37. Chester, After Action Report Operation Restore Hope, p. 2. Howell interview, Apr.1, 1998.

38. The initial MASF manning was 6 flight nurses and 19 AE medical technicians who were equipped with cardiac monitors, ventilators, pulse oximeters, infusion pumps, oxygen analyzers and oxygen suction devices. Their mission was to hold, process, and provide nursing care for at a maximum of 25 patients for up to 6 hours. In his report, the UN Chief Medical Officer during UNOSOM II, Maj. Robert Ditch, says that he requested reactivation of the MASF and the deployment forward of additional medical flight crews following the hostile incidents in early June. UNOSOM II End of Tour/Annual Medical Operations Report, 4 May 1993 – 1 Jan 1994 (Mogadishu, Somalia: Office of the Force Medical Staff, 1 Feb. 1994), pp. 37–39, 47. The CENTCOM Surgeon's office had requested even earlier on Apr. 9th that the MASF be reactivated to provide holding facilities at the airport after the 86th to the embassy site. This was apparently done because in late May, the AECC, now located at Cairo West, proposed that the MASF in Mogadishu be eliminated in the interest of further reducing AE forces in Somalia. Still,

the MASF tentage was reportedly left in place to "back" the ambulance to aircraft transfers that were the norm until early June. Msg., USCINCENT/CCSG, to USCENTAF, Shaw AFB, SC/SGX, Subj.: MASF Request in Support of Restore Hope, Apr. 9, 1993; msg., AECC, Cairo West, to HQ AMC/SGXP, Subj.: Downsizing A/E Forces in the AOR, May 12, 1993. AMC/HO. Ltr, Lt. Col. Konczal to the author, May 24, 2000. Gruber tel. interview, Mar. 24, 2000. The 86th was replaced by the 42nd Combat Support Hospital (CASH) in April which was, in turn, replaced by the 46th CASH in August.

39. West and Clark, "The Army Nurse Corps and Operation Restore Hope," p. 180. Gruber tel. interview, Mar. 24, 2000. Flossman interview, Dec. 12, 1998.

40. AMC Public Affairs Office, Restore Hope Statistics. AMC/HO. Chester, After-Action Report Operation Restore Hope, p.6. Ditch, UNOSOM II End of Tour/Annual Medical Operations Report, p. 49.

41. Tel. interview, Col. (Ret.) Walter Evans, USAF, Mar. 28, 2000. Evans had been Mikolacjik's operations officer when Mikolacjik had commanded the 435th Airlift Wing at Rhein-Main, and they had earlier served together as majors on the AMC staff and on the Air Force C-X task force that was created to designate the specifications for what was to become the C–17. Mikolacjik was also designated Deputy Air Component Commander under a USMC general officer.

42. One discordant note was that sounded by Lt. Col. Flossman, AECC chief during the latter part of 1993 and commander of the ANG 142 AES, who said later that he came away from the Somalia operations with the strong feeling that ninety-day tours of duty for ANG medical flight crews in small-scale operations like peacekeeping stretched the tolerance of the employers of ANG AE crew members unnecessarily because he believed that the AF could secure enough ANG volunteers for two-week rotations. The record does reveal that AMC was sensitive to the problems of ARC personnel having trouble with their civilian employers if they were held too long on active duty. Volunteer aircrew had been integrated into the airlift supplementing active duty flight crews, and, as early as Dec. 18, AMC advised its subordinate headquarters that scheduled return times for the latter would be extended as necessary but that AMC wanted to honor ARC crew scheduled return dates because "volunteer crewman had civilian job commitments." The underlying factor was AMC's desire to maintain a sufficient number of ARC volunteers to provide some possible relief for the active duty crews during the then coming holidays, and the Mobility Command headquarters did not believe that that could be achieved without some reasonable assurances that ARC members would be returned to civilian life as scheduled. Global Reach in Action, p. 67.

43. For example, Jill Von Rothe, the flight nurse who voluntarily and successfully took over the task of creating a medical logistics system for Brannon during Desert Shield/Desert Storm, served as one of the alert medical flight crew members rotating between Cairo West and Mogadishu every two weeks during May and July 1993. Tel. interview, Maj. Jill Von Rothe, NC, USAFR, June 4, 2000. Tel. interviews, Lt. Col. Susan Konczal, MSC, USAFR, May 17 & 18, 2000. Konczal had volunteered for a 120-day active duty tour from her MacDill AFB unit, the 37th AES AFRES. Ltr, Col. Ditch, MSC, USAF, to the author, May 4, 2000. In a few cases, at least at the beginning of AE system operations, prior association had apparently not made the heart grow fonder. Tel. interview, Col. Farley Howell, NC, USAF, May 10, 1999. Ditch reports that he continually warned UN headquarters of the problems posed by the lack of a UNOSOM medevac capability which forced him to rely on medevac helicopters owned by the national contingents and UNOSOM contract aircraft. However, the UN never took action to provide any. Ditch, UNOSOM II End of Tour Report, p. 43.

44. Allowable flight crew duty was increased successively from 125 hours per month to 150 hours and finally to 165 hours during ANC's "surge operations," Dec. 9 1992 to Jan. 11, 1993. Halfway through that period, the TACC also authorized wing commanders to issue waivers to allow C–5 and C–141 pilots who were being grounded for pending retirement or promotion to continue flying. An early release program for C–130 pilots and navigators was also suspended in early January as the effect of voluntary separations and reductions in force programs began to take effect on efforts to support Somalia and other commitments. Although the airlift activity in terms of missions and tons transported during Restore Hope was substantially less than that during Desert Shield in August 1990, a number of factors hampered operations for airlift support of U.S. deployments to Somalia. Not the least of these were constraints on the airlift system imposed by restrictions on the operation of the C–141 fleet (discussed later) and the limited number of suitable airfields and the absence of supporting infrastructure in Somalia; one observer described the situation as trying to force a large amount of material through a funnel the wrong way. These things helped create periodic disruptions of the flow plan that caused flight crews and aircraft to spend longer times away from their stations than planned. The aging airlift fleet contributed to interruptions in the flow plan through aircraft breakdowns, which also interrupted the flow plan. Global Reach in Action, pp. 66, 71, 95, and 122.

45. The conflict over the issue of who controlled the strategic AE crews seems to have been confined to the Restore Hope period, and was, according to observers, rooted more in personality differences than in doctrinal ambiguity, even though there was an obvious issue of the respective authority of the two elements. Howell tel. interview, May 10, 1999. Mahlum tel. interview, June 14, 2000.

46. The UN paid for the deployment of the U.S. Army hospitals, the 42d and 46th Combat Support Hospitals, which operated successively in Mogadishu during UNOSOM II. This gave Ditch as UN Chief Medical Officer directive authority over the hospitals, but the latter governed themselves according to terms of reference (TOR) which, to Ditch's frustration (particularly because the UN had never agreed to the TOR), restricted their medical support to U.S. personnel only. They would and did treat other coalition personnel in an emergency on a space-available basis. Ditch did have some control over a number of UN-funded U.S. MEDEVAC helicopters that he used together with several French and German helicopters to move patients intratheater. However, the same limiting TOR applied to what he could officially task this U.S. rotary-wing medevac capability to do. His medevac system also used fixed-wing opportune aircraft owned by several national contingents and some UN-contracted, Russian-built Mi–17 helicopters without medical equipment or medical crew members. These aircraft could be configured to take up to twelve litter or twenty-two ambulatory patients, but were also limited in their utility for medevac because of operational restrictions placed upon their employment, possibly because of insurance. UNOSOM II after-action report, pp. 43–48.

The term "TACON" to characterize the relationship of the UN CMO to the aeromedical evacuation elements in Mogadishu during UNOSOM II was made in separate interviews by both an AELT OIC and an AECC chief who were assigned to the Mogadishu airport during the last half of 1993. Flossman tel. interview, May 23, 2000; Konczal tel. interview, May 17, 2000. Ditch himself agreed in a subsequent interview that this was probably a reasonable characterization of the relationship. Tel. interview, Col. Robert Ditch, MSC, USAF, June 12, 2000. The OICs of the MASF and AELT did attend the UN Medical Staff Meetings as did the Flight

Surgeon beginning in August, 1993. Hadbavny After Action Report, p. 3.

47. Maj. Von Rothe was a member of a U.S. medical flight crew that flew thirty-nine Pakistani casualties to Islamabad on June 8, 1993. She also stood alert with the Italian helicopter crews. On the AE mission to Islamabad, the USAF AECMs, eight flight nurses and eight medical technicians, had minimal Pakistani assistance, including two Pakistani interpreters, according to Von Rothe. However, the report to the AMC Surgeon on this mission indicated that there had been a Pakistani physician and two medical technicians on board. Maj. Von Rothe reports that, upon arriving in Pakistan, the U.S. AECMs were not allowed to carry the litters off the aircraft for reasons that were never explained. Sgt. Clarence Brown, a USAFR medical technician who also served in the AOR during the summer of 1993, also participated in such missions. Tel. interview, June 4, 2000. Von Rothe tel. interview, June 4, 2000. Maj. David Bramigk, Point Paper, Subj.: Aeromedical Evacuation of Pakistani Casualties, June 8, 1993. AMC/HO.

48. UNOSOM II After Action/End of Tour Report, p. 46. The U.S. Army medevac unit formally came under the command of the commander of the 46th CASH. However, sometimes his medevac helicopters were commandeered for non-medevac purposes by those higher up in the U.S. forces' chain of command, which caused the hospital commander concern about his readiness. Tel. interview, Dr. Bruce Bailey, June 27, 2000.

49. In Djibouti, the French maintained one medical evacuation crew comprising a single physician and two nurses with four C–160 cargo aircraft to move patients from their base area in Somalia to the French military hospital in Djibouti. Repatriation of patients from there was accomplished by medical crews and aircraft from France. The Italians maintained one physician/medical technician team in Mogadishu primarily for Huey support but which also could be used to support patients on flights to Egypt where Italian Air Force C–130s or jets could then forward the patients on to Italy. The Germans also maintained one AE team in Djibouti with four C–160 aircraft, and Belgian forces maintained one AE team in Mombasa with their one mission support C–130. UNOSOM II After Action/End of Tour Report, p. 47.

50. *Ibid.*, p. 48. In his attempts to develop a much-needed UNOSOM medical evacuation capability, Ditch apparently sought to secure de jure TACON over some of the U.S. AE resources in mid-August after the failure of talks with German officials. He proposed to create a combined fixed- and rotary-wing support structure under his control manned by six to seven flight nurses and a like number of medical technicians with a U.S. field grade flight nurse to act as the coordinator for the UNOSOM evacuation operations. The AECMS would be distributed at three or four in-country sites where non-U.S. UNOSOM II forces were bedded down. Whereas the correspondence on this matter reveals that CENTAF recognized the need for flexibility with regard to medical evacuation, it was decidedly cool to the idea of Ditch having direct tasking authority over U.S. AE forces. Fax to Lt. Col. Hadbavny/Lt. Julie Glover from Maj. Philip Mahlum, HQ, AMC/SGXP, Sept. 2, 1993; msg, Mahlum to USCINCENT/CCSG, USCENTAF/SXM, and AMC/SG, Subj.: UNOSOM II AE Support, Sept. 2, 1993; msg., to Mahlum from Maj. Weltz, 9AF/SGM (Medical Plans), Subj.: UNISOM (sic) II AE Support, Sept. 2, 1993. I am indebted to Col. Hadbavny for copies of these documents. Other documents provided by Col. Hadbavny are referred to hereinafter as Hadbavny documents.

51. *Ibid.*, pp. 32–34. When the UN medical director from UN HQ, New York, visited Somalia in May 1993, she neither knew who the UN CMO was nor tried to contact him. Ditch learned of her presence only by accident after she had been in Somalia a week, and when he sought her out, he had only a 45-

minute discussion with her before she had to leave. However, she sponsored Ditch's visit to UN HQ two months later and, according to Ditch, spent a great deal of time with him assisting him in becoming oriented to UN procedures and policies. By all accounts of those who have worked with Ditch, his aggressiveness and dedication made him exactly the right man to meet the challenges of creating a health support system for UNOSOM II, an opinion shared by the author on the basis of several contacts and a close reading of his after-action report.

52. The author participated in and helped plan several such workshops conducted by the Institute for National Strategic Studies (INSS) of the National Defense University while he was on the INSS staff. For example, Dr. William H. Lewis, ed. The Security Roles of the United Nations: Proceedings of a Conference, October 9 & 10, 1991 (Fort Lesley J. McNair: NDU Press, n.d.) and Dr. William H. Lewis and Dr. Thomas A. Julian, eds., Military Implications of United Nations Peacekeeping Operations. Proceedings of the Workshop, November 17, 1992 (Fort Lesley J. McNair: NDU Press, n.d.). Also see Brig. Gen. Raymond E. Bell, Jr. "Somalia Revisited: Creating the Proper U.S. Army Force Structure for Peace-Enforcement Missions," Armed Forces Journal (March 1997): 42–43.

53. Ditch, p. 91. As noted earlier, the USAF had provided airlift support to UN peacekeeping operations including patient movement in the Congo many decades before, but, in keeping with the unstated principle of the time regarding the principal antagonists in the Cold War, no U.S. forces were directly involved.

54. Tel. interview, Lt. Col. (Ret.) Philip Mahlum, MSC, USAF, Aug. 23, 2000. Col. Mahlum was assigned to the GPMRC at that time.

55. Col. Howell notes on several occasions that requests by AECC to use a specific C–141 physically located in sight of AE personnel on the parking ramp at Mogadishu to evacuate a patient elicited the response that the aircraft could not be there because its presence did not match the TACC airlift flow schedule. Howell tel. interview, Apr.1, 1998.

56. Tel. interview, Col. (Ret.) Sarah Wright, NC, USAF, May 31, 2000. Lt. Col. Eileen Hadbavny, who was the director of AE forces during the period July 19–November 8, 2000, headquartered at Cairo West, said in a recent interview that Cairo West appeared to be in a communications "dead zone" during her tenure some of the time. Interview, Lt. Col. Hadbavny, NC, ANG, June 29, 2000.

57. Tel. interview, Lt. Col. Susan Konczal, MSC, USAFR, May 18, 2000. The then Maj. Susan Konczal was the officer in charge (OIC) of the AELT, and she deliberately bypassed the AECC at Cairo West to talk directly to Lt. Col. Wright in the TACC and give the center a "heads up" with the objective of pushing the AE system to secure the required airlift as rapidly as possible. A similar "heads up" was given the TACC when Pakistani troops were attacked with significant casualties in early June. Within a few hours of that attack on June 5, 1993, the TACC was notified of the possible regulation of fifteen to twenty casualties, and was able to identify an airframe and move three "urgent" litter patients on the same day from Mogadishu to Ramstein who had been regulated to the Landstuhl Army Hospital. Staff Summary Sheet (SSS) with attached Point Paper, Brig. Gen. Roadman for TACC/CC, Subj.: Aeromedical Evacuation of Pakistani Casualties, Jun. 8, 1993. The SSS has been annotated by the AMC command surgeon in pen with two points: "This contains a series of great examples of Global Reach outlined by TACC interface with staff," and "We have unbelievable capability!" AMC/HO. As indicated earlier, Col. Wright reported in her recent interview that her communications with Mogadishu were always better than with Cairo West. Tel. interview, May 31, 2000.

58. Chester, After Action Report Operation Restore Hope, pp. 18–21.

However, part of the problem Chester experienced with the DSN was competition for the limited number of DSN lines available, a factor that he mentions briefly in his after-action report. The AEOT com munications problems were also in part the result of poor radio operator training and the failure to deploy with cables necessary to operate a so-called automatic link establishment (ALE), which had been found to increase the reliability of the PACER BOUNCE radios.

59. Ltr to the author, Lt. Col. Susan Konczal, MSC, USAFR, May 23, 2000. Col. Konczal also stated in a recent interview that, in spite of the variety of communications systems that were available for coordinating AE missions, communications were always a problem. Tel. interview, May 22, 2000. The chief of the AECC during the later stages of UNOSOM II also indicated his difficulties with communications. Tel. interview, Col. Loren Flossman, MSC, ANG, May 23, 2000. The chief of the AE cell in the TACC throughout the Somalia operations, Col. Sarah Wright, noted in a recent interview that it was easier to talk with Mogadishu than with the AEOT at Cairo West. Konczal's means of communication with the TACC was by DSN. The tactical airlift control elements (TALCE) in Mogadishu and at Cairo West did have UHF SATCOM terminals. Tel. interview, Wright, May 31, 2000. Tel. interview, Lt. Col. Eileen Hadbavny, NC, USAFR, June 7, 2000. Lt. Col. Felins, the then 1st AES Director of Operations for the AECC at Mogadishu, confirmed that the UHF SATCOM terminals that the 1st AES brought to the AOR were redeployed with the squadron when it returned to Pope in the closing days of Operation Restore Hope. Tel. interview, Lt. Col. John Felins, MSC, USAF, June 4, 2000.

60. The shortage of C–141s also necessitated looking for other sources of airlift capability, and the AMC turned to substituting the airlift capacity of KC–135s and KC–10s when possible. As early as Dec. 10, Gen. Fogleman had urged the use of the tankers' airlift capability, telling his planners to "break the mindset on KC–10s." On Dec. 18, 1992, the AMC vice commander, Gen. Walter Kross, reported that, due to the shortage of C–141 aircraft and crews, KC–10s were being substituted for C–141 missions to maintain the airlift flow. The C–141 fleet had been operating under restrictions on its load limit since the Persian Gulf War because of cracks in the wing structure and around the cockpit windows. However, in early May 1993, cracks were found in the aircraft's wing structures that resulted in a further reduction of the load limit until the fleet had been inspected. Finally, an analysis of the resultant findings caused Gen. Fogleman to restrict 45 of the C–141B Starlifters from flight and 116 of the remaining 204 from any in-flight refueling. B. Opall, "USAF Restricts C–141s After Report Notes More Cracks," *Defense News* (May 24–30, 1993): 5. AMC Press Release 93-08006, "AMC Restricts Portion of C–141 Fleet From Flight," Aug. 9, 1993. History of AMC, 1 June 1992–31 December 1994 (Scott AFB, Ill.: AMC History Office, July 1995), 374.

61. Once decided upon, the KC–10 was configured and launched within an hour and a half with three litter and thirteen ambulatory patients. Air Mobility Warfare Center, CTF–Somalia AFFOR/AME Lessons Learned, n.d., pp. 4–5. AMC/HO. One of the litter patients was a member of the Merchant Marine with acid burns to both eyes. A second was a marine who had been sprayed by the venom of a spitting cobra. Both had injuries so severe that they could not wait for a retrograde mission on an aircraft in the normal flow or diversion of a C–141. Global Reach in Action, p. 131. The DIRAEFOR, Lt. Col. Hadbavny, directed experiments that revealed that catering trucks with extendable ramps could elevate litter patients to door #6 which gave access to the C–5's 75-place passenger compartment located high above the cargo compartment. Hadbavny, USAF

Aeromedical Operations for Operation Restore/Continue Hope–Somalia, 19 June to 8 November 1993 [hereinafter referred to as Hadbavny after-action report], p. 25. Hadbavny documents. The experiments were described in detail to AMC/SGX including various configurations of ambulatory and litter patients who could be carried. Memo to AMC/SGX from Director of AE Forces [Hadbavny], Subj.: Limited Litter Onload Capabilities of C–5, Oct. 22, 1993. Hadbavny documents. Hadbavny tel. interview, June 7, 2000. Almost as many KC–135 airlift missions (324) as C–141 missions (411) were flown in support of Continued Hope, the USAF support operation for UNOSOM II, between May 5, 1993, and Mar. 13, 1994. AMC/Public Affairs Fact Sheet, RESTORE HOPE Statistics, Mar. 22, 1994. AMC/HO.

62. Tel. interview, Wright, May 31, 2000.

63. Hadbavny after-action report, p. 11. The "normal" C–141 alert crew was one flight nurse and two medical technicians. I am indebted to Col. Hadbavny for a copy of her report. [1st AES], Operation Restore Hope After-Action Briefing, n.d. I am indebted to Lt. Col. John Felins, who was director of operations for the 1st AES in Somalia for a copy of this briefing. Tel. interview, Konczal, May 18, 2000. Tel. interview, Martello, June 8, 2000.

64. Appendices 3 to Annex D to UNOSOM II OPLAN. Medical Services, dated May 1, 1993, and Dec. 31, 1993, respectively, included in Ditch's after-action report. Memo for HQ AMC/SGX from 1610 ALSGP.AMED [Hadbavny], Subj.: AE Manning Requirements for Operation Restore Hope, Oct. 25, 1993. Hadbavny papers.

65. Tel. interview, Konczal, May 18, 2000. Tel. interview, Von Rothe, June 4, 2000. Maj. Von Rothe indicated that an anesthetist from the 42 CASH accompanied the Pakistani patients on the AE mission to Islamabad by C–141 in June on which she served as a member of the medical flight crew. Tel. interview, Dr. Gordon Moshman, USNR. Tel. interview, July 8, 2000. Dr. Moshman had been deployed at Mombasa for surveillance purposes with a specially equipped E–3A from his parent patrol wing at Brunswick, Maine. When he heard of the Ranger casualties at Mogadishu, he secured a flight that arrived at the Mogadishu airport at dawn where for several hours he helped prepare patients for AE as they arrived from the 46th CASH. He served as an attending physician on the second of the C–141 aircraft dispatched to evacuate the wounded Rangers, which departed at three on Tuesday afternoon for a nonstop flight to Germany. It transported thirty-two patients: fifteen ambulatory, seventeen litter including two on ventilators, one of whom had been shot through the liver. Moshman's C–141 was diverted from Ramstein to Rhein-Main where the patients were transferred to a C–9 and flown to Ramstein and then transported by ambulance to Landstuhl Army Medical Center with Moshman in attendance throughout the evacuation. Although without orders or personal baggage, Moshman secured a C–141 flight back to Mogadishu via Cairo West, and he remained in the Somali capital until early November. Ltr, Moshman to the author, July 30, 2000.

66. Memo for HQ AMC/SGXP from Lt. Col. Hadbavny, Director, AE, Subj.: AE Support for US Forces Somalia, Oct. 13, 1993. Hadbavny papers. The issue of attendants on AE flights was not a new concern for the Army hospital staff. Dr. MacNamara, who himself had been an Army special forces medical officer, recalls having a discussion with the 46th CASH commander, Dr. Bailey, regarding the issue of an attendant whom the CASH commander felt they could not supply without compromising their medical mission but whom MacNamara knew the Air Force would require. He ended up sending an Air Force medical technician as an attendant. Tel. interview, July 24, 2000. Dr. 'Moshman's air-

craft was diverted to Rhein-Main Air Base at Frankfurt because of a temporary closure of the runway at Ramstein.

67. Col. Thomas A. Chester, pp. 9, 15–16. Other observers have echoed this complaint, in part, because of difficulties in using the data-input devices provided for transmitting data over the HF PACER BOUNCE radios as well as problems with these radios' ability to transmit large amounts of data without shutting down the data flow (characterized as "freezing" by one frustrated system user). Tel. interview, Konczal, May 18, 2000. Tel. interview, Wright, May 31, 2000.

68. Tel. interview, Lt. Col. Eileen Hadbavny, NC, USAF, June 12, 2000. Interview, Col. Hadbavny, June 29, 2000. Hadbavny after-action report, pp. 8–10.

69. Information on SOC forces is generally highly classified. However, Collins has drawn upon various unclassified testimony by Gen. Stiner when CINCSOC which identified the Delta Force and Navy Seal Team 6 as permanently assigned SMU. Black Hawk Down also mentions Air Force participants. Delta Force includes personnel from all three Services. John M. Collins, *Special Operations Forces* (Washington, D.C.: NDU Press, 1994), provides a concise description of special operations forces, their organization, and command and control systems. Special Mission Units (SMUs) include Army Delta Force and Navy SEAL Team Six.

70. Tel. interview, Konczal, June 13, 2000.

71. For example, the NCOIC of the MASF, TSgt. William Wise, ANG, was a paramedic in civilian life with training in ATLS and ACLS. The flight surgeon, Lt. Col. MacNamara had been an infantry officer as well as a special forces medic prior to entering the Air Force. Tel. interviews, July 9 and June 6, 2000, respectively. Tel. interview, MacNamara, June 12, 2000. Interview, MacNamara, July 19, 2000.

72. Tel. interview, Maj. (Ret.) Rob Marsh, MC, USA. June 28, 2000. MacNamara had taught special forces medical technicians at the John F. Kennedy School at Fort Bragg, some of whom were assigned to the JSOTF. He and Volpe had succeeded each other in assignments with the U.S. personnel providing a "buffer" between Egypt and Israel in the Sinai peninsula and were close personally. Marsh and MacNamara had served together years before. Tel. interview, Lt. Col. (Ret.) John MacNamara, July 24, 2000. The Mogadishu airfield was both the Rangers' home base and the location of Gen. Garrison's operations center from which the Ranger raid was being directed. Given the SOC forces' strong interest in preserving secrecy, Marsh's prior arrangements to use the MASF as a casualty collection point, the presence of Air Force medical personnel and JSOC medics at the airport, and the proximity of the MASF to the scene of the attempted seizure, the decision to use it as a kind of battalion aid station was a foregone conclusion.

73. Tel. interview, Marsh, June 28, 2000. Lt. Rast had finished her voluntary tour of duty before the Ranger's attempt to seize Aidid. However, Marsh praised her enthusiastically for her understanding and willingness to fulfil his requirements solely on the basis of informal discussions. He credited her efforts as major contributions to the effectiveness of the medical treatment his troops received and offered highly laudatory comments that stressed how easy it was to work with Rast. It seems reasonable to conjecture that perhaps the major reason for this was rooted in the generally less formal approaches their respective organizations, SOC and the ANG, shared to the military context within which they performed their missions.

74. Tel. interview, Lt. Col. Susan Konczal, MSC, USAFR, June 1, 2000. Konczal reports that Col. Volpe described the use to which the MASF might be put but she left discussion of the medical support that might be required from the MASF staff and other AF medical personnel at the airport to direct conversations between them and the

Ranger task force surgeon, Maj. Marsh.

75. Tel. interview, Konczal, June 1, 2000. Given the obviously high degree of secrecy surrounding the SOTF mission and presence, Konczal chose not to seek permission or advice from her normal chain of command prior to the operation. This was confirmed in separate interviews by the OIC of the AE cell in the TACC, Col. Wright, and Konczal's immediate superior, the director of AE forces at Cairo West, Lt. Col. Hadbavny. Tel. interviews with Col. (Ret.) Sarah Wright, NC, USAF, and Lt. Col. Eileen Hadbavny, NC, USAFR, June 7, 2000 and July 11, 2000, respectively. According to one of Gen. Roadman's medical planners, however, the AMC SG staff realized how few medical resources were available in Mogadishu and had thought such a requirement might arise. Lt. Col. (Ret.) Philip Mahlum, MSC, USAF, May 30, 2000.

76. This propinquity in an otherwise highly austere and dangerous environment helped generate unusually strong bonds among the Americans at the air base particularly between some of the female Air Force medical personnel and the troopers, many of whom on both sides were quite young. This made the later trauma of having to help deal with the 'troopers' severe wounds and, in some cases, deaths, quite severe, although there is no evidence that their medical performance was affected adversely. In fact, the testimony of people such as Dr. Marsh indicates that all performed admirably. Tel. interviews, Col. Sylvia Nye, NC, ANG, June 26, 2000; Sgt. Nicole Fagula, ANG, July 9, 2000. Wise interview, July 9, 2000.

77. MacNamara indicates that it was difficult to get equipment sent from stocks at Cairo West to increase the actual treatment capability of the MASF because, by doctrine, the MASF was only a holding facility for patients scheduled for aeromedical evacuation. Most equipment and medicine that he and the MASF staff obtained was cadged or borrowed from the 46th CASH and the U.S. Navy. Interview, Lt. Col. John MacNamara, MC, USAF, July 19, 2000.

78. Atto was seized on Sept. 21, during a raid launched by JSOTF Commander, Gen. Garrison, as a response to a mortar attack on the JSOTF area at the airfield the night before during which twelve mortars exploded on the airfield. Warner–Levin Memo, Subj: Review of the Circumstances Surrounding the Ranger Raid, Sept. 29. 1995, 37–38, 47. Capt. (Ret.) William F. Sims, USAF, Somalia diary (San Antonio: Burke Publishing Company, 1999), 71. Sims was chief of the USAF command post at the Mogadishu airport from September 3 until December 2, 1993. Written in a highly informal style, Sims' privately printed diary contains his observations on events and people that he recorded with few exceptions each day of his lengthy assignment. Ltr, Col. (Ret.) Carroll Bloomquist, MSC, USAF, to the author, July 23, 2000.

79. Tel. interview, Maj. (Ret.) Rob Marsh, USA, June 28, 2000.

80. *Ibid.* According to a medical technician who had served in the MASF prior to Lt. Rast's arrival, the previous MASF OIC, Capt. Duiker had anticipated the use of the MASF for casualty care and conducted some exercises. Fagula interview, July 9, 2000. Capt. Konczal indicates that she does not recall Dr. Volpe discussing aeromedical evacuation with her as part of his request to use the MASF as a CCP. However, she automatically assumed that it logically followed and was confident that her credibility with Col. Wright in the TACC was such that the necessary aircraft for AE would be available. Ltr, Konczal to the author, June 21, 2000.

81. For simplicity in the rest of this narrative, the term "Rangers" when used alone will denote all elements of the SOTF in Mogadishu, which included the Delta Force, as well as the Army Rangers.

82. Tel. interview, Col. Robert Ditch, MSC, USAF, June 12, 2000. At the time of this writing, Ditch was the deputy comman-

der of the 363 Expeditionary Medical Group stationed in Saudi Arabia. Volpe did not similarly take the 46th CASH commander, Dr. Bruce Bailey, into his confidence, perhaps because Bailey considered the secrecy the SOC surgeons sought to impose on their activities wildly excessive ("strange stuff") in the circumstances existing in Mogadishu. In a recent interview, he reported that he was awakened around two 'one morning to find a helicopter idling on his hospital medevac pad with people still inside. Upon inquiring, he was told that the helicopter contained a SOC trooper suspected of having appendicitis and a Ranger physician who was conducting the medical evaluation inside the helicopter because the Rangers wanted to preserve the trooper's anonymity. Tel. interview, Dr. Bailey, June 27, 2000.

83. *Ibid.* Col. Hadbavny noted in her report that, contrary to doctrine, the MASF had also functioned as a primary care facility and at times a staging area for mortuary services. After-action report, p. 12. The location of the MASF on the airfield together with the medical skills available in the Air Force AE contingent made it the focal point for emergency care because transportation to the Army Combat Support Hospital at the embassy site required a helicopter after the atmosphere turned hostile to the UN in early June, and there was no other medical facility on the airport. At least one highly experienced former AMC medical planner with responsibility for AE in the command applauded Maj. Konczal's decision in a letter to the author. Ltr, Col. (Ret.) Carroll Bloomquist, MSC, USAF, to the author, July 23, 2000. Research reveals no post-facto criticism of Major Konczal's decision nor adverse effect on her subsequent career. Medical planners at AMC were aware that the MASF had already been used as an emergency aid station.

84. Tel. interview, Konczal, June 1, 2000. Interviews, Lt. Col. (Ret.) Eileen Hadbavny, June 29, 2000, Lt. Col. John MacNamara, July 19, 2000. Both Hadbavny and MacNamara have provided the author with pictures of the ceremony held in the MASF tent. Sims, Somalia diary, p. 186. The last Rangers left Mogadishu on Oct. 27.

85. Sims prints lengthy edited excerpts from the personal written accounts of two Rangers, PFCs David Floyd and Brian Heard, who were pinned down in Mogadishu until rescued near dawn on Oct. 4 and transported to the stadium used by the Pakistanis as a base. Somalia diary, pp. 114–24.

86. Tel. interview, Lt. Col. John MacNamara, June 14, 2000. Marsh interview, June 28, 2000. According to Dr. MacNamara, the two SOTF medical personnel had other responsibilities to their unit that caused them to leave and return periodically. Tel. interview, MacNamara, July 13, 2000. Interview, July 19, 2000. MacNamara worked continuously from the arrival of the first casualties until the flow essentially stopped just before midnight until early the next morning. MacNamara's recollections are confirmed by the Asst. OIC of the MASF, Maj. Susan Martello, NC, ANG. Tel. interview, Martello, July 19, 2000. As noted earlier, the immediacy of the experience with the seriously wounded Rangers was difficult for some of the less-experienced Air Force personnel. Tel. interviews, Staff Sgt. Nicole Fagula, ANG, July 9, 2000; Lt. Col. Susan Konczal, June 1, 2000. Ltr, Col. (Ret.) Carroll Bloomquist, MSC, USAF, July 23, 2000.

87. Bowden, p. 228. The AELT chief, Susan Konczal, commented in a recent interview appropos Bowden's book that while his account of most events seems correct from her observations, "he got the medical parts all wrong." Konczal tel. interview, May 18, 2000. In a subsequent Ltr, she affirmed her earlier view that Bowden's account may be considered "authoritative from an operational perspective but not from a medical perspective." Ltr to the author, June 21, 2000. All Air Force participants in the events of Oct. 3–4

contacted by the author, challenge Bowden's account of the medical support provided the SOC casualties. In a recent interview, the 46th CASH Commander indicated that he thought the measures that the SOC surgeons used to preserve the anonymity of the Rangers were faintly ridiculous. Bailey tel. interview, June 27, 2000. Appropos this extreme concern with security, the anesthesiologist at the 46th CASH remarked in another recent interview that when the first SOC casualties arrived at the CASH, the initial attitude of two SOC surgeons present was to tell the CASH physicians they must leave the operating room while the SOC physicians handled their casualties. In fact, this procedure had been followed previously when single Rangers had needed emergency treatment, but it was quickly abandoned on Oct. 3rd since it was manifestly impractical in the circumstances prevailing especially as more casualties began to arrive. Two SOC physicians were billeted with their medical counterparts assigned to the CASH but said nothing about the nature of the SOC forces' mission other than to urge the CASH physicians to establish an alert status during off-duty hours. Tel. interview, Col. Denver Perkins, MC, USA, June 26, 2000. Col Perkins is now the Chief of Anesthesiology at the Walter Reed Army Hospital.

88. Tel. interview, Martello, June 8, 2000; tel. interview, Konczal, June 1, 2000. Hadbavny after-action report, p. 19. Tel. interview, Konczal, July 11, 2000. Konczal observed and participated in the casualty reception and treatment on the airport and in the MASF/CCP.

89. Tel. interview, Lt. Col. Konczal, June 13, 2000. Tel. interview, Moshman, July 8, 2000. Tel. interview, Wise, July 9, 2000. Tel. interview, Martello, June 8, 2000; tel. interview, Konczal, June 1, 2000. Hadbavny after-action report, p. 19. Tel. interview, Konczal, July 11, 2000. These validation visits to the CASH were routine prior to the regular Monday AE missions. As in Desert Shield/Desert Storm, an immediate concern of the 46th CASH commander was the need to clear patients from his hospital as quickly as possible to make way for the casualties of combat on October 3–4 who would also need to be aeromedically evacuated as quickly as possible because the bed capacity was relatively small and further attacks were expected. Patients in the hospital when news of the casualties first arrived were distributed to some of the U.S. medical organizations attached to the U.S. Army combat units that composed the quick-reaction force. Tel. interview, Dr. Bruce Bailey, June 27, 2000.

90. In a recent interview, Col. Ditch indicated that he was aware that, in addition to the C–141 at Cairo West scheduled to fly the normal Monday AE mission to Mogadishu the next day, another C–141 was on the ground at Cairo West. Concerned that the 46th CASH had only a few empty beds by late Sunday evening and unsure what new casualties the next day might bring, he had asked Captain Konczal to request that the first evacuation aircraft arrive before dawn around four in the morning to clear the CASH of patients and have the second arrive at the normal arrival time around seven that morning to be in place to take any new casualties that the Rangers might suffer. Konczal confirmed Ditch's account in a recent interview; however, she said that she did not request such an evacuation sequence because she did not believe the patients could be readied for aeromedical evacuation to meet a predawn departure. Events validated her judgment. Tel. interview, Ditch, June 12, 2000. Tel. interview, Konczal, June 13, 2000. It should also be noted that the policy was not to conduct flight operations at night because they drew ground fire.

91. Tel. interview, Lt. Col. Lewis Bartles, July 12, 2000. Dr. Bartles, a flight surgeon from the 31st AES (Associate Reserve), Charleston AFB, was enroute to Mogadishu for a thirty-day volunteer tour to relieve Dr. MacNamara, the MASF flight surgeon.

Bartles had been scheduled to fly to Mogadishu from Cairo West on the regular Monday AE mission, but helped mobilize the medical personnel and equipment drawn from the ATH that went aboard the C–5. Originally, the ATH personnel had been scheduled to fly with Dr. Bartles on the C–141 but were not ready to go when it departed, so they were placed aboard the C–5. Interview, Lt. Col. Eileen Hadbavny, NC, USAFR, July 14, 2000. Bartles noted in the interview that several of the CASH personnel were critical of the lack of Air Force support. Ground fire directed at the airport during daylight hours was an unusual occurrence that forced the C–5 to not land. Tel. interview, Capt. (Ret.) William F. Sims, USAF, July 23, 2000. Sims, chief of the airport command post, reports that the C–5 was directed to orbit at altitude for some time before being directed to return to Cairo in view of the continuing ground fire.

92. Dr. Bartles reports that the medical capabilities of the Cairo ATH had been progressively reduced. Upon arrival at Ramstein, the patients were removed from the C–141 by personnel from Brannon's 86th AES and transported to the Landstuhl Army Medical Center. Two were on ventilators, one with a double pneumothorax. The other had a head wound and could not be treated adequately at Landstuhl because no neurosurgeon was present, and he was flown by C–9 to Hamburg for civilian hospitalization. Tel. interview, Bartles, July 12, 2000.

93. Hadbavny after-action report, pp. 16, 19–20. Tel. interviews, Konczal, June 1 and June 6, 2000. Tel. interview, Martello, June 8, 2000. Tel. interview, Nye, June 26, 2000. Many of the evacuees were fresh postsurgical patients who were stabilized sufficiently to the satisfaction of the physicians at the hospital to survive the flight to Ramstein. However, because of their condition, an attendant to supplement the normal medical flight crew was required, and, rather than require the CASH to provide one from among the limited number of physicians assigned as would have normally been done, Col. Bartles, the flight surgeon who had arrived to replace Lt. Col. John MacNamara, accompanied this first load of evacuees. Lt. Col. MacNamara voluntarily remained in Mogadishu rather than leave the Air Force personnel short of a physician's skills during Bartles's absence. Bartles had been sent to fill a "gap" until 9th Air Force could provide another active duty flight surgeon and allow MacNamara to take his board examinations in aerospace medicine. He left only in mid-October. Hadbavny after-action report, p. 20. Tel. interview, Bartles, July 17, 2000. The second C–141 AE mission was accompanied by a U.S. Navy flight surgeon, Dr. Gordon Moshman. Tel. interview, Col. MacNamara, June 13, 2000. Col. MacNamara was assigned to Pope AFB at the time of this interview. Tel. interview, Dr. Gordon Moshman, July 8, 2000.

94. Bowden, *Black Hawk Down*, and Kent DeLong and Stephen Tuckey, *Mogadishu! Heroism and Tragedy* (Westport, Conn.: Praeger, 1994). Bowden discusses medical care for the wounded (pp. 227–79, 265–66, and 292–99) but never mentions anything about the work of the flight nurses' nor other Air Force medical contributions. In his discussion of the medical support the Ranger casualties received, Bowden focuses his account around the person of Maj. Rob Marsh, the Delta Force surgeon, the son of the Secretary of the Army, who was later wounded seriously in the stomach by a mortar round during Aidid's retaliatory attack on U.S. forces at the Mogadishu airport the following Thursday. Marsh was well liked by the Air Force personnel and is reported to have said that the nurses who attended to him immediately after he had been hit had saved his life. By several accounts, the Rangers and the flight nurses had "bonded," the former coming to regard the latter as their protectors, which made their work in the MASF assisting with

the Ranger casualties doubly traumatic. One of the Ranger officers later married an ANG flight nurse from the Air Force contingent at the Mogadishu airport. Tel. interview, Martello, June 8, 2000. Tel. interview, Grae Brown, June 4, 2000. Tel. interview, 1/Lt Wes Hamilton, MSC, ANG, June 7, 2000.

95. The quotation is from *Mogadishu! Heroism and Tragedy*, p. 85. Although the presence of flight nurses undoubtedly provided a small measure of comfort to those of the casualties whose wounds were not so severe that they could not appreciate it, as noted in the text, the flight medical personnel who were present at the Mogadishu airport tell a different story. One very brief description of events at the MASF is TSgt. Timothy P. Barela, "Bloody Sunday," Airman (Feb. 1994). Nurses and medical technicians are quoted in the article about conducting triage on all the wounded soldiers on litters who began to pour through the airport gate, and according to 'the memory of one, "kept coming and coming." The author of Black Hawk Down does characterize the Delong and Tuckey book as a "hasty, sincere effort," that is, however, "full of mistakes." However, the exclusion of the nurses's efforts shows an ignorance of events that is more profound. A module in the Special Operations Medic Course, "Mogadishu Raid Exercise," refers to the CCP at the airport several times, only once referring to as the "CCP/MASF." In all fairness, the focus of this exercise is on what SF medics can learn about how to conduct themselves in critical situations like Mogadishu and clearly is not meant to slight the Air Force role. I am indebted to Col. Cliff Cloonan, MC, USAF, Dean of the Special Operations Medical Training Center at Fort Bragg, for a copy of this exercise.

96. Gen. Fogleman, then CINCTRANS/Commander AMC, recalled seven years after the event that the only mention of the use of the MASF as an emergency medical facility was made at one of the standard morning briefings and presented as the Air Force "was able to help," with no further elaboration. Tel. interview, Gen. Ronald R. Fogleman, USAF, June 28, 2000.

97. Handwritten draft of a letter from Col. Bartles, and Lt. Col. MacNamara with Lt. Col. Volpe's handwritten concurrence, to "AMC Medical Command" [*sic*], Oct. 8, 1993; whether a final draft was prepared and sent is not known. However, Col. Hadbavny sent a letter to AMC incorporating the details of a briefing and recommendations she had received at Cairo West from Col. Bartles immediately prior to his return to Mogadishu. In a letter dated Oct. 7. and based on a handwritten draft left her by Bartles, Col. Hadbavny reported that the limited number of beds at the 46th CASH meant that the MASF would again become a CCP in future mass casualty (MASCAL) situations and recommended that two to three "acute care doctors," one of them being available to augment the standard medical flight crew for urgent missions, be deployed to augment the MASF staff. Bartles also recommended that consideration be given to upgrading the MASF to a second-echelon MTF. Ltr, from Director, AE Forces [Hadbavny], to AMC/SGPC, subj: Direct Field Assignment of 4 Oct 93 Casualty Evacuation from Mogadishu, Somalia, with Recommendations, Oct. 7, 1993. Hadbavny papers. Although, as of July 1993, the C–130s and the tactical AE mission had been reassigned to the Air Combat Command, AMC kept responsibility for the Somalia operation for purposes of continuity. Reportedly, when the request for additional physicians was referred to the ARC, the responsible officer said, "Doesn't she know that we're drawing down?" Tel. interview, Hadbavny, June 11, 2000. However, two additional flight surgeons were, in fact, dispatched to Mogadishu in mid-October 1993. Hadbavny after-action report, p. 3.

98. Tel. interview, Brig. Gen. Jerome Foust, MSC, USA, Mar. 3, 1999. See Chapter 8.

99. Tel. interview, Wright, June 7, 2000.

Col. Wright reported that special forces' representatives sat in the TACC several times during her tenure in the TACC (from June 1992 to November 1995) to help coordinate required airlift for some highly classified missions. The after-action report on the AE system established for the Haiti operation was much more "joint" in concept and, among other things, included deployment of the medical regulating elements prescribed doctrinally by Joint Pub 4.02.02, which was not to be promulgated formally until two years later. The AE system deployed for the Haiti operations is described in the after-action report conveyed by Memo for HQ AMC (TPMRC Augmentees), USTRANSCOM (GPMRC), Wilford Hall Med Ctr (CCAT Personnel), et al., from Col. Thomas M. Chester, MSC. USAF, subj: Aeromedical Evacuation After Action Report – Operation Uphold/Maintain Democracy, n.d. [routing slip stamp dated Jan 11, 1995]. I am indebted to Lt. Col. Susan Konczal, MSC, USAF, for a copy of this report.

100. There is a useful chronology in Margaret Daly Hayes and Gary F. Wheatley, Interagency and Political-Military Dimensions of Peace Operations: Haiti – A Case Study (Washington, DC: National Defense University [NDU], Feb. 1996. This publication reports on one of a series of workshops conducted by NDU's Institute for National Strategic Studies. It focuses on process primarily and does not treat medical support of the Haiti operation. Interestingly, two items from its list of "What Went Right" in Haiti: viz., "adequate resources for the job" and "commanders had the latitude to do the job," could be taken as negative commentaries on the U.S. role in Somalia, not just on the restrictions placed on the U.S.-manned Quick Reaction Force but also on the AE system which supported Operation Continue Hope. At least with regard to performing their medical support mission, the initiative and aggressiveness of the AE personnel at Mogadishu transcended some of the obstacles that policy inadvertently placed in their way.

101. Tel. interview, Hartley, Aug. 21, 2000. Bob Shacochis describes the activities of various Special Operations' detachments that he observed while in Haiti for several weeks after the unopposed arrival of CJTF 190 at Port-au-Prince. Bob Shacochis, The Immaculate Invasion (New York: Viking, 1999).

102. *Ibid.*, pp. 16–17. Chester, Uphold Democracy after-action report, p. 1.

103. On July 1, 1994, the 1st AES was deactivated and the 23rd AES activated, with no change in mission, location, or personnel.

104. For example, the Knightly Rogue after-action report noted that the "user" wanted to utilize the 1st AES "in a diversion from standard TAES mission,'" and that the "standard MASF package is inefficient for this type operation," whose new operational requirements were for "more trauma/emergency nursing care skills." SOC medical personnel provided the Air Force participants with a lengthy list of lectures that clearly related to emergency medicine and the evacuation of "stabilized" patients rather than the MASF' doctrinal role of patient holding and stable patient evacuation. The subjects of these lectures included abdominal trauma, thoracic/chest injuries, burn assessment and emergency care, vascular injuries, trauma patient care and shock, battlefield anesthesia, and wound ballistics. Quotes are extracted from Knightly Rogue after-action report, paras: 13.1.2-3, 13.7.1, and 13.18.4. The "user" also requested that the first AE mission be planned for patients supported by six ventilators, which, by AMC regulation, would have required attendants that the "user" was not necessarily ready to provide. In a recent conversation with one of the 1st AES planners who developed the CONOPS for the Haiti operation, Dr. Volpe cited the Panama medical support and evacuation system at Howard as the model he had wanted for the AE system supporting the SOCOM

force deploying to Haiti. Tel. interview, Maj. James Lorraine, NC, USAF, July 17, 2000. At the time of this interview, Maj. Lorraine was assigned to the Joint Staff J4, Medical Readiness Division. Lorraine wrote the CONOPS for both Knightly Rogue and Restore Democracy. The nature of Exercise Knightly Rogue and its relationship to the CONOPS for the Haiti operation was also confirmed in separate tel. interviews by the former director of operations for the 1st AES, Lt. Col. Kernist T. Stovall, MSC, USAF, July 23, 2000, and the drafter of the after-action report, Lt. Col. Susan Konczal, July 17, 2000. As Dr. MacNamara observed in a recent interview, "Dr. Volpe and the medical elements of the SOC got exactly what they wanted for medical support in Mogadishu." Tel. interview, July 24, 2000. Clearly, the Somalia experience was a stimulus to the SOCOM institutional memory of the concept of integrating JSOTF medical personnel and Air Force AE elements that had proved so successful at Howard AFB during the Panama operation five years before.

105. Tel. interviews, Maj. James Lorraine, July 17 and 25, 2000; Tel. interview, Stovall, July 23 2000. Tel. interview, Konczal, July 17, 2000. Theater command was exercised by the Atlantic Command (USACOM), and its component, Air Combat Command, tasked the 23rd AES to do the planning for the needed TAES. The Deputy USACOM surgeon, Col. Felix Meyer, was a former commander of the 1st AES during the Grenada operation and one of the key planners of the medical support and the AE system that supported Operation Just Cause in Panama. He noted in an interview with the author that the latter was the original "template" for the Haiti planning. Tel. interview, Col. (Ret.) Felix Meyer, MSC, USAF, Aug. 18, 2000.

106. There is a consensus among the group that actually did the planning that Reay, an MSC officer with a very considerable experience in AE planning and operations, was the driving force in the planning process. Tel. interview, Hartley, Aug 21, 2000; tel. interview, Riley, Aug. 18, 2000; tel. interview, Bouchard, Aug. 21, 2000. Reay had been alerted to the interest of the special operations community in Gen. Carleton's CCATT proposals (discussed later), and Reay was later instrumental in developing the participation of ACC active duty and ARC AE units in the Joint Readiness Training Center on the basis of discussions with the 18th Airborne Corps Command Surgeon, Brig. Gen. James Peake. The planning group conducted their sessions in secure facilities at various locations including Fort Bragg, MacDill AFB, and Hurlburt AFB, and those planners who were focused on AE support of the conventional forces were not privy to the details of that being developed for the JSOTF.

107. Chester, Uphold Democracy after-action report, p. 9. Tel. interviews, Col. Randy Hartley, MSC, USAF, Aug. 21, 2000; Col. (Ret.) James D. Reay, MSC, USAF, Aug. 18, 2000; Col. (Ret.) Felix Meyer, MSC, USAF, Aug. 18, 2000. Col. Hartley used the term "post-anesthesia recovery unit" in referring to the MASF. Col. Meyer cited Col. Volpe's specific reference to the medical and AE support at Howard AFB during Just Cause as the "template."

108. According to senior Air Force MSC officers who were present, the then Brig. Gen. P. K. Carleton from the Air Education and Training Command (AETC) briefed the Air Force Special Operations Command (AFSOC) staff in early 1994 about Air Force "mini-surgical teams" and CCATTs that could augment standard Air Force medical flight crews for the evacuation of patients who were not clinically stable. However, Carleton indicated that the teams regularly used specially designed equipment that was intended to deploy with the teams. However, the equipment had been funded for use in the AETC MTFs with AETC funds, which Carleton believed should be repaid to free it

for "on call" use. AFSOC had both funds available and an interest in the capability CCATTS represented to provide care in the air, something that JSOC surgeons, particularly Col. Volpe, had been pressing AFSOC to develop. The upshot was that AFSOC transferred funds ($180,000) to AETC, and the surgical teams and CCATTs were placed in a 24-hour response position and later included in the planning for the Haiti operations. Tel. interviews, Col. Randy Hartley, MSC, USAF, Dep. Command Surgeon, CENTCOM, Aug. 21, 2000; and Col. David Hammer, MC, USAF, Director, AF Medical Operations Agency (AFMOA), Aug. 31, 2000. At the time of the Carleton briefing, Hartley was the deputy command surgeon of AFSOC and its chief administrative officer; Hammer was the command surgeon and Hartley's boss. The chief medical planner of the 23d AES who subsequently was one of the planning group that developed the AE CONOPS for Operation Uphold Democracy also heard a similar briefing given by Gen. Carleton's staff as did Col. Sheila Millette who was serving as the chief nurse for ACC at the time. Tel. interview, Capt. James Lorraine, NC, USAF, July 17, 2000; tel. interview, Col. Sheila Millette, NC, USAF, Aug. 25, 2000. Col. Millette had previously served in the 1st AES and deployed with Col. Brannon to establish the MASF/JCCP at Howard AFB for Operation Just Cause.

109. Col. Thomas M. Chester, Aeromedical Evacuation After Action Report –Operation Uphold/Maintain Democracy, n.d. [routing stamp marked with date of Jan. 11, 1995], pp. 1–5.

110. One manifestation was a delay in the planned relocation of the MASF from Guantanamo Bay to Port-au-Prince, which had to be delayed because of ongoing operations by the JSOTF. The result was an unplanned reconstitution of an AEOT at MacDill AFB into a MASF and its deployment to the Haitian capital. Chester, Uphold Democracy after-action report, pp. 7–8.

111. Tel. interviews, Maj. James Lorraine, NC, USAF, July 23 and 25. Ltr to the author, Aug. 8, 2000. Lorraine notes that, as director of the AECC at Pope, he had to request aircraft for the evacuation of "urgent" patients–that is, those requiring aeromedical evacuation as soon as possible–on three successive days. On the first occasion he directed that the AELT deployed on USS Comfort have the approximately thirty patients aboard medevaced to shore to take advantage of the unscheduled aeromedical evacuation aircraft. However, he had to make requests for aircraft to carry out the aeromedical evacuation of the later "urgents" because his inquiries why the patients could not find the definitive treatment they required on the Comfort elicited the information that the humanitarian mission of the hospital ship had taken priority. Chester, Uphold Democracy after-action report, p.4.

112. The CONOPS for a forced entry called for the AELT deploying to Port-au-Prince to parachute in. Tel. interview, Stovall, Aug. 2, 2000; tel. interview, Lt. Col. Konczal, MSC, USAFR. Konczal was OIC of the AELT at Jacksonville Naval Air Station. Chester, Uphold Democracy after-action report, pp. 12–13.

113. Chester, Uphold Democracy after-action report, pp. 7. The 28th CASH assumed all medical regulating and treatment capabilities for the AOR on October 2. Chester's after-action report states that it had been planned that the MASF/JCCP supporting the JSOTF at Guantanamo would be moved to Port-au-Prince (PAP) some forty-eight hours after the deployment of U.S. forces began when the JSOTF operations were supposed to be over. However, the AE personnel were not "chopped" back to the director of AE forces until several days later, and a MASF for PAP was constituted using personnel from the AELT at MacDill augmented by others from the AFRES 610 AES. This detail is worth noting because the retention of the MASF at Guantanamo seems to have been a

direct result of caution growing out of events in Mogadishu. There, the early withdrawal of a significant part of the U.S. combat capability that had initially overawed the Somali warlords had been followed by the hostile resurgence of the warlords, culminating in the disaster growing out of the Rangers' attempt to seize Mohammed Aidid. See the Warner–Levin Memo, "Review of the Circumstances Surrounding the Rander Raid on October 3–4, 1993, pp. 4–5. This explanation for the MASF/JCCP' retention was offered by a former ACC medical planner who had just been reassigned to AMC at the time of Uphold Democracy. Tel. interview, Lt. Col. (Ret.) Mark Hamilton, MSC. USAF, Aug. 2000.

114. Chester, Uphold Democracy after-action report, p. 7. Tel. interview, Lorraine, July 25, 2000.

115. Tel. interview, Lt. Col. (Ret.) Philip Mahlum, MSC, USAF, Aug.23, 2000. Mahlum had moved from the AMC Command Surgeon' planning staff to the newly established GPMRC. The deployed DMRTs were from his new office. Chester, Uphold Democracy after-action report, pp. 10–11.

116. Tel. interview, Lorraine, July 25, 2000. Tel. interview, Mahlum, Aug. 23, 2000.

117. Tel. interview, Mahlum, Aug. 23 2000. Based on the demonstrated utility of this equipment, AMC subsequently procured six INMARSAT terminals. Chester, Uphold Democracy after-action report, p. 10. According to Maj. Lorraine, the crews were also provided with pictures of the OICs of the several deployed AELTs that would have directive authority over issues related to patient evacuation. Tel. interview, Lorraine, July 25, 2000.

118. Quoted in the after-action briefing on the TAES by the then Capt. Lorraine at Pope AFB, n.d. I am indebted to Lt. Col. Konczal for a copy of the briefing slides. Maj. Lorraine verified the quotation in a recent letter to the author.

119. Some JULLS entries were quite basic. JULLS 11.15 observed in a discussion of how mixed active duty and ANG AE crews performed that several ANG AE crewmembers were not physically able to lift patient litters into the fourth and fifth litter tiers and noted that "physical fitness is a must to accomplish the mission and stay healthy." A number of other JULLS entries were not criticisms but descriptions of procedures and adaptations to changing circumstances that the particular entry recommended be continued or included in doctrine and policy. The relevant JULLS entries are attached to Chester's Uphold Democracy after-action report. Lorraine in the after-action briefing cited in a previous footnote listed six items under the heading "What we can do better": improve AECM preparation, develop employment concept for DMRT, exercise and equip AE crew augmentee concept, improve AE equipment readiness/availability, formalize doctrine to meet customer requirements, and acquisition of joint medical communications.

120. Tel. interview, Col. (Ret.) Daniel Reay, MSC, USAF, Aug. 18, 2000. Col. Reay served as the Surgeon of the Air Force Component (AFFOR) of the Joint Task Force.

121. I am indebted to Lt. Col. Mahlum for this insight.

122. ACC Surgeon's Office, "ACC Surgeon's Program to Improve Casualty Care," n.d. [ca. Jan. 1995]. I am indebted to Lt. Col. John Felins, MSC, USAF, for a copy of this program description. Tel. interview, Lt. Col. Felins, Aug. 17, 2000. Tel. interview, Lt. Col. (Ret.) Mark Hamilton, MSC, USAF, Aug. 20,2000. Tel. interview, Col. (Ret.) James D. Reay, MSC, USAF, Aug. 18, 2000.

123. Reay believed that AMC headquarters did not have a strong interest in tactical AE, which the AMC leadership tended to consider, like the C–130s, part of "Little MAC," that is, the nonstrategic airlift units that were the most important instruments for

conducting the TRANSCOM/AMC' principal wartime mission of deploying U.S. personnel and equipment to support U.S. theater commanders. When queried by the author what 'the reaction of AMC was to the policies embodied in the CONOPS for Operation Uphold Democracy, which varied so sharply from those AMC policies governing intertheater patient movement, Reay indicated he was indifferent to the reaction of AMC because he viewed AMC as an obstacle to progress because of its focus on strategic AE. Tel. interview, Reay, Aug 19, 2000.

124. The quotation is from the ACC CONOPS for Theater Aeromedical Evacuation System Assets, Feb. 15, 1995, signed by the ACC Surgeon, Brig. Gen. Thomas D. Gensler, MC, USAF. Formally promulgated after Operation Uphold Democracy had been planned, this approach obviously permeated the CONOPS for the Haiti operations, but its deliberate use as a guide is confirmed by one of the ACC planners involved. Tel. interview, Lt. Col. John Felins, MSC, USAF, Aug. 17, 2000. Felins is generally credited with being the author of the CONOPS and also shared Reay's opinion of AMC's lack of understanding and responsiveness toward the tactical AE mission. 'Tel. interview, Felins, Mar. 22, 2000.

125. Tel. interview, Hartley, Aug.21, 2000. Hadbavny after-action report, p. 19.

126. Tel. interview, Lorraine, July 17 and 25, 2000. Major Lorraine's account of the meeting has been supported by Col. Bloomquist, although he remembers the audience as being agitated at times but perhaps somewhat less vociferous than Maj. Lorraine recalls. Ltr, Col. (Ret.) Carroll Bloomquist, MSC, USAF, to the author, July 23, 2000. Lorraine briefed his squadron commander and operations officer about this meeting after his return, and the latter confirmed recently that Lorraine's account of this meeting to the author is the same as he heard in late April 1994. Tel. interview, Lt. Col. (Ret.) Kernist Stovall, MSC, USAF, Aug. 2, 2000. The subjective element in perceptions presumably is at work here. Maj. Lorraine, was, of course, stationed for some eight months in Mogadishu during Restore Hope and Continue Hope. Additionally, because Lorraine was an Air Force nurse, a medical professional, he would undoubtedly have acutely felt accusations reflecting on the quality of medical care. I am indebted for this insight to Col. Stovall. The key issue, in any event, is how Lorraine perceived the Army criticisms because these affected his approach to the CONOPS he would be tasked to write a few short months later.

127. Both casualty care air transport teams (CCATTs), flight surgeons, multiple AELTS and MASFs (beefed up to serve as CCPs as needed), an AECC, and significant numbers of AECMs "staged" to man AE flights carrying U.S. casualties and other patients were all part of the AE forces deployed. In spite of the success of the program to track PMI, there were still difficulties with Army medical logistics, which failed to resupply the 28th CASH with litters, litter straps, and blankets in the mistaken belief that the Air Force was required to exchange these items for those sent from the CASH with patients who were aeromedically evacuated. The MASF at Port-au-Prince filled these shortages for the CASH. JULLS entry 11.38. Chester, Uphold Democracy after-action report. Tel. interview, Hammer, Aug. 31, 2000.

128. Tel. interview, Lorraine, July 25, 2000. This major change in doctrine was confirmed by the 23rd AES Operations Officer, Col. Stovall, who was present at the Port-au-Prince airport during the initial days of the U.S. intervention at the specific request of the commander of the 18th Airborne Corps' 44th Medical Brigade, Col. Peake. Peake, the army's fortieth surgeon general, interacted frequently with the staff of the 23rd and asked Stovall to deploy to Haiti to monitor the aeromedical evacuation system as it went into operation. Although on active duty and

well trained, OICs of AELTs were generally company grade officers. Lorraine's description of the restriction on MCD's right to refuse patients is confirmed by the other planners including Col. Reay.

129. *Ibid.*

130. Quotation is from comments provided by Gen. Downing for the then Lt. Col. Randy Hartley's performance evaluation. I am indebted to Col. Hartley for this information. Tel. interview, Aug. 21, 2000. In a separate interview, Hartley's boss, Col. Hammer, then the AFSOC surgeon, attributed the same comment to Gen. Downing in exactly the same words.

Chapter Twelve

1. Tel. interview, Lt. Col. (Ret.) Philip Mahlum, MSC, USAF, Aug. 23, 2000.

2. It is not clear to what degree medical support including AE requirements has been factored into military planning overall. A highly experienced former Army medical corps physician who participated in a high-level wargame at the Army War College (AWC) in early 1999 reported that a number of medical issues raised by the U.S. Army medical department representatives were termed "war stoppers" by the wargame director who said that these would need to be considered in future games. A recent "Army Transformational Wargame" at the AWC involving the Army chief of staff and a very senior group of "players" from all services reportedly was very concerned about better defining the logistics requirements of the Army "objective force," which the wargame was designed to evaluate. For a lengthy report on the game, see Jason Sherman, "Coming Attraction: At Play in the Fields of the Future with the Army's Objective Force," Armed Forces Journal International (July, 2000), pp.: 40–44. Whether medical requirements were part of the logistics discussions is not mentioned in this brief article. However, one retired general ""who participated noted that the objective force requires new investments in ships and planes to carry it, an observation that might have negative potential implications for any future reengineering of the Air Force' AE capabilities that require any significant budgetary increases.

3. The Joint Chiefs of Staff published successive "Joint Vision" documents with advancing dates that have been echoed by the services and the AMC medical planners.

4. By June 1994, the Air Force no longer regarded the service life extension program as a viable option. Air Mobility Command History, 1 June 1992–31 Dec. 1995, Vol. I: Narrative, (Scott AFB, Ill.: Office of History, Air Mobility Command, July 1995), p. 374. AMC/HO.

5. Capt. Don Wasik, Point Paper, subj: Stage III Noise Commpliance, Aug. 6, 1999. AMC/HO.

6. Gen. Walter Kross, USAF, CINCTRANS/AMC commander, discussed with some urgency the need for C–5 funding at an "Air Mobility Symposium: 1947 to the Twenty-First Century," Sept. 19–20, 1997, which the author attended. Gen. Kross also discussed C–5 modernization in his oral history. Kross, An Oral History, pp. 50, 53. His predecessor, General Robert Rutherford, also expressed concern over the low C–5 reliability rate for both models of the C–5, which he asserted ranged from 65 to 75 percent when 90 percent was necessary for AMC to meet its mission. Gen. Robert L. Rutherford, USAF, An Oral History (Scott AFB, Ill.: TRANSCOM Research Center, October, 1996.), p. 31. Kross's successor, Gen. Charles T. Robertson, USAF, also identified C–17 acquisition and C–5 modernization as his two top priorities for FY99 funding. "Air Mobility Master Plan Update," AMC History, 1996–1998, p. 3. AMC/HO.

7. The then AMC surgeon, Brig. Gen. John Jernigan, MD, USAF, had requested that the Air Force Institute of Technology (AFIT) conduct a study assessing replacements for the C–9s, and it was done as an

AFIT thesis by Maj. Scott A. Wilhelm, USAF. "An Analytic Tool to Assess Aeromedical Evacuation Systems for the Department of Defense," Mar. 1998. AMC/HO. Procuring a possible replacement for the C–9 may ultimately parallel the course of the its own original procurement. As a projected replacement for the C–131, the propeller-driven first Air Force aircraft dedicated to AE, the C–9 twice failed to secure Air Force funding until President Johnson's visit to Vietnam early in the Vietnam War when he spoke approvingly about aeromedical evacuation after touring an aircraft configured for AE. See Chapter 7.

8. Quote from Executive Summary, Report of Audit, Review of the Aeromedical Evacuation System, p. 1. Audit transmitted by Memo for the Secretary of the Air Force and Chief of Staff, USAF, from Jackie R. Crawford, The Auditor General, July 5, 1995. Air University Library, Maxwell AFB, Alabama.

9. [Betty Kennedy], Issue Paper, "C–9A Replacement Issues/ Strategy," n.d. [ca. Apr. 1999]. AMC/HO.

10. *Ibid.* An earlier audit of the AE system in 1977 had also recommended halving the C–9A flying-hour program (for FY 1978 it was programmed to be 25,806 hours) for similar reasons of cost ineffectiveness. However, the wartime mission for the domestic C–9A fleet adopted in the mid-1980s–that is, deployment to Europe to support movement of casualties from a NATO–Warsaw Pact conflict to contingency hospitals–provided a rationale for resisting such a large cut. Draft Report on the Audit of the Worldwide Aeromedical Evacuation System, p. 8. Report transmitted by Memo for ASD/HA and Asst. Secretary of the Air Force from James H. Curry, Associate Director, Systems and Logistics Audit, Nov. 6, 1978. AMC/HO.

11. Issue Paper, Draft Report of Audit. Worldwide AE System, July 5, 1995, p. 20.

12. *Ibid.*, pp. 21–22. Although he gave his top priority for funding to C–17 acquisition and C–5 modernization in that order, Gen. Robertson listed "C–130X modernization" as his third. Acquisition of C–130J models was another key issue with which AMC had to deal.

13. Interview, Lt. Col. Rita Kerrick. Col. Kerrick was commander of the 459th AES, AFRES, which was assigned to an AFRES C–141 wing based at Andrews AFB, Md.

14. AMC History. AMC/HO. Tel. interview, Maj. Gen. P. K. Carleton, MC, USAF, 1998. Tel. interview, Lt. Gen. James Roadman, MC, USAF.

15. Maj. Scott Wilhelm, Point Paper, subj: C–9 Replacement, Jan. 19, 2000. AMC/HO. Maj. Wilhelm conducted the C–9 study that was delivered to Gen. Jernigan's successor, Maj. Gen. Randolph, CENTAF surgeon during Desert Shield/Desert Storm, and, subsequently, CENTCOM surgeon prior to his assignment as the TRANSCOM/AMC surgeon.

16. Tel. interviews, Col. (Ret.) Sarah Wright, NC, USAF, Sept. 9, 2000; Lt. Col. (Ret) Philip Mahlum, Aug. 8, 2000; Col. Sheila Millette, NC, USAF, Aug. 25, 2000. Col. Millette was codirector of the Tiger Team.

17. Aeromedical Evacuation Tiger Team Final Report, June 19, 2000. AMC/HO. Tel. interview, Col. Sheila Millette, NC, USAF.

18. Tel. interview, Col. David Hammer, MC, USAF, Aug. 31, 2000. Col. Hammer, formerly on on the staff of the AF surgeon general, was the AFSOC surgeon during the preparation for and execution of the Haiti operations.