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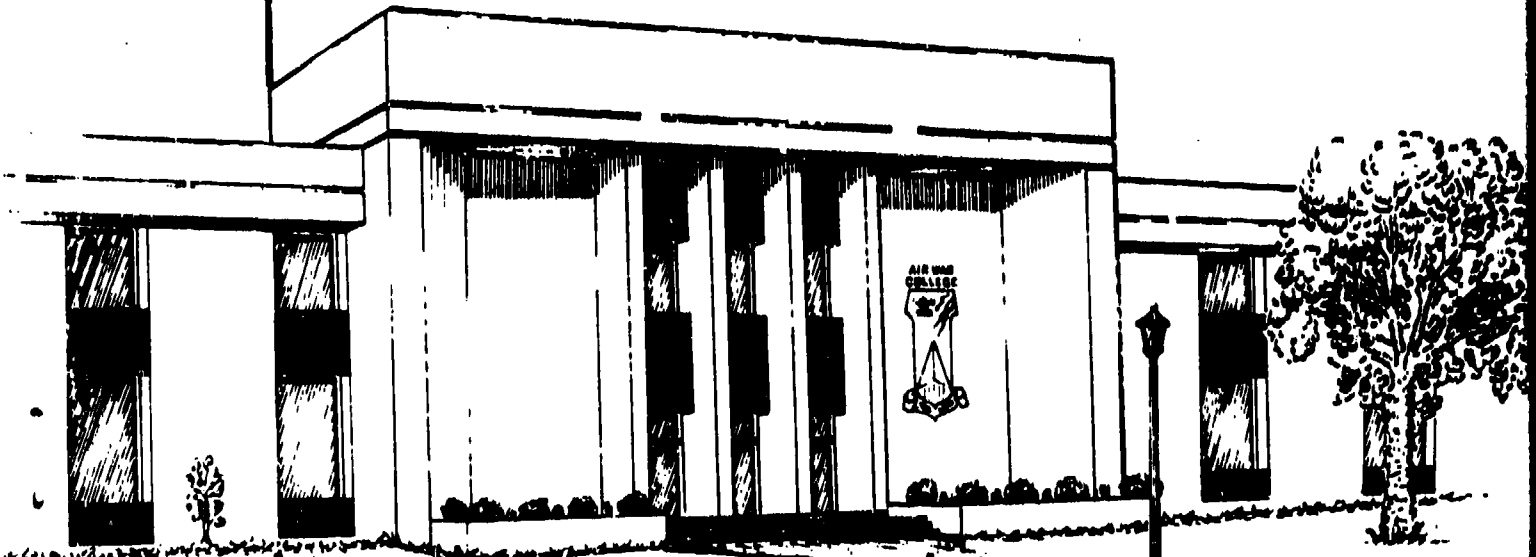
RESEARCH REPORT

AEROMEDICAL AIRLIFT -- DO THE PIECES FIT?

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AEROMEDICAL AIRLIFT -- DO THE PIECES FIT?

by

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A RESEARCH REPORT SUBMITTED TO THE FACULTY
IN
FULFILLMENT OF THE RESEARCH
REQUIREMENT

Research Adviser: Colonel Ronald L. Morey

MAXWELL AIR FORCE BASE, ALABAMA

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AIR COLLEGE RESEARCH REPORT ABSTRACT

TITLE: Aeromedical Airlift -- Do the Pieces Fit ?

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Remarks on the nature of war and the implicit importance of America's wartime medical system introduce a discussion of the Department of Defense's medical operation and the associated planning effort. A discourse on the inadequacies of the Nation's airlift capabilities and the ensuing concept of using the Civil Reserve Air Fleet to support aeromedical airlift follows. An explanation of the planning that is being accomplished to make this new asset a viable entity of the wartime and peacetime medical system completes the background for the author's views on the capabilities of the system. The lack of a central controlling organization manned with people of diverse specialties and the inability to see aeromedical airlift as a specialized entity in itself are seen as the main drawbacks. Suggestions to overcome these deficiencies are provided.

*Keyed to: airforce operations;
medical logistics; medical services;
(K-7/SES) ←*

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BIOGRAPHICAL SKETCH

Lieutenant Colonel John D. Becker (B.S., Ohio State University, M.A. University of Nebraska) has served the Air Force in numerous capacities. He was stationed in Germany as a Special Air Missions pilot and at Headquarters United States Air Force Europe as a Chief Flight Examiner. Later, as an Air Intelligence Officer, he performed duties at Headquarters Strategic Air Command. Colonel Becker has viewed aeromedical airlift from many vantage points: From the grass roots level as a C-9 pilot, from the Wing perspective as a wing executive officer, and from the MAJCOM's point of view as a Headquarters Military Airlift Command action officer for the Deputy Chief of Staff Operations. He further extended his views on the subject as Commander of the Eleventh Aeromedical Airlift Squadron. Colonel Becker is a graduate of the Air War College, class of 1988.

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CHAPTER I

INTRODUCTION : THE AIREVAC SYSTEM

Warfare has changed significantly since World War II. The lethality of the modern tank gun makes it about 10 times as effective as its counterpart of the early 1940s. Today's artillery ammunition is five to 10 times more lethal than that used in World War II. Helicopters armed with anti-tank missiles and highly accurate long-range mobile air defense systems are present in large numbers. With such sophisticated weaponry on the battlefield, and highly capable advanced aircraft with "smart" munitions above the war zone, virtually anything that can be seen can be hit and killed. To fight and win in this environment, the United States (U.S.) has adopted a doctrine that emphasizes initiative, depth, agility, and synchronization. The Integrated "AirLand Battle" plan employs a nuclear, biological, chemical (NBC), directed energy (DE) and electronic warfare (EW) arsenal that may at any time be used in support of the nation's conventional weapons. (24:1) When viewed in perspective, this highly lethal and deadly battlefield dictates the importance of today's wartime health

service support. A recent House of Representatives Appropriations Committee report concludes that:

A trained, ready and prepared military medical system is a top priority item in any discussion of readiness of our military system. Without a means to care for our fighting forces, the United States loses its credibility with the American people, our adversaries, the military commander, and most importantly, the troops themselves. (10:1)

The health of America's wartime medical system was highlighted on October 23, 1983, when the terrorist bombing of the Marine Barracks in Beirut took the lives of 241 U.S. military personnel and wounded 112 others. This terrorist action severely stressed the peacetime health care system in Europe and directed attention to the ability of our Armed Forces to respond to a wartime medical contingency. (25:2) Since that time, numerous studies, and a heightened national awareness, have combined with increased spending and a joint planning effort to begin the development of a comprehensive plan that will bring together the resources required to medically support the operating forces in war. In the center of this scheme, serving as the glue to bond the independent pieces together, is the Nation's aeromedical evacuation system. It is aeromedical evacuation (AIREVAC) that spans the mountains, valleys and oceans to tie the battlefield casualty to the theater hospitals and to the health care facilities in

the United States. But, in spite of the new-found interest, the many changes, and improved readiness planning, the question remains: will the system work? Are the functional units that make up and support aeromedical airlift capable of integrating to create an effective war fighting system? To answer these questions, we must understand how aeromedical airlift fits into the wartime medical system, how the functional units plan and accomplish their missions, and how they will accomplish them tomorrow.

CHAPTER II

THE WARTIME MEDICAL SYSTEM AND AEROMEDICAL AIRLIFT

The ability to evacuate America's sick, wounded, and injured fighting men from the war zone has been an evolutionary process. Today's doctrine is a culmination of years of experience and lessons learned. The Health Services System encompasses the collecting of wounded, sorting and triaging, evacuation and medical care enroute and at the terminal facility. An understanding of the complexities and problems associated with the aeromedical airlift system stems from a comprehension of the forces driving this system. (24:5-1)

Conceptually, wartime theaters of operations (TO) are divided into two zones: the Combat Zone (CZ) and the Communications Zone (COMMZ). The CZ begins at the corps rear boundary and extends forward to the extent of the corps commander's area of influence. The COMMZ begins at the corps rear boundary and extends rearward to include the areas necessary to provide support to forces in the combat zone. For planning purposes, medical care is provided in a sequential fashion beginning with basic first aid in the forward areas and

becoming more sophisticated as one moves back into the COMMZ. There are four echelons of medical support within the theater: 1. The first echelon provides the emergency care necessary to prepare the casualty for evacuation to the rear. 2. The second echelon provides prioritization for further evacuation. 3. The third echelon provides resuscitation, surgical procedures for those that cannot be transported further, and post-operative treatment. 4. Lastly, fourth echelon care is provided in a hospital located in the COMMZ with a mission of either rehabilitating and returning casualties to duty or evacuating them to the CONUS. (10:4)

Each service provides medical care for its own forces through support organizations that provide similar care at each of the four echelons. However, as Figure II-1 indicates, this care is provided by a vast array of organizations, operating under various organizational structures. Figure II-2 graphically depicts the transportation scheme that interfaces with each of the four echelons and the individual service's care facilities. Responsibilities for the movement of casualties are divided and accomplished as follows:

Within the Combat Zone, the responsibility for casualty evacuation is assigned to the service or organization actually engaged in the conflict.

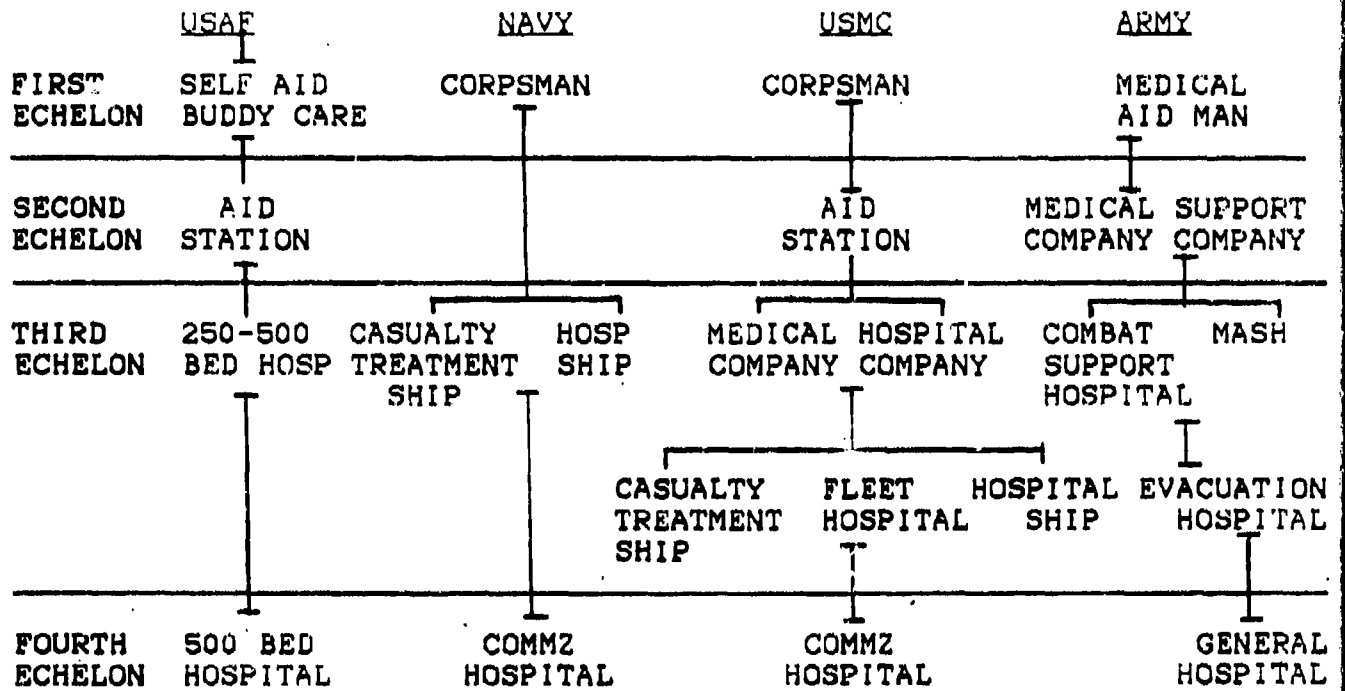
Movement from the place of injury or collection point to initial staging area is normally accomplished using litter, organic ground transportation, or helicopter.

Combat Zone to Communications Zone, transportation of patients is assigned to the Air Force, which uses Military Airlift Command assets. Normally, this movement is accomplished with C-9A aircraft (if deployed to the theater) or retrograde C-130s.

Communications Zone to CONUS, transportation of patients is the responsibility of the Air Force, which normally uses C-141 and C-5 aircraft, augmented by the Civil Reserve Air Fleet (CRAF).

In-CONUS, movement of casualties from the initial arrival aerial ports to the designated hospital is the responsibility of the Air Force, which uses Air Force C-9s (unless deployed to the theater) and CRAF aircraft augmented by local ground transportation as the situation warrants. (10:21)

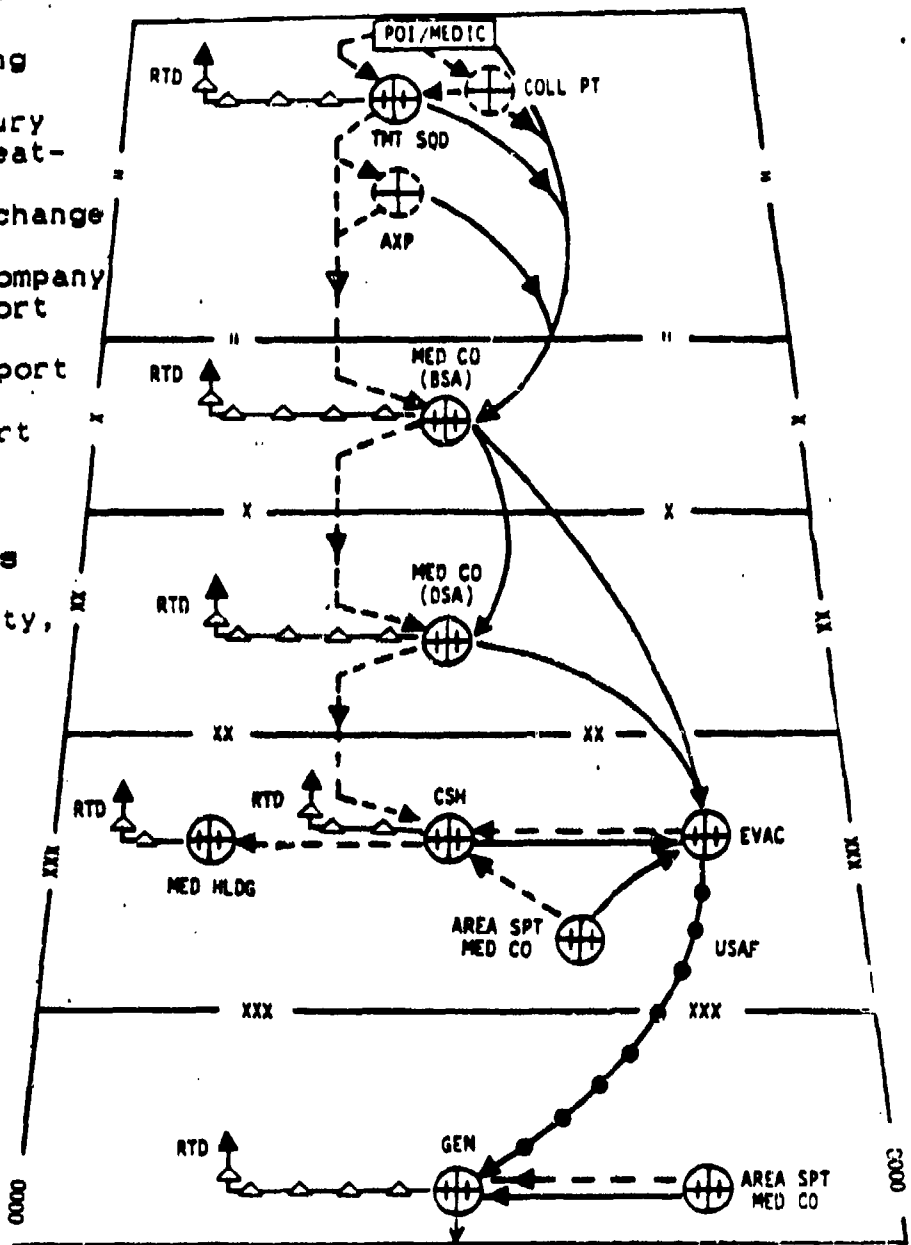
FIGURE II-1: DOD THEATER COMBAT MEDICAL SYSTEM



(Source: "Integrating the Civilian Health Care System Into Medical Mobilization Planning." (10:5) As derived from "Assistant Secretary of Defense for Health Affairs report "Contingency Hospital Milcon Planning.")

FIGURE II-2: EVACUATION -- PATIENT FLOW

- COLL PT -- Collecting Point
 POI -- Point of Injury
 TMT SQD -- Trauma Treatment Squad
 AXP -- Ambulance Exchange Point
 MED CO -- Medical Company
 BSA -- Brigade Support Area
 DSA -- Division Support Area
 CSH -- Combat Support Hospital
 MED HLDG -- Medical Holding Area
 GEN -- General Hospital
 AREA SPT MED CO -- Area Support Medical Company
 USAF -- USAF Assets
- Air Assets
 - - - Ground Assets
 ●●●●● USAF Assets
 ▲▲▲▲▲ Return to duty, ground or air



(Source: "Field Circular, Medical Evacuation in the Combat Zone," (24:5-1))

CHAPTER III
MEDICAL PLANNING

Wartime medical care planning is accomplished in accordance with the Joint Operation Planning System (JOPS). The process begins with the Theater Commander's assessment of the threat. From this assessment, a concept plan is developed and forwarded to the Joint Chiefs of Staff and the services for review. Following review, the Theater Commander develops a plan based on his strategy for executing the mission. During this process, theater planners coordinate all service requirements to insure the capability of a Joint theater force. Each service theater plan contains an annex or appendix which provides for medical planning. (10:8)

Within JOPS, the medical planners use a computer-based software program called the Medical Planning Module (MPM). Factors such as the number of combat troops at risk, the intensity of the battle, the evacuation policy, the expected casualty rates, and non-battle related injuries are combined with lists detailing the assets expected at specified places within a specific time to estimate the daily admissions

to the medical support system. From the number of troops at risk, the module also projects the number of patients wounded, diseased or injured and the numbers evacuated or returned to duty. Medical projections of wartime hospital bed requirements are simultaneously time-phased by expected casualty rates and are divided into two parts: in-theater requirements for the Combat and Communications Zones and requirements for evacuation to the CONUS. Through this process, the medical requirements, which are usually defined in terms of hospital beds, are also produced. The number of beds serves as the correlating factor in determining medical requirements for manpower, supplies and transportation. (10:8/9)

The determining factor as to whether a casualty will be treated in theater or returned to the CONUS is the theater evacuation policy. This policy is defined as "the maximum number of days that a casualty can be hospitalized for treatment in-theater." Once stabilized, casualties that cannot be returned to duty within the stated evacuation period are evacuated to the CONUS on the first available lift. "Currently, the minimum evacuation policy allowed in planning for all services is 15 days." (10:10) Statistically, this policy permits four of each ten casualties to be

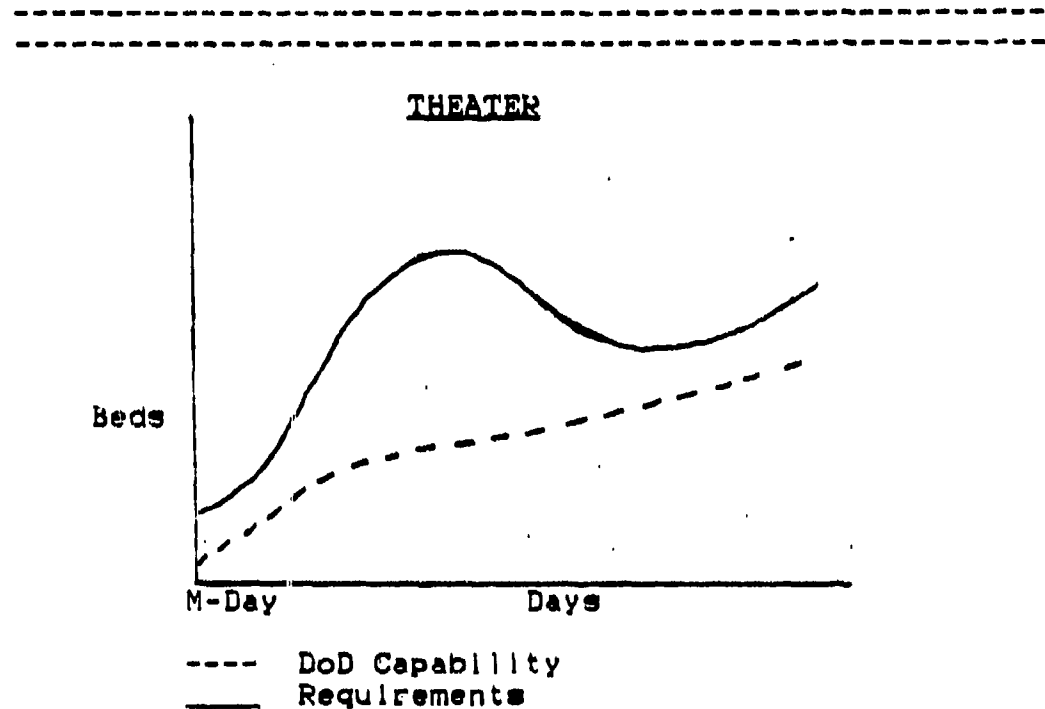
returned to duty. If there was a 30 day policy, five of ten would be returned, while a 60 day policy returns seven out of ten casualties. This implies that, with a 15 day policy, most theater beds are occupied by patients waiting to be evacuated. The length of wait is predicated on the evacuation schedule. A difference of only several days in the evacuation schedule will greatly increase the theater bed requirements.

For example, under a 15 day evacuation policy a typical casualty flow of 2000 patients per day will generate a requirement of 11,500 beds if the evacuation schedule is 5 days. If the evacuation schedule is 9 days, a requirement for 17,000 beds is generated. In either case, the number of beds occupied by patients returning to duty in-theater remains constant at 4,600. (10:15)

The sensitive relationship between the evacuation schedule and hospital beds is critical. When combined in a NATO scenario, the 15-day evacuation policy and the service planning factors built into the Medical Planning Module indicate a daily movement of between 3000 and 5000 casualties. Due to the nature of today's weapons, medical planners assume that 12 percent of the casualties will be ambulatory and the remaining 88 percent will be litter patients. (10:22) The theater and CONUS bed requirements that these casualties dictate are represented in Figures III-1 and III-2. The relationship between an evacuation policy and the

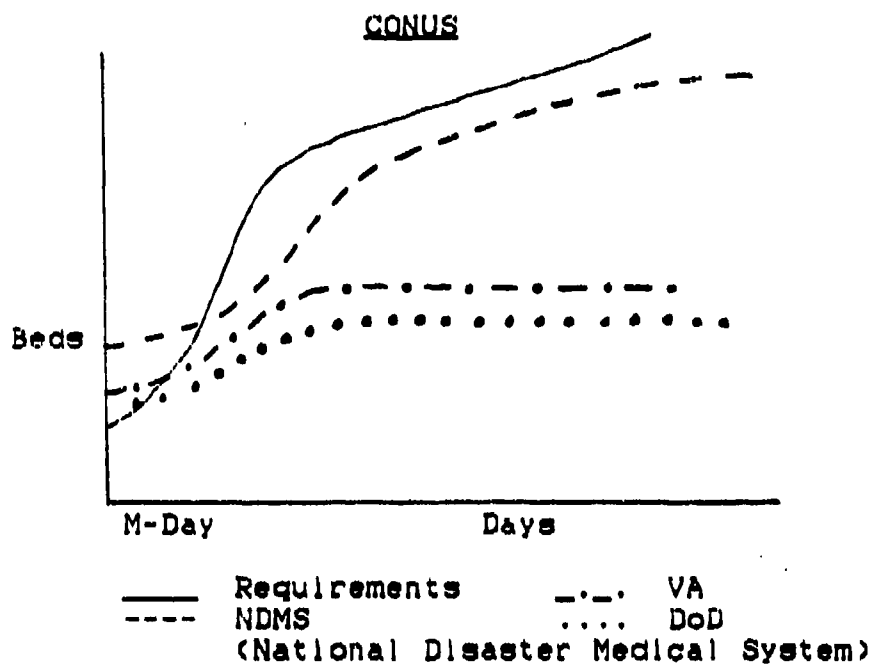
number of hospital beds, the personnel to operate the associated facilities, and the required transportation assets is highly important and can be referenced in Figure III-3 and Table III-1.

FIGURE III-1: THEATER BED REQUIREMENTS



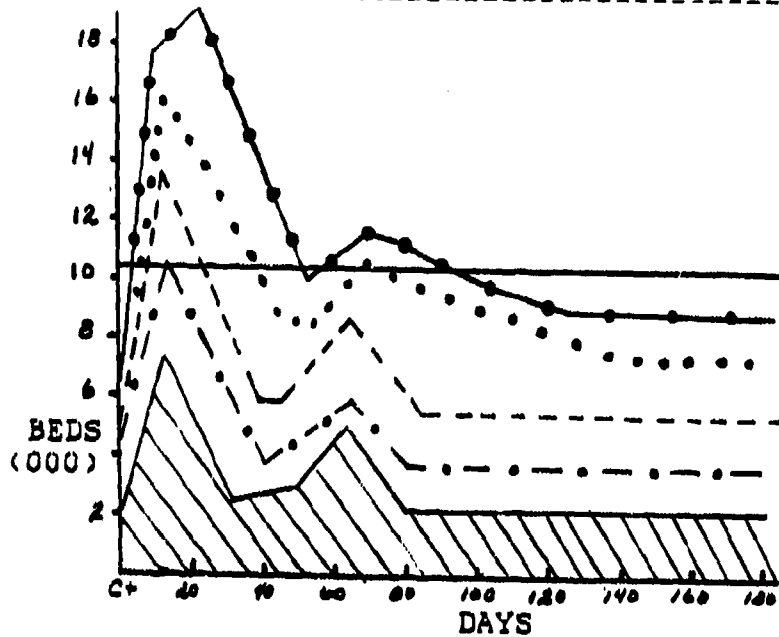
(Source: "Integrating the Civilian Health Care System Into Medical Mobilization Planning" (10:11). FY 86-90, Service Program Objective Memoranda (POM))

FIGURE III-2: CONUS BED REQUIREMENTS



(Source: "Integrating the Civilian Health Care System into Medical Mobilization Planning" (10:13). FY 86-90, Service Program Objective Memoranda (POM))

FIGURE III-3: THEATER HOSPITAL BED REQUIREMENTS AS A FUNCTION OF EVACUATION POLICY



- 60 - Day Evacuation Policy
- 45 - Day Evacuation Policy
- - - 30 - Day Evacuation Policy
- . - . 16 - Day Evacuation Policy
- Guidance Structure For This Scenario
- //// Evacuation Schedule Requirements

(Source: "Integrating the Civilian Health Care System Into Medical Mobilization Planning" (10:13). From Medicine, Vol. 148, February 1983, p. 104)

TABLE III-1: AIRLIFT REQUIREMENTS AS A FUNCTION OF
EVACUATION POLICY

C-141 SORTIES

	EVACUATION POLICY		
	15 Days	30 Days	60 Days
To Move Hospitals	142	249	401
Evac Patients - CONUS	454	315	200
Total: Evacuations & Replacements	908	630	400

ASSUME: (1) 130 TROOPS OR PATIENTS PER SORTIE
(2) ONE FOR ONE TROOP REPLACEMENT

(Source: "Integrating the Civilian Health Care System
Into Medical Mobilization Planning." (10:14))

CHAPTER IV

THE AIRLIFT SHORTFALL

Today, due to reconfiguration requirements and a limited number of C-141 and C-130 aircraft, the Air Force does not have sufficient intertheater or intratheater aeromedical evacuation resources to support the force structure. The need for long-range international airlift capability is well documented in DoD's planning efforts. National security policy dictates that the United States be prepared to move combat forces, equipment and supplies to any location in the world. To accomplish this goal rapidly requires airlift. The Military Airlift Command has indicated that a war with greater than one front will require the ability to airlift at least 90 million ton-miles per day (MTM/D). In April of 1981, the Congressionally Mandated Mobility Study identified a fiscally constrained goal of 66 MTM/D. Today, during a national emergency, about 35.4 MTM/D could be lifted. Of this the Civil Reserve Air Fleet (CRAF) would carry 8.4 MTM/D or 24 percent of the cargo, and 95 percent of the troops. The Air Force C-141, C-5 and KC-10 aircraft would transport 27.0 MTM/D. The remaining 30.6 MTM/D

represents a shortfall between current capability and the DoD established goal of 66 MTM/D. (15)

In the early days of a war, until a sea bridge can be formed, the Nation's ability to resupply its forward deployed forces rests on airlift. The success of the airlift effort rests in considerable measure in how quickly aircraft can be "turned around" in-theater and in the CONUS. Therefore, a major contributor to the airlift shortfall is reconfiguration time. MAC projects that on each C-141 round trip to theater, two and one-half hours would be lost in reconfiguring to and from the aeromedical configuration. (2:A-II-2/3) Aeromedical Evacuation doctrine states that aeromedical evacuation occurs using the backhaul/retrograde portion of airlift missions. The C-130 provides the bulk of the intratheater aeromedical evacuation capability, reconfigured C-141s provide strategic lift, and C-9s serve to redistribute patients stateside. In actuality, this doctrine has never met aeromedical requirements. In Korea and Vietnam, virtually all intratheater aeromedical missions were scheduled or diverted missions because C-130 airlift normally did not go where the casualties were. (2:A-II-2) Because there is no predetermined intratheater flow data available for C-130s, there is no way to quantify the

current shortfall. Nevertheless, planners estimate that critical tactical airlift operational tasking overloads the C-130s. This speculation is so deep-rooted that the 11 CONUS based C-9s have been assigned against the AIREVAC backhaul portion of the tactical airlift mission and will be deployed to the theater during a contingency. Though C-141 missions initially used the retrograde concept in Vietnam, scheduled aeromedical airlift missions became the norm and were routinely used to meet all requirements. As future wartime retrograde requirements become more quantifiable, planners predict that less than the required 75 percent of the returning missions will be available to aeromedical evacuation. The lack of an applied attrition factor against the 257 C-141s and the procedure whereby the theater CINC's needs determine the availability of assets add credence to this belief.

(2:A-II-2)

The general shortfall of airlift and the specific impact of using critical cargo capable airlift assets to evacuate casualties forced the Air Force to look to the Civil Reserve Air Fleet (CRAF) as an untapped resource and a more viable plan.

CHAPTER V

AEROMEDICAL AIRLIFT AND THE CRAF

The CRAF program is designed to augment the Department of Defense's airlift capability with commercial aircraft during peacetime and wartime. "The Air Force's Military Airlift Command (MAC) manages the CRAF program for the DoD. Nineteen carriers have 324 long-range aircraft committed to CRAF. (15) When mobilized, CRAF aircraft are slated to be operated, managed, and supported by their companies. Upon receipt of mission assignments from MAC, the carriers are to provide aircraft and crews to perform the missions, facilities and personnel to plan and control the flights, plus the maintenance and logistics capability to insure mission accomplishment. Under the program, while at foreign airfields, CRAF aircraft will receive all of these support services from selected "Senior Lodger" (usually the largest) carriers. (16:2) In exchange for a proportionate share of the peacetime DoD airlift business, the CRAF program allows the DOD to plan for management assets and aircrews to support 10 hours per day per aircraft without having to buy aircraft, pay personnel, or fly and maintain the aircraft during peace time (16:2).

On 17 November 1985 CINCMAC proposed to the Secretary of the Air Force that a separate segment of the CRAF be created and dedicated to aeromedical airlift. On 26 May 1986, the Secretary of the Air Force, acting as the DOD single manager for airlift, approved the development of the aeromedical airlift CRAF segment (MEDCRAF). (12:1)

A study conducted by the Headquarters Military Airlift Command, office of the Assistant for Civil Air (HQ MAC/XPW), concluded that there was only one long range capable aircraft type with the necessary numbers uncommitted to the CRAF to satisfy the dedicated aeromedical fleet concept. That airplane was the Boeing - 767. (2:A-III-1) Similarly, Hq MAC formed a Short Range Aircraft Working Group which established criteria for a short range MEDCRAF aircraft and forwarded them to the aircraft manufacturers for data on their respective aircraft types and models. Based on the returned data, the group selected the McDonnell Douglas MD-80 series aircraft to form the short range function of the MEDCRAF proposal. To entice carriers to commit their fleets to MEDCRAF, MAC has proposed that a new compensation rate structure be developed specifically for the "humanitarian airlift" or MEDCRAF mission. In accordance with MAC's concept, this use

rate would be higher than normal due to the aircraft reconfiguration requirement and the limited number of aeromedical flights that would be flown each month.

The advantages of having a dedicated aeromedical airlift aircraft are numerous. As the B-767s are called to duty, they will require 12 hours to configure for the aeromedical role, never to leave this configuration until the end of the conflict. The aircraft will carry up to 111 litter and 18 ambulatory patients plus its crew a distance of 3500 miles. Upon return to theater, the aircraft can transport the redeploying medical crews, along with their 1000 pounds of medical kits, and up to 50,000 pounds of medical supplies. This frees the cargo aircraft to continue reinforcement or resupply efforts. Lastly, having only one type aircraft and a standard equipment package means easier and cheaper medical crew training.

(2:A-III-14)

The use of the MD-80 aircraft is predicated on the C-9 Nightingale moving forward to the theater of operations. The MD-80 is capable of carrying 48 litter patients and dispersing them from the port of debarkation to the numerous hospitals around the country. (2:A-III-15)

MAC plans to enlist 85 B-767s and 30 MD-80s for aeromedical use. Currently, the following carriers have contracted to purchase 110 Boeing-767 aircraft.

TABLE V-1: B-767 OWNERS

<u>CARRIER</u>	<u>QUANTITY</u>	<u>TYPE</u>	<u>COMMENTS</u>
Transworld Airlines	10	B-767-200	All worldwide
United Airlines	19	B-767-200	Domestic only
American Airlines	30	B-767-200	17 worldwide
American Airlines	15	B-767-300	All worldwide
Delta Airlines	15	B-767-200	Domestic only
Delta Airlines	15	B-767-300	Domestic only
Piedmont Airlines	6	B-767-200	All worldwide

(Note: Federal Aviation Agency wartime waiver for hydraulic and baggage area fire suppression capability makes all aircraft worldwide.)

(Source: Talking Paper on Dedicated Aeromedical Segment of CRAF. (15:2))

The aeromedical configuration for these aircraft is based on a modular component that employs no basic modification to the aircraft. Twenty-eight litter stanchions per aircraft will be constructed to fit in the seat tracks and have the capability to build a basic configuration of 87 litters and 52 seats; expanded configuration, 99 litters and 36 seats; maximum configuration, 111 litters and 18 seats. To supply the 258.2 liters of patient oxygen required on each aircraft, two LD-2 containers (1200 cubic foot

cargo containers compatible with the B-767 belly compartments) will be fitted with liquid oxygen (LOX) converters, heat exchangers, and two 75 liter LOX bottles . Two modular nurse's stations with work and storage space, plus one linen closet and two clothes closets round out the modification kits (28:4/5). The same modifications apply to the MD-80 aircraft with the exception that there is only one nurse's station (28:5). Boeing Aircraft Company estimates that a shipset kit will cost:

FIGURE V-II: B-767 SHIPSET COSTS

<u>10 KITS</u>	<u>25 KITS</u>	<u>50 KITS</u>	<u>100 KITS</u>
\$520,000	\$364,000	\$281,000	\$220,000

(Source: Talking paper on Dedicated Aeromedical Segment of CRAF. (15,2))

These estimates do not include the cantilever arms or LD-2 containers which will be government-furnished equipment (GFE). "The HQ MAC Surgeon's Office, (HQ MAC/SG), estimates that the total shipset cost for the proposed fleet, including GFE, will be twice these estimates, or about \$440,000 per 767 shipset, with cantilever arms being the major cost factor."

Headquarters MAC/SG further estimates MD-80 shipset costs to be half those of the B-767. (2:A-VI-1)

The United States Air Force Surgeon General has ordered full scale development of the aeromedical-unique equipment for the CRAF aeromedical segment. He has placed the program as number two in the list of medical priorities, and has identified 51.4 million dollars (Table V-III) in fiscal years 1988 through 1990 to fully fund the equipment. (2:A-VI-2)

TABLE V-III: MEDCRAF SHIPSET FUNDING

	<u>FY88</u>	<u>FY89</u>	<u>FY90</u>	<u>TOTAL</u>
B-767 SETS	41	21	23	85
MONEY	20.58M	10.93M	12.42M	43.93M
MD-80 SETS			30	30
MONEY			7.55M	7.55M

(Source: Talking paper on dedicated Aeromedical Segment of CRAF, (28:5))

Even though there is great interest, weight and money behind this project, it is experiencing difficulties. The Request For Proposal (RFP) for the litter stanchions was issued in early 1987. It received no bids. Although a second attempt at

obtaining a proposal looks promising, it may not be possible to obligate the FY88 production funds in time. Although this failure could extend the initial operational capability date beyond 1990, (28:1) many contractors privately convey that production schedules can be easily met if only some of the bureaucratic red tape associated with the contractual phase could be eliminated. (15)

CHAPTER VI

MEDCRAF -- CONCEPT OF OPERATIONS

Although aeromedical airlift is not a front line fighting force, when the troop is ordered to deploy and go to war, it becomes an important instrument of national power. As such, the AIREVAC force is no less important to the war effort than front line tanks or fighter aircraft. Proper employment planning for these systems should be no less intense and should also be based on the threat that is posed. According to Army Field Circular 8-45, the threat to medical evacuation units varies with the intensity of the conflict. Whether the danger stems from high-intensity or low-intensity conflict, the environment provides the enemy with opportunities for deep strikes, long-range unconventional operations, and terrorism. "Prepared airfields, permanent bases, and fixed support facilities (some hospitals) can be expected to become primary targets for opposing forces." (24:2-3) The primary danger to medical evacuation in the rear areas, from the corps rear through the COMMZ, where the majority of Air Force and CRAF aeromedical assets will operate, will likely arise from:

- Nuclear, biological, and chemical weapons.

- Unconventional warfare operations.
- Isolated terrorist actions.
- Electronic warfare. (24:2-3)

The Soviet Union is better prepared to conduct chemical and biological warfare than any other nation in the world. Their unconventional warfare forces, SPETSNAZ, can be inserted and operate behind enemy lines for extended periods of time. Here, they can attack and sabotage a variety of targets, while simultaneously organizing terrorist activity. Similarly, electronic warfare is fundamental to Soviet doctrine. Aeromedical evacuation units can expect to encounter continuous meaconing, intrusion, jamming and interference. (24:2-3/4)

The Air Force's view of the threat, as expressed in MAC's concept of operations and in the Medical Readiness Strategic Plan, varies from that envisioned by the Army. MAC's assessment states that the aircraft will operate in a "low threat environment." If targeted, the aircraft would be a target of opportunity. (12:8) The strategic plan goes even further and ignores the threat by suggesting the development of safety zones:

The employment of European MEDCRAF requires a new approach to theater hospitalization and evacuation in the form of hospital and safety zones as described in the Geneva Conventions. Airports near the battle zone can be designated as hospital and

safety zones which can be equipped to service and employ European MEDCRAF and C-9s for intra-theater airlift missions. In addition, these zones could serve as the ports of debarkation for returning aeromedical evacuation crews and Class VIII medical resupply missions from the U.S. (25:38)

These statements make little sense when viewed in light of the fact that 24 percent of the war materials and 95 percent of the troops will be carried to the war zone by civilian aircraft. The similarity of the CRAF B-747, DC-10, and other civil aircraft to the B-767, and DC-9 in itself places the AIREVAC aircraft at risk, whether on the ground or in the air. The only real protection is a well conceived concept of operations and a follow-on employment plan that maximizes the capabilities of the AIREVAC system while minimizing the risks arising from the threat.

Activation of the MEDCRAF can occur in stages. "Stage I can be implemented by CINCMAC, Stage II by SECDEF, and Stage III by the President. Each stage involves different numbers of aircraft; the fewest aircraft at Stage I, with Stage III being complete CRAF activation." It is estimated that 26 B-767s will be committed to Stage II of the MEDCRAF, with the remainder being committed to Stage III. All MD-80s will be in Stage III. (12:8)

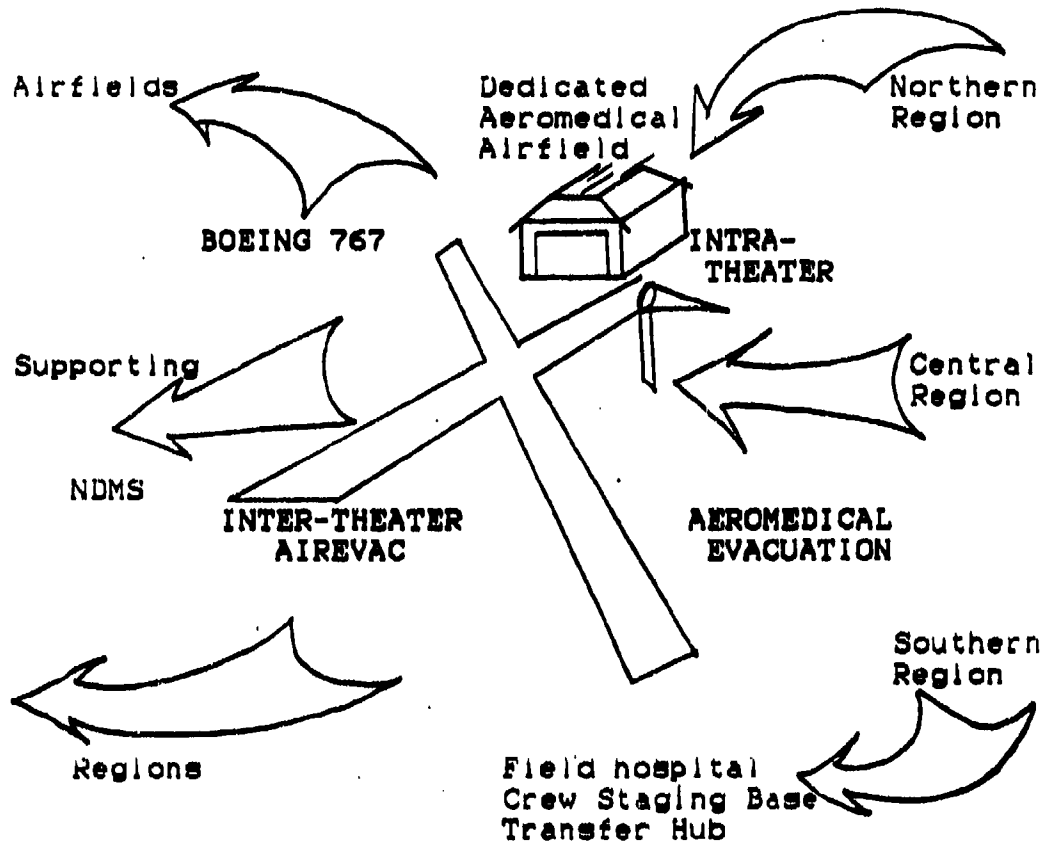
The aircraft configuration kits that are necessary to make the aircraft mission ready are to be stored in two groups. Short-term storage matches with Stage II aircraft and is the responsibility of the carrier. Fifty percent of the shipsets are to be ready for installation within six hours of notification. One hundred percent of the kits must be prepared in 12 hours. AIREVAC equipment in Stage III would be stored by a storage vendor close to the airports where the carriers will configure the aircraft. Twenty-five percent of the ship sets must be presented in 12 hours, fifty percent in 24 hours and one hundred percent in 36 hours. Each aircraft may require up to 12 hours to configure once the kits arrive. This permits the aircraft to be mission ready in 24 hours for Stage II and 48 hours for Stage III.

As the aircraft nears mission ready status, it is married with a pilot crew and a full complement of flight attendants, who will be employed to assist the medical crew by serving meals and liquids and distributing pillows and blankets. To complete the cadre, a basic medical crew which consists of two nurses and three medical technicians will be added to each MD-80 and two basic crews will be employed on each B-767. (12:7) The majority of these medical crews are

members of the Air Force Reserve and are widely dispersed across the nation. At present, no plan is being developed that will identify transportation resources or the equally necessary staging areas where the medical and CRAF crews may be joined.

The strategic aeromedical airlift provided by the B-767 fleet is slated to operate from theater centers. By designating certain rearward airfields as "aeromedical hubs" (Figure VI-1) the B-767s can link with intratheater aircraft to provide airlift back to the CONUS. This plane-to-plane transfer of patients almost guarantees a patient a CONUS bed within 24 hours of entering the airlift channel. The theater hubs will serve as the staging point for crews, as well as a port for refueling and minor maintenance. Although all services to include fleet service, ground support, fuel, flight operations, traffic services, communications, supplies, maintenance, and accommodations for crew needs are to be provided by the designated "Senior Lodger," (16:11) major maintenance and heavy servicing such as LOX resupply, food service, fleet service, and maintenance inspections, are scheduled to take place, to the greatest extent possible, at the CONUS civil airports to allow minimum ground time at the overseas hubs. (12:2)

FIGURE VI-1: THE MEDCRAF CONCEPT



(Source: Aeromedical Evacuation in the 1990s.
(2:A-IV-3))

The in-theater turn around time of the B-767s is complicated by the 16-foot-high doorsill which inhibits the loading of litter patients. Two general plans exist to solve this problem. Plan one centers around the use of "Jet-ways" which are the hydraulically operated "walk-ways" that connect the terminal to the

loading aircraft. It is envisioned that one Jet-way, lowered to three feet, which is the maximum extent possible, will serve as a corridor into the terminal for arriving patients from C-130 and C-9 aircraft, as well as busses and ambulances. A second Jet-way will then be used to transit from the terminal to the B-767. The terminal will serve as an Aeromedical Staging Facility (ASF). Patients will either flow directly through the facility to an awaiting aircraft, or they will be held for a future flight. Plan two comes into play when an airfield, not equipped with Jet-ways, is designated as a hub. In this case wide-bodied loaders, food service vehicles, and "make shift ramps" are planned to serve as the loading devices. (1:2) In light of the threat as viewed by the Army, this process of loading litter patients is unreliable and slow. It extends the aircraft's ground time and, thus, its exposure to risk. If ramps are to be used, they should be designed and planned. Each B-767 has 20 LD-2 pallet positions, or 50,000 pounds of cargo capability available in the lower lobes. (1:2) A lightweight, easily assembled and deployable ramp could be designed for transport using this capability. The ramp could be stored and maintained in the same manner as the litter stanchions and added to the reconfiguration process.

In either case, no consideration has been given to the increased work load associated with the labor intensive process of loading litter patients on a B-767 versus a C-141 which is routinely backed up to the ASF front door and loaded from ground level. Nevertheless, medical planners like plan one because of its patient flexibility. They desire a minimum number of hubs because this simplifies the patient regulation problem, and reduces the number of ASFs and personnel required. Operational planners, on the other hand, prefer to disperse their assets in relation to the threat, and increase the number of hubs. With 50 to 60 strategic AIREVAC missions per day, this dispersion also reduces airfield congestion and expedites the handling and movement of the aeromedical evacuation aircraft and the myriad of other aircraft scheduled to deliver replacement forces and war supplies. In general, an increased number of hubs, dispersed throughout the theater, means that the associated airfields will be closer to the point of patient pick up. The shorter transport distances translate into a greater number of daily sorties, more casualties moved, a shorter aeromedical evacuation schedule interval, and a lower in-theater bed requirement.

In most cases, the arguments of the operational planner will go unheeded as the medical planning on the supporting and supported CINC's staffs is accomplished by Medical Service and Medical Corps planners who are most often on their first and last AIREVAC assignment. The newly developed draft of the Strategic Readiness Plan states:

Theater planning is presently being conducted with varying degrees of coordination. Largely as a result of the Beirut experience and the ensuing casualties, theater planning in the European Command (EUCOM) has become a prototype against which the remaining theaters should be developed. EUCOM medical planning is coordinated by the Theater Surgeon, a medical officer with the rank of Major General, who is assisted by a full complement of tri-service medical planners. (25:10)

To obtain a well-rounded planning effort, this trend must be reversed.

Intratheater tactical aeromedical airlift will be provided by the C-130 and C-9 force. The C-130s will be employed to the greatest extent possible, solely for the evacuation from short runways less than 5000 feet in length and from unimproved strips and runways. If possible, the C-9s will carry the remainder of the load. (1:3) Great speculation exists as to the ability of these aircraft to move up to 5000 patients per day. Consequently, planners are exploring the possibility of developing a European MEDCRAF capability. Although

related, this endeavor exceeds the scope of this report and will not be addressed.

To reduce the number of patient movements, casualties destined for the same CONUS hospital will be scheduled on the same B-767. (12:7)

If the aircraft is destined for an airfield located east of the Rocky Mountains, the B-767 will fly directly to it and offload casualties. If some casualties are destined to a location west of the Rockies, the B-767 will land at a civil airport servicing a destination hospital east of the mountains, offload casualties at the location, and transfer those casualties going west to an MD-80 for redistribution. (12:2)

Once downloaded, the aircraft may be turned to another mission or returned to its domicile for repairs and inspections. (12:2)

The MD-80 will fly three types of schedules:

1. The first type is "hub-spoke." MD-80s will meet incoming B-767s at designated domestic "hubs" serving large hospital bed concentrations. Some casualties will be identified for onward movement to western US "spokes", those civil airports serving hospital centers west of the Rocky Mountains. Casualties will be transferred at these hubs either plane to plane (B-767 to MD-80) or after further stabilization, if required. The MD-80s will then fly the casualties to the western spokes.
2. "Wheel". Many MD-80s will link spokes, redistributing patients who were either misrouted, whose condition had changed and required care of specialist, or who had to be moved earlier in the flow to avoid destabilization.
3. Spares. Several MD-80s will be scheduled as spares to back up flights cancelled for maintenance or weather at another location. These spares would

also remain "on the hook" for short notice, unscheduled, emergency aeromedical evacuation. (12:3)

At the conclusion of each day's missions, the aircraft will return to their domicile for crew staging and maintenance. (12:3) There is no plan for carriers to pool their assets in one or several centrally located bed down or stage locations. A consolidated operations plan would build efficiency into the aircraft and crew schedule, while reducing the non-productive "dead head" time associated with the returning to and repositioning from individual carrier's domiciles.

In 1986, the General Accounting Office prepared a report to the Secretary of Defense concerning the responsiveness of the Civil Reserve Air Fleet. The report specifically addressed the sufficiency of planning for CRAF mobilization, the ability of the CRAF carriers to mobilize, and the ability of senior lodger carriers to support the CRAF at foreign airfield locations. The report concluded that:

It is uncertain whether CRAF can effectively meet DoD's mobilization requirements. Testing of the program by MAC through simulation and field exercises has been very limited. DOD has provided only limited mobilization planning data to CRAF carriers making it very difficult for the carriers to plan for utilization of the system in an emergency. This particularly affects those carriers responsible for supporting CRAF aircraft at foreign airfields. MAC has not sufficiently monitored carrier compliance with contract

provisions designed to help ensure effective mobilization. (16:3)

Although MAC has made headway in resolving the deficiencies identified by the GAO, many of the same problems loom heavy over MEDCRAF. Although large scale testing of the CRAF's ability to respond to an emergency is not practical from the standpoint of shutting down our national transportation system, an alternative must be developed. The only way to insure that workload information, travel routes, aircraft service and maintenance requirements have been properly identified and planned for is to activate at least a portion of the system. Only through testing under exercise conditions will we ever know if the MEDCRAF equipment and system with its associated contractual agreements, logistics arrangements, and host nation support will work. Additionally, exercising the system will insure a commitment to the development of new procedures and the crew training that accompanies a new airframe.

CHAPTER VI

US CIVILIAN HEALTH CARE ASSETS

The evacuation of patients must be planned for from the Forward Line of Troops (FLOT) to the final destination in the CONUS. As a result of JCS exercises and casualty estimate models, military planners have known for several years that existing DoD medical facilities would be inadequate to care for the huge number of casualties which would be generated by a land war in Europe. To resolve the problem, planners turned to the U.S. health care industry which represents one of the Nation's largest industries. In 1984, this tremendous national asset represented 11 percent of the U.S. Gross National Product. (10:23) "The current civilian health care system includes approximately 6000 non-federal hospitals that provide approximately 1,000,000 beds in support of the civilian in-patient needs of the country." (10:28) Generally speaking, these 6000 hospitals are heavily centralized along the Northeastern/Eastern and Pacific coasts of the Nation. The process to incorporate this national asset into a military support plan began in 1980 when the DoD established the Civilian-Military Contingency Hospital

System (CMCHS) which backed up the DoD-VA hospital system with volunteering private sector hospitals. In 1981, President Reagan envisioned a broader program that would encompass transportation and medical care in response to any national disaster to include a military contingency. The result has been the development of the National Disaster Medical System (NDMS).

The National Disaster Medical System is organized on a regional concept with regard to both manpower and medical facilities. In order to qualify as a region, the following criteria must be met:

1. Available beds: Each area should have a minimum of 2,500 acute care hospital beds in facilities offering a full range of general medical and surgical services.
2. Coordinating center: The area must have a Federal or non-Federal institution capable of acting as a coordinating center linking hospital beds with transportation, communication and other resources, and to establish patient administration procedures.
3. Air access: The area must possess an airport capable of accommodating aeromedical evacuation aircraft. (13:17)

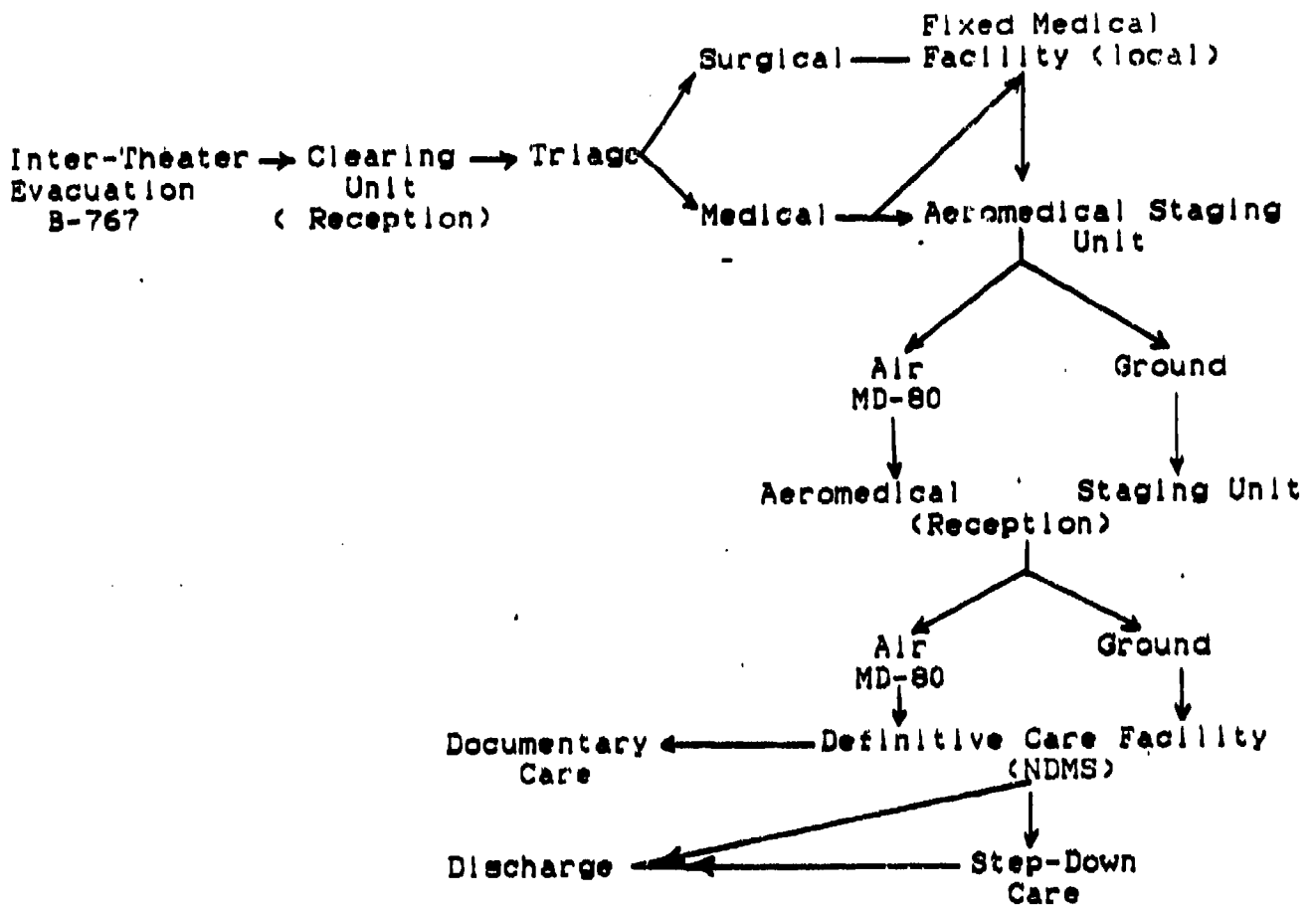
Seventy-one urban areas met these criteria and qualified as NDMS regions. As of July 1986, over 73,000 beds in 950 hospitals have been committed to the system, with a goal of 100,000 precommitted beds.

The manpower for the NDMS is derived from participating hospitals or agencies. All participants are

volunteers, and all training and planning are accomplished as local community projects. Participants are combined to form Disaster Medical Assistance Teams or DMATs. Each team is composed of 29 people: physicians, nurses, technical staff and other health professionals as well as support staff, such as litter bearers and food preparation personnel. These teams are designed to do medical clearing in a disaster area or medical staging for the evacuation system. "Each NDMS region must form at least one clearing-staging unit (three assistance teams) to enable it to receive casualties at its airport. The maximum plausible 100,000-casualty scenario requires 150 clearing-staging units nationwide." (13:18) Per the Department of Health and Human Services, four teams have been trained in California, two teams in New Mexico, one team in Indiana, and one team in Illinois. Combined with the six teams that the public health service has formed, 14 teams have been trained and stand ready to receive the daily flow of up to 85 B-767 and 30 MD-80 aircraft and the associated 5000 casualties. One of the main benefits of the dedicated MEDCRAF concept is the reduced work load associated with the B-767's ability to deliver casualties directly to the CONUS treatment facility versus being tied to the Nation's 10 military

Aeromedical Staging Facilities. Unless more Disaster Medical Assistance Teams can be recruited and trained, more than the planned 30 MD-80s, more than the 35 associated ship sets of equipment, and more active duty and reserve medical forces will have to be obtained to complete the casualty distribution equation.

FIGURE VII-1: MILITARY/NDMS PATIENT FLOW PLAN



(Source: Integrating the Civilian Health Care System Into Medical Mobilization Planning (10:33)).

The United States Air Force Staging Facilities and their pre-positioned medical equipment for patient receiving and holding are available to NDMS coordinators during a contingency. However, if the additional 71 regions are to be used to receive

casualties, the staging sites must be extemporized. According to the Disaster Medical Assistance Team Organization Guide:

Wherever possible existing buildings should be used. The site should have adequate ramp access for aircraft as large as a C-141, and a ground access suitable for ambulances and busses. A passenger terminal is not suitable because of its limited ground access. (13:101/102)

This statement is incompatible with the concept of operations for the B-767. It also serves to highlight the patient downloading problems associated with any commercial airliner. If jet-ways are available and used to offload patients, but an adjacent hanger versus the terminal is not used as the ASF, then the transportation problem is exacerbated, and the aircraft ground time is extended. If jet-ways are not available, the system is once again forced to rely on unplanned, make-shift ramps.

Once the strategic MEDCRAF aircraft is down loaded at the CONUS airport, transportation of the casualties becomes the responsibility of the NDMS region. (13:109) For those patients that will continue by air, the coordination for the MD-80 support is part of this process. Additionally, a tremendous amount of ground transportation will be required to clear the patients from the aircraft to local area hospitals. Many local

communities have developed emergency transportation plans. Most include the use of existing county fire and rescue vehicles, private ambulances, and modified school buses, trucks and other vehicles. While municipal authorities have excellent plans, there is a dearth of centralized national planning for the redistribution of patients from the aerial ports to the hospitals located throughout the nation. This deficiency directly impacts the ability to coordinate efficient aeromedical airlift of mass casualties.

CHAPTER VIII

AEROMEDICAL LOGISTICS/RESUPPLY

The adoption of the MEDCRAF concept opened up a complete new era for aeromedical evacuation. In doing so it also opened up new possibilities in the area of medical logistics or resupply. The Defense Medical Standardization Board (DMSB) appointed the Air Force Medical Logistics Office (AFMLO) the responsibility of coordinating the DoD medical logistics effort. To insure a Joint approach, a Quad-Service working group was created. Realizing that logistics is only a spin-off of MEDCRAF's casualty movement mission, and that all other missions are subordinate, the following priorities were established:

1. The highest logistics priority is the resupply of medical materiel to the theater of operation.
2. Priority two is the return of aeromedical evacuation equipment and supplies to the theater of operation.
3. The lowest priority is assigned to the return of medical equipment to the CONUS for repair. (5:1).

The working group began its efforts by forwarding questions to Headquarters Military Airlift Command Plans (HQ MAC/XPW), and Surgeon General (HQ MAC/SGR), Headquarters Defense Logistics Agency (HQ/DLA), and the Armed Services Whole Blood Processing Laboratory.

These questions covered a wide spectrum. Some were very general, while others were specific in nature. For example: What are the forward cargo door configurations and sizes available? Who will distribute material at the ports overseas? (31:2) Will DLA support shipments of medical assets for the Quad-Services to aircraft at civilian airports? Will there be any customs clearance necessary either in peacetime exercise or contingency operations when civilian overseas airports are used? (11a:1/2) What medical equipment and supplies are going to accompany casualties coming back from the theater of operation? (26:1) It is through answers to these questions, approximately 30 in total, that guidance and policy for medical materiel movement is being developed. No attempt has been made to draw all of the functional experts together and develop a comprehensive concept of operations for medical logistics, as it relates to the remainder of the aeromedical airlift system. All but two members of the Quad-Service Group are from medical related career fields. As a result, the Group has made decisions based on limited information. They have recommended to the Joint Services Medical Logistics Coordinating Group (JSMLCG) that Philadelphia and Atlanta be the primary MEDCRAF medical logistics

on-load and East coast-out ports, with San Francisco and Salt Lake City serving the West coast. (9:1) In arriving at these locations, there was no direct coordination with the civilian aircraft operators, no consideration given to where the majority of the Reserve Medical Crews are located or could be staged from and no attention given to where the greatest number of aircraft are domiciled or where maintenance facilities exist. As a result, operational restrictions, such as those associated with flight operations out of Salt Lake City's high density airport, are built into the plan.

Additional review of the Working Group's meeting minutes reveals that there is great concentration on the intricacies of medical resupply, while very little, if any, attention has been applied to priority two, the returning of aeromedical equipment to the theater. No plan has been envisioned to develop a system that would tie into a CONUS equipment tracking network and then allocate the resources to pick up and deliver equipment (litters, blankets, litter pads, striker frames etc.) and medical crews to the coast-out ports.

The redeployment of strategic aeromedical airlift assets to the theater may further be slowed by lack of personnel to prepare the load and then load the

aircraft. The Defense Logistics Agency identified loading, unloading, material inspection, and load manifests at the ports to be the responsibility of "the aerial port operational unit established by a service component (probably MAC or AFLC) to receive shipments at the aerial port and forward them onward. Defense Logistics Agency would only be involved in the forwarding of shipments from depot or contractor source to the APOE." (8:atch 4) Although no accurate volume of cargo has been identified, the Group has concluded that to handle these cargo requirements a liaison team should be identified for each coast-out port. The team will operate on 12 hour shifts, and consist of "as a minimum, a medical materiel specialist, a medical equipment maintenance technician, an air transportation supervisor and an air cargo specialist." (9:2)

CHAPTER IX

MEDICAL REGULATION

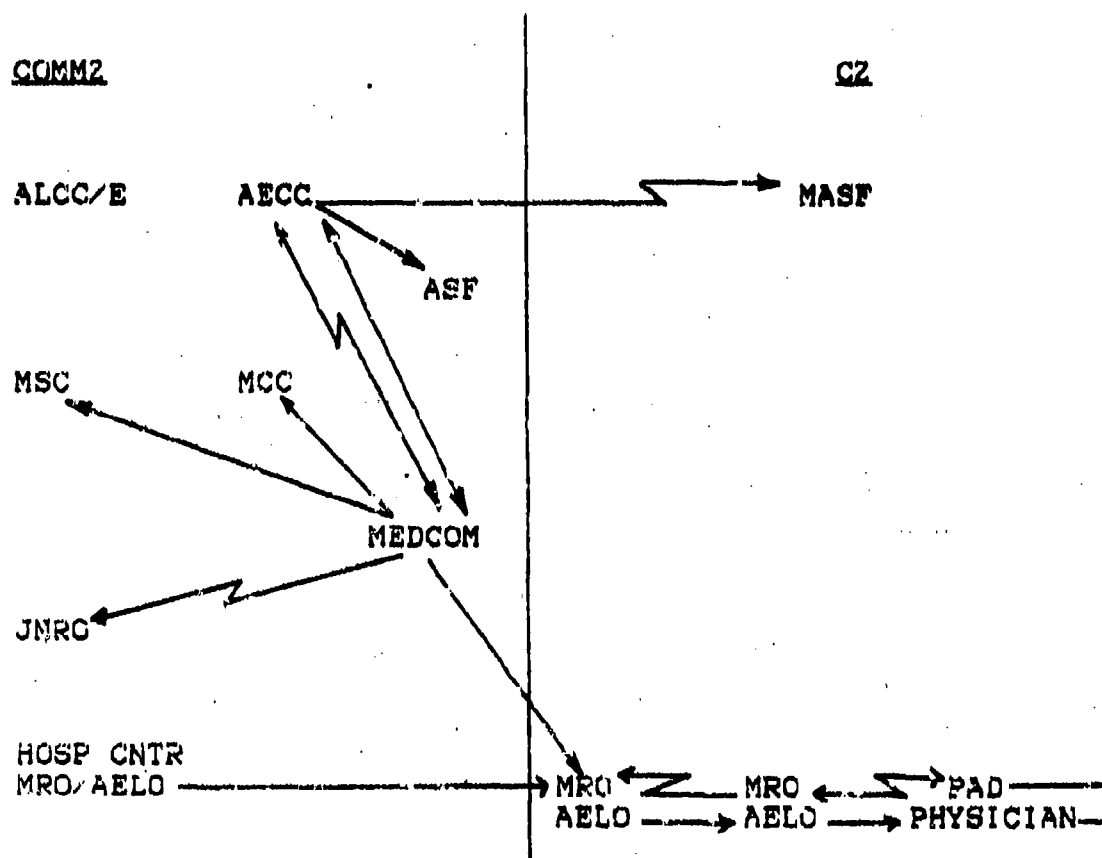
Medical regulation is the coordination and control of the movement of patients to treatment facilities which are able to provide the required care. The process entails identifying the patient and the required treatment, identifying the treatment center with available beds, and coordination of an evacuation means that can transport the patient to the proper facility on a timely basis. The factors that influence medical regulation include:

- Patient's condition.
- Tactical situation.
- Availability of the means of evacuation.
- Locations of treatment facilities with special capabilities or resources.
- Current bed status of treatment facilities.
- Surgical backlogs.
- Number and location of patients by diagnostic category.
- Location of airfields and seaports. (24:7-1)

Medical regulation from the combat zone to the COMMZ begins with a physician's request to the Patient Administrator (PAD) who consolidates the requests and forwards them to the group Medical Regulating Office (MRO) for further compilation and transmission. If two or more services are providing intratheater hospital care, the Joint Medical Regulating Office (JMRO) is

formed and receives the MRO request through the medical command (MEDCOM). The JMRO designates the treatment facility in the COMMZ to receive the patients from the CZ hospitals, based on available bed status. During this process, an aeromedical evacuation liaison officer (AELO) passes information to the Airlift Control Center (ALCC) through the Aeromedical Evacuation Control Center (AECC) seeking an aircraft to perform the evacuation mission. With the necessary aircraft identified, the AECC will notify the Medical Evacuation Squadron, and the ALCC will notify the Aeromedical Airlift Squadron (C-9 pilots) of the mission. The MEDCOM MRO provides the hospitals with authority to move the patients and the pertinent aircraft schedule. The hospitals then deliver the casualties to the ASF for pick up. (24:7-6/7)

FIGURE IX-1: INTRATHEATER MEDICAL REGULATION

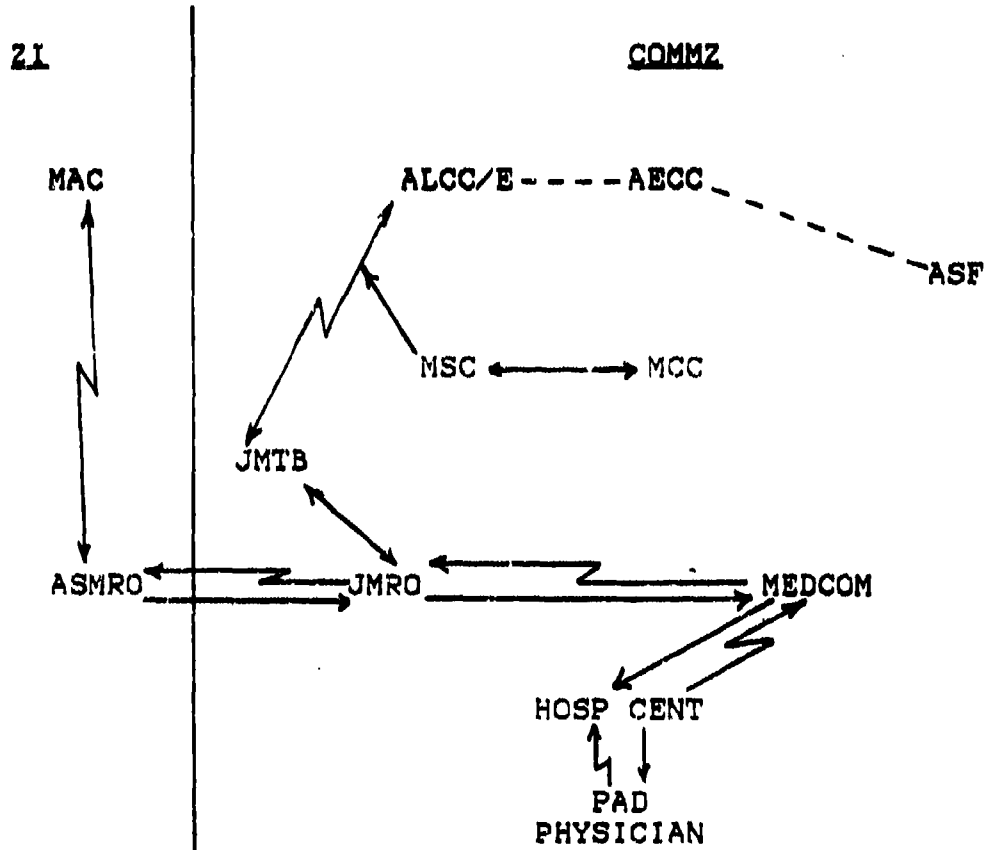


(Source: Field Circular 8-45, Medical Evacuation in the Combat Zone (24:7-2))

Patients evacuated to the COMMZ will receive further treatment there and then be returned to duty, or evacuated to the zone of the interior. As was the case on the intratheater move, the physician identifies the move to the PAD who notifies the MRO at the next higher echelon for request consolidation and forwarding

to MEDCOM MRO and finally to the JMRO. All of the theater requests are consolidated here and forwarded to the Armed Services Regulating Office (ASMRO) which directs the distribution of these patients into Military, Veterans, or NDMS hospitals throughout the CONUS. When JMRO receives the authorization to move patients, it coordinates with the Joint Military Transportation Board for arrangement of transportation, through a process that is very similar to that employed during an intratheater move. The hospitals, which are notified of patient movement plans by reversing the process, are responsible for delivering the patients at the right time to the Aeromedical Staging Facility which is located at the terminal supporting the B-767s.
(24:7-7/8)

FIGURE IX-2: INTERTHEATER MEDICAL REGULATION



(Source: Field Circular 8-45, Medical Evacuation in the Combat Zone (24:7-3))

To put the wartime workload of this regulating system in perspective it is only necessary to envision 5000 casualties being reported and moved daily from the CZ to COMMZ hospitals and another 5000 patients being moved from those hospitals to the ZI. Further compounding the regulation effort is the "hand

massaging" that is required to insure that each strategic aeromedical airlift aircraft is on the ground for minimum time, that the aircraft is full when it departs, and that all of the casualties on board are treatable at the same NDMS regional facilities, which should be as close as possible to the patient's home of record. An interview with a C-9 Aircraft Commander who participated in exercise Return of Forces to Germany 87 (REFORGER 87) revealed that he and his fellow mission commanders were unable to operate their missions on time due to patient regulation inaccuracies. (32) REFORGER 87 was a simple AIREVAC exercise involving the movement of 200 simulated casualties through the strategic and tactical aeromedical system over a four day period. (22:1) If missions cannot operate on time for four days, while regulating only 200 patients over preplanned routes and precoordinated schedules, it is doubtful that the capability exists to manage 5000 casualties on a daily basis.

CHAPTER X

COMMAND, CONTROL AND COMMUNICATIONS

The casualties generated on the modern battlefield will place great demands on the health care delivery system, the control of patients, and the movement and management of medical equipment, supplies and blood. The timeliness and accuracy of medical information will determine the commander's ability to make reasonable decisions concerning the use of medical resources. Proper employment of resources will reduce casualty morbidity and mortality rates, and improve a tactical commander's ability to sustain combat by returning more patients to duty. To ensure patients and supplies are efficiently moved through the theater requires a communications system capable of handling the entire range of health care requirements. (19:4-1) To insure this capability is developed, the proposed Medical Readiness Strategic Plan calls for the creation of a Management Information System. The system as envisioned will consist of "automated on-line microcomputer systems which are compatible across all military Services that treat combat casualties." (25:12) The system will be comprehensive, providing information system support for:

Medical command and control.
Medical intelligence.
Patient evacuation.
Blood products management
Patient administration.
Medical services.
Hospital ancillary services. (25:12)

Information required for management of the entire medical system is presently transmitted by electronic message or telephone. This system is slow, unreliable and promotes errors. An automated system will allow for a rapid estimate of the impact that casualties will have at each echelon of the system. The Defense Medical Regulation Information System (DMIRS) is designed to assist with the distribution of casualties to appropriate receiving medical facilities. If linked with a Theater Medical Management System, it could serve as the basis for a DoD-wide Management Information System. (25:13)

In June of 1985, the Joint Chiefs of Staff (JCS) Medical Steering Committee recognized the possibilities of a joint medical communications and information system. To develop the capability and establish the requirements, the Combat Medical Information and Communications Systems Subcommittee was established. The subcommittee proposed the development of two sets of medical requirements,

one set for wartime medical information and another for a communication system. The requirements are the backbone for the Joint Theater Medical Information System (JOTMIS), which will provide an automated information processing capability that meets each service's requirements at each echelon of care. (19:3-1)

A summary of the medical information requirements can be seen at Figure X-1, and the Communications requirements are listed in Figure X-2. (19:3-3)

**FIGURE X-1: JCS THEATER MEDICAL INFORMATION
REQUIREMENTS**

FUNCTIONAL AREA	ECHELON 1	ECHELON 2	ECHELON 3	ECHELON 4
1. Patient Administration		X	X	X
2. Laboratory			X	X
3. Radiology			X	X
4. Nursing Services		X	X	X
5. Clinical Dietetics			X	X
6. Pharmacy		X	X	X
7. Food Service Management			X	X
8. Patient Regulation and Transportation		X	X	X
9. Command and Control		X	X	X
10. Blood Products Management		X	X	X

X = Requirement exists within functional area

(Source: Joint Theater Medical Information System (1913-3))

FIGURE X-2:

A SUMMARY OF JCS THEATER MEDICAL COMMUNICATIONS REQUIREMENTS

FUNCTIONAL AREA	ECHELON 1	ECHELON 2	ECHELON 3	ECHELON 4
1. Blood Products Management		X	X	X
2. Command and Control	X	X	X	X
3. Logistics	X	X	X	X
4. Medical Evacuation	X	X	X	X
5. Medical Regulating	X	X	X	X

X = Requirement exists within functional area

(Source: Joint Theater Medical Information System (19:3-3))

If JOTMIS development continues on schedule, the system will be deployed in FY 90. However, the five areas identified in the Communications matrix, to include medical evacuation, patient regulating and logistics, will not be included in the original system deployment, but " will be addressed at a later date." (19:3-1)

The plan for the future entails all of the hardware and software required for the operation of a self-contained, independent aeromedical evacuation system with the possible exception of operational flight data for the CRAF assets. The current AIREVAC system is anything but independent and self-contained.

After studying the system, Mr. Roy Hansell and Mr. David Martin of Analytical Systems Engineering Corporation describe it as "a loose confederation of three independent systems each with its own command and control structure and procedures." (22:11) Under the present concept, any large scale aeromedical operation would result in the implementation of a dual track command and control effort and a confused, inefficient operation at best. The dual chain and redundant command and control effort was highlighted by the C-9 participation in REFORGER 87. The designated C-9 Deployment Commander reported to the Commander of Airlift Forces (COMALF), who delegated operational control for all operational and logistics personnel. The operational control line of communication was by definition through the ALCE to the ALCC (which was collocated with the AECC) to the Airlift Division (ALD). The theater Air Component Command Surgeon obtained operational control of theater assigned AIREVAC medical crews and forces that deployed from the same wing as the operational crews. The medical operational control line of communication ran through the Aeromedical Evacuation Management Branch (AEMB) to the AECC. Because there are no operationally trained AIREVAC personnel assigned to the ALCE and because C-9 AIREVAC

is not normally considered to be part of the "Big MAC" airlift system, the ALCE did not assist with C-9 operational communications and taskings. As a result, the mission commander had no organic communications equipment and written mission tasking was never received until after his missions departed. On the other hand, the AEMB, which was located at the same station as the ALCE and the mission commander, had (organic) high frequency secure radio capability. The use of this radio was denied to the mission commander. Because the medical personnel worked for a different boss, there was no pressure on them to assist with the overall AIREVAC system's problems. (22: atch 14-2)

The dual track command and control chain also caused problems at the crew level. Parallel communication links had to be activated to successfully alert the crew (operations and medical). This process was especially difficult during nonscheduled remain overnights (RONs). Quite often the medical crew members were required to delay their entry into crew rest to perform non-aircrew duties. This is in concert with the mission tasking of the ASF which requires crew members to "provide supportive medical care, prepare patients for evacuation, initiate patient evacuation manifests, identify tags, and fly aeromedical airlift

missions to provide in-flight patient care." (24:7-8)
These additional duties caused the pilots to have one
"legal for alert" time and the nurses and medical
technicians to have another. Because two chains of
control were followed, the alert times were not closely
coordinated. Pilots were alerted for duty to find that
their medical-counterparts had to remain in crew rest
for several more hours. This wasted valuable mission
time and placed mission accomplishment at risk. (22:
atch 9/14-5)

The Headquarters Military Airlift Command
Surgeon's Office is working on some of these problems.
Part of the solution rests in a study prepared by the
Analytical Systems Engineering Corporation, titled
"Aeromedical Evacuation Command and Control Functional
Requirements." Although the study takes steps in the
right direction by suggesting that all medical
evacuation personnel should be placed under the control
of the COMALF, it fails to remove the dual
communication chain, continues to rely on a command and
control system that is ill-designed to handle the
specific requirements of aeromedical evacuation, and
fails to create and employ aeromedical experts who
understand the system. Systems Engineering also
suggests a redundant and cumbersome procedure to tie

the CRAF into the operation. This initiative serves as one more disjunction by missing the mark and ignoring the command and control system that is being developed around DMIRS and JOTMIS. These simple errors might have been avoided if senior managers had been allowed to gain more experience and depth of knowledge by "growing-up" in a medical mobility career field.

CHAPTER XI

CONCLUSIONS AND RECOMMENDATIONS

INTRODUCTION:

The United State's wartime medical system is developing rapidly. Unfortunately it is expanding in divergent directions. There is great doubt that the Nation's aeromedical airlift system could, with any semblance of efficiency, complete its mission. The system's pieces, in fact, do not fit together. The following conclusions and recommendations are provided as a starting point for the development of a unified, coherent AIREVAC system.

ORGANIZATION:

Conclusion: The wartime medical system and aeromedical evacuation have outgrown their rule by committee organizational structure.

Recommendation: The U.S. Government must establish a central office within the DoD to serve as the focal point for the national disaster medical system to include AIREVAC. The breadth of the task dictates that full-time personnel from each federal agency and service that impacts on mobilization and wartime medical transportation be included in the group. Furthermore, the organization must include

specialists, such as "pilots and transporters," from outside the medical career field.

Conclusion: Experience in and knowledge of the medical mobilization and evacuation career field is shallow. It is not unusual that people are assigned to this duty only once in their career. Senior managers are often placed in position with little or no experience.

Recommendation: Medical mobilization and transport must become a career field in its own right. To gain the expertise and depth of knowledge required to develop and maintain a professional organization, people must be allowed more than one assignment in the medical mobilization arena. A career field that includes physicians, nurses, medical technicians, medical services officers, pilots, logisticians and transporters should be developed. Career broadening assignments "outside of" instead of "into" the aeromedical airlift specialty should become the rule and not the exception.

Conclusion: A wall exists between medical and operations personnel at all levels. Cooperation and information flow is limited.

Recommendation: Staff functions from the JCS and MAJCOMS to the wings and squadrons must integrate

people with diverse specialties. Contingency planners from multiple career fields must begin to coordinate and work together to develop comprehensive plans. At the air division and wing level, command and control staffs and medical and operational mission planners should also be incorporated into combined teams, working for one boss and for one mission oriented goal. Similarly, when deployed, aeromedical evacuation control centers and aeromedical evacuation management branches should employ combined teams capable of managing all medical and operational aspects of the mission. Basic to this recommendation is the incorporation of all crew members (pilots, nurses and medical technicians) under one commander at the squadron level.

Conclusion: The concept of front-end (pilot) and back-end (medical) crews is disruptive, counterproductive, and results in redundant command and control systems.

Recommendation: All co-located "crew members," should be assigned to the same squadron, and work for the same wing commander or theater COMALF. A single line of command and operational control should be established.

Conclusion: MEDCRAF cannot successfully integrate into the current evacuation command and control organizational structure. If mobilized today, the CRAF crews would receive tasking directly from Headquarters MAC, through their individual operations centers and then through the numbered air force, the theater ALCC and the ALCE. Indirectly, the AECC, the AEMB and the medical crews would also be making inputs. This process is too complicated, inefficient and destined to breakdown.

Recommendation: A streamlined organizational structure that centralizes MEDCRAF and C-9 command and control through a combined AECC/AEMB system is required.

Conclusion: Today's theater aeromedical airlift organizational structure does not support a fleet of up to 80 plus aircraft operating in support of AIREVAC.

Recommendation: The Commander/Vice Commander of the 375 Aeromedical Airlift Wing, or the Commander of the 322 Aeromedical Airlift Group, should deploy in conjunction with the CONUS based C-9s. He should assume the position of Deputy Chief of Staff for Aeromedical Evacuation Operations assigned to the COMALF's staff. From this position he would: 1. Serve as the theater Commander in Chief's single point of

contact for AIREVAC operations and capabilities. 2. Report directly to the COMALF and execute operational control of aeromedical evacuation crews (military and civilian pilots, nurses, medical technicians and flight attendants). 3. Maintain command authority over the military crews. A supporting aeromedical airlift staff consisting of intheater and CONUS based operations and medical personnel, augmented by counterparts from the Reserve Associate 932 Aeromedical Evacuation Group, should be identified.

PLANNING:

Conclusion: Although many hours of work and thought have gone into the MEDCRAF concept of operations, it is narrow in perspective.

Recommendation: Functional experts from all pertinent career fields must be assigned to one organization and tasked with developing an all-encompassing concept of operations. The plan must be based on a common threat and a common set of goals and operating parameters. A statement such as, "we'll use make-shift ramps to load the aircraft," is an unacceptable tenet of any good concept. Similarly, accepting the proposal to use jet-ways without first conducting aircraft load studies to determine the

plan's feasibility, the manpower requirements and the acceptability of the procedure in relation to the threat is unacceptable. A professional planning process must be used.

Conclusion: An inadequate and inappropriate planning process is being used to develop and establish the medical logistics and procedures for the MEDCRAF.

Recommendation: The Quad Service Working Group is on the right track as far as including all services in the planning process. But, operational planners, to include representatives from the airline industry and air transportation experts, need to be added to the team. The quantity and load characteristics of the medical equipment and supplies must be determined. Additionally, related areas such as using the B-767's logistics capability to transport the spare parts needed to employ the C-9 force overseas should be evaluated. A method of tracking the disposition of medical equipment and transporting it to the port from the NDMS hospitals has yet to be incorporated. The selection of the MEDCRAF coast-out ports should be reconsidered. Prior to selection, the synergistic effects of the decision on the air carriers and the medical crews should be fully considered.

Conclusion: As mobilization occurs, and the CRAF aircraft begin transporting war materials to the theater, commercial flight schedules will be significantly affected. As a result, many reserve medical crews will be unable to move rapidly from their homes to the locations (which have not been determined) where they will board the B767s.

Recommendation: Crew staging locations and transportation assets must be identified and planned for prior to mobilization. The use of Air National Guard T-43s and C-22s, active duty C-21s, or commercial contract engaging civil aircraft not committed to the CRAF are possible solutions.

Conclusion: There is no patient distribution plan for the National Disaster Medical System.

Recommendation: To make possible the development of wartime strategic AIREVAC schedules, and to determine if preplanned mission itineraries are possible, the capabilities, specialties, and sequence of casualty distribution for each NDMS region need to be determined.

Conclusion: Many of the benefits associated with a dedicated fleet of AIREVAC aircraft are eroded if all of the casualties entering the CONUS system are forced through the military's staging facilities. To take

full advantage of the B-767 fleet and to minimize the number of MD-80 aircraft required for redistribution, more Disaster Medical Assistance Teams must be recruited and trained.

Recommendation: The development of a viable NDMS system will require a Nation that is ready to pay the bill. Incentives must be used to recruit a civilian medical force. Offerings could be in the form of tax incentives, direct payments or mandatory national service. The latter could take the form of an exchange, a specific number of years of active military service for a substantially greater number of years serving as a DMAT member.

Conclusion: The flow of aircraft and casualties through a NDMS regional airport will be slowed by the lack of a plan to organize the Nation's ground transportation assets.

Recommendation: A nation-wide program that enlists and manages an NDMS region's ground assets must be developed. The equipment required to reconfigure buses, trains and trucks to carry litters should be developed, funded, procured and stored in each region.

COMMAND AND CONTROL

Conclusion: Several medical command and control initiatives are being worked simultaneously.

Recommendation: The creation of one command and control system based on the Joint Theater Medical Information System and the Defense Medical Regulating Information System should be pursued. The Military Airlift Command should discontinue its efforts to have Analytical Systems Engineering Corporation develop their own set of aeromedical evacuation command and control functional requirements.

Conclusion: Less priority is being placed on the communications requirements of the proposed Joint medical information system than on the information requirements. As a result, deployment of the command and control aspects of the system will be unduly delayed.

Recommendation: JOTMIS has a well established and well defined development schedule that includes a functional description, architecture analysis, feasibility study, and system design phase. To save money and time associated with unforeseen down-line modifications that may result from the attempted integration of a communication system into a medical information system, the development schedule should

address both medical information and communications requirements simultaneously.

Conclusion: The concept of operating a relatively large fleet of AIREVAC aircraft, that by treaty can be used for no other purpose, and the availability of a comprehensive medical information system dictate that aeromedical airlift develop its own dedicated and organic command and control system.

Recommendation: The communications capabilities of the medical information system should interface with all echelons of air crew "Command" and "Operational Control" to include the CRAF operations centers. This connection would facilitate the transmittal of CRAF aircrew flight planning data and aircraft or crew rotation schedules, etc. The possibility of including AIREVAC aircraft logistical support information into the system should also be explored.

LOGISTICS:

Conclusion: Unless commercial carriers increase the number of overseas missions flown on the B-767, there will not be enough spare parts stocked overseas to support the extended operations of a large fleet.

Recommendation: A required spare parts list must be prepared and plans made to ship or preposition parts to the theater.

TRANSPORTATION:

Conclusion: An airlift shortfall exists and will continue to exist even with the incorporation of the C-17 into the airlift fleet. In a true contingency, the Nation's aeromedical evacuation requirements cannot be met through the use of retrograde airlift. The Civil Reserve Air Fleet and the B-767/MD-80 concept is the only cost effective way to solve the AIREVAC crisis. To make this a viable option, incentives are needed to entice the commercial carriers to participate in the MEDCRAF.

Recommendation: Adopt the HQ MAC/XPW proposal to use MEDCRAF in support of the AIREVAC schedule, but don't limit the participation. The B-767 MEDCRAF should be incorporated, as much as possible, into the daily strategic aeromedical airlift flow by replacing the C-141. The MD-80 should be incorporated into the domestic route structure by replacing the C-95 on the transcontinental missions. By rotating the AIREVAC mission between the MEDCRAF carriers, each would realize monetary gain for their participation, many

CRAF crews would receive valuable training and all aspects of the AIREVAC command and control and logistics systems would be exercised. As a by-product of routine use of the MEDCRAF, medical crews could train on live missions, instead of being tied to expensive ground based simulators.

Conclusion: The concept of having no MEDCRAF in Stage I, ready for mobilization at the direction of CINCMAC, does not allow for convenient withdrawal of the C-141 force from its peacetime backhaul medical mission in preparation for hostilities. Similarly, placing all MD-80s in Stage III does not allow for early deployment of the CONUS based C-9s without shutting down the stateside AIREVAC system.

Recommendation: Part of this deficiency can be eliminated by making the MEDCRAF the mainstay of the peace time strategic aeromedical airlift system. To increase flexibility associated with the C-9s, the daily use of the MD-80s on domestic AIREVAC trunk lines and the incorporation of 50 percent of the MD-80 force into Stage II should help solve the problem.

Conclusion: The peace time environment which the C-9 air crews fly in is substantially different than the environment associated with their war time deployment mission.

Recommendation: To insure a safe deployment overseas, and a safe efficient operation within the theater of operation, at least one third of the CONUS based C-9s must be deployed each year. These movements should be in support of JCS exercises, and coincide with activation of all facets of the wartime medical system, from the corpsman on the battlefield to the National Disaster Medical System.

GLOSSARY

ABBREVIATIONS AND ACRONYMS

AECC	Aeromedical Evacuation Control Center
AELO	Aeromedical Evacuation Liaison Officer
AELT	Aeromedical Evacuation Liaison Team
AFMLO	Air Force Medical Logistics Office
ALCC	Airlift Control Center
AECE	Airlift Control Element
ALD	Airlift Division
ASF	Aeromedical Staging Facilities
ASD(HA)	Assistant Secretary of Defense for Health Affairs
ASMRO	Armed Services Medical Regulating Office
ASWBPL	Armed Services Whole Blood Processing Laboratory
AXP	Ambulance Exchange Point
BSA	Brigade Support Area
CINC	Commander-in-Chief
CINCMAC	Commander-in-Chief Military Airlift Command
CMCHS	Civilian-Military Contingency Hospital System
COMMZ	Communications Zone
COMALF	Commander Airlift Forces
CONUS	Continental United States
CRAF	Civil Reserve Air Fleet
CSH	Combat Support Hospital
CZ	Combat Zone
DLA	Defense Logistics Agency
DSA	Division Support Area
DMAT	Disaster Medical Assistance Team
DMRIS	Defense Medical Regulation Information System
DMSB	Defense Medical Standardization Board
DoD	Department of Defense
JCS	Joint Chiefs of Staff
JOPS	Joint Operation Planning System
JOTMIS	Joint Theater Medical Information System
JMRO	Joint Medical Regulating Office
JMTB	Joint Military Transportation Board
JSMLCG	Joint Services Medical Logistics Coordinating Group
MAC	Military Airlift Command
MAAF	Mobile Aeromedical Staging Facility
MEDCOM	Medical Command

MED CO	Medical Company
MEDCRAF	Medical Civil Reserve Air Fleet
MCC	Movement Control Center
MPM	Medical Planning Module
MRO	Medical Regulating Office
MSC	Military Sealift Command
NBC	Nuclear, Biological, Chemical
NDMS	National Disaster Medical System
PAD	Patient Administrator
REFORGER	Return of Forces to Germany
TAES	Tactical Aeromedical Evacuation System
TMT SQD	Trauma Treatment Squad
VA	Veterans Administration
ZI	Zone of the Interior

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