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THE EVOLUTION OF AIRLIFT
DOCTRINE AND ORGANIZATION

by

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Abstract

As we entered World War II, what little airlift doctrine existed was based largely on limited experiences. Beginning with the development of airlift using balloons in the Civil War, through World War I, and the inter-war period, combat airlift and airlift doctrine was untested. However, many important events since caused airlift to mature and evolve—the varied operations of World War II, Berlin, Korea, Vietnam, Israel, Grenada, Panama, and the Gulf War. The experiences form the basis of modern airlift doctrine. Organizationally, airlift has struggled through the years as the controversy over consolidation has grown. Should strategic and tactical airlift be consolidated in one command, or are they distinct enough that tactical (theater) airlift should belong to theater commanders, even in peacetime? The evidence, including nearly 20 years of consolidation, provides strong support in favor of consolidation. Despite its organizational difficulties, airlift continues to do its mission and do it well. Airlift doctrine was born in the second world war. It was tested in battle, refined in Berlin, Korea, Vietnam, and Southwest Asia, and remains with us today. Whether as a tool for power projection, mobility, logistical support, or humanitarian relief, airlift remains a vital element of America's defense.

Chapter 1

Introduction

Shortly after World War II, Maj. Gen. Robert M. Webster, who led both tactical and transport commands during the war, said,

I would say that we went into the last war with only two basic types of military aircraft, the bomber and the fighter. I feel that we have come out of that war with an additional type, the transport plane, and that we should think in terms of bomber-fighter-transport—since they are all equally important—and they must be properly balanced to each other if we are to be prepared to conduct successful war operations.¹

Just as aviation was in its infancy when the world fought the first Great War, so too was military airlift in its infancy when World War II began. That great conflict saw the development, and refinement of both strategic and troop carrier airlift and the doctrine to employ them. However, the use of military aircraft for airlift was not a new concept. As with the fighter and the bomber, airlift, the development of new specialized aircraft, and the doctrine to go with it suffered in the period from the beginnings of aviation into World War II.

Doctrine represents the basic and enduring beliefs and principles that guide the use of aerospace forces in military action. It ordains how we intend to operate and fight. It provides guidelines for employment, but it is not an inflexible checklist to be followed blindly. Doctrine comes from two primary sources, theory and experience. As we entered World War II, fighter and bomber doctrine was based heavily on the theories of Douhet,

Mitchell, Trenchard, and the Air Corps Tactical School. However, no theorists wrote much about airlift. What little doctrine existed was based largely on limited experiences.

This paper describes many of those experiences and outlines the evolution of airlift and its doctrine from its inception, through World War II, and the numerous operations since, keying on important doctrinal issues, revelations, and changes. Additionally, for most of its existence, airlift has been organizationally split into two branches—strategic and tactical. For just about as long, airlifters have argued for consolidation. I'll finish with an examination of this issue which has been controversial since the beginnings of military airlift—consolidation of all airlift forces under a single command. Airlift doctrine was born in the second world war. It was tested in battle, refined in Berlin, Korea, Vietnam, and Southwest Asia, and remains with us today.

Notes

¹ Robert F. Futrell, *Ideas, Concepts, Doctrine: Basic Thinking in the United States Air Force*, Vols. I and II, (Maxwell AFB AL, Air University Press, 1989), 178.

Chapter 2

Airlift Is Born

The Early Years

Military aviation had its beginnings in the Civil War as both the Union and the Confederacy made use of balloons, primarily for observation. The Army of the Potomac used balloon observation during the Peninsular Campaign. Amazingly, both sides in that conflict designed and attempted to build flying machines similar to helicopters. The South even planned to use theirs as a bomber!¹ An army balloon directed artillery fire during the Battle for San Juan Hill in the Spanish-American War.²

In 1908, Lt Frank P. Lahm flew as a passenger in a Wright flyer—one of the first examples of military airlift. Just a few days later, Lt Thomas E. Selfridge became the first military aviation fatality when he was mortally injured in a crash that also severely injured pilot Orville Wright.³ In 1911, Lt Benjamin D. Fulois demonstrated aviation's usefulness in courier duty, carrying a message from an Army Division Commander to a remote (26 miles) camp and returning with a reply in just 1 hour and 45 minutes.⁴

Over the next several years, Army aviation officers recognized the potential military and commercial applications of the aircraft. Brigadier General John J. Pershing used aircraft on his expedition to Mexico in 1916 for reconnaissance, as well as for hauling mail

and dispatches.⁵ However, the limited weight-bearing capacity of the aircraft made it difficult to carry anything in significant quantity. By the time World War I began, the combat potential of the aircraft, for such uses as observation, pursuit, and bombardment, was well-known and understood, at least by airmen.

World War I

One of the first uses of combat airlift occurred in late 1915 and early 1916 in Mesopotamia (now Iraq) along the Tigris River at the port of Kut-al-Almara, or Kut. A large British force (an overstrength, 25,000 man division with air elements) suffered a defeat against the Turks. Retreating to Kut after suffering 50% casualties, the British set up a quick defensive perimeter and the siege by the Turks began. The only way in or out was by air. When Turkish fire halted airland resupply efforts, British aviators quickly adapted and began airdropping less sensitive supplies. The besieged forces had plenty of rations and felt they could easily wait for relief. But when the relief forces were stopped by the Turks, the situation became critical. All food sources would be consumed within a month. With a minimum requirement of 5000 pounds per day, the air officer calculated that if each of his 14 aircraft flew three times per day, that goal was theoretically achievable. Slingshotting flour sacks from the bomb racks and the wings, the operation began. Unfortunately, aircraft serviceability and poor weather kept the airmen from ever achieving the 5000 pound goal. The problem was compounded when German Fokkers attacked the British airlifters, necessitating the use of their limited airframes for escort. Unfortunately, an escort with its armed observer was too heavy to carry any food.

Eventually, the besieged division (only 8000 men were left) surrendered. Averaging only 2500 pounds per day, the first combat airlift had failed.⁶

The earliest American use of airlift in combat probably came in late 1918, when a force of 550 Americans (later called the “Lost Battalion”) became surrounded by German soldiers. Pinned down in a ravine, they soon ran low on supplies. They successfully released carrier pigeons but the messages contained the wrong coordinates. The 50th Aero Squadron undertook the mission to first locate, and then resupply the Lost Battalion. Because of the incorrect location, the 50th’s first attempt resulted in supplies dropped into the German trenches. Lieutenants Harold E. Goettler and Erwin R. Bleckley volunteered for the next mission, but bad weather forced them to fly low over the ravine. They tried to draw just enough enemy fire to help locate the battalion, but both sustained fatal injuries. For their heroic efforts, both received the Medal of Honor—the first for an airlift operation. The 50th continued the operation, located the Lost Battalion and relayed their location to rescue forces.⁷

Brigadier General Billy Mitchell, perhaps best remembered for his advocacy for an independent air force and subsequent court-martial, conceived a plan which included airdropping an entire 12,000 man division behind German lines. He envisioned an operation involving 1200 Handley Page bombers in 60 squadrons. Following the air assault, the bombers would resupply the force with food and ammunition. Mitchell believed this assault would constitute a death blow to the German Army. While General Pershing granted tentative approval, the Armistice ended Mitchell’s plan.⁸ From their experiences in World War I, Army commanders came to realize the value and importance of aviation, wanting it as a part of their forces, under their control.

Between the Wars

The development of airlift aviation continued in the interwar period. In 1918, a medical officer and the commander of a flight training facility modified a JN-4 Jenny to carry an injured person in a semi-reclined seat in the rear cockpit. Probably the first use of aircraft for aeromedical evacuation, its success led to an order directing all military airfields to have an air ambulance. Further development of this concept continued into the 20s and 30s. Several other types of aircraft were successfully converted to air evacuation use. Aircraft specifically designed for crash rescue were designed and built. However, limited defense budgets and the higher priority placed on bomber and fighter aircraft meant that transport aircraft would be used for air evacuation through the interwar period.⁹

In the mid-20s, Congress authorized private contracts for carrying airmail—the beginnings of commercial aviation. Profits from this business provided a significant boost to commercial aviation. Millions of dollars in investment resulted in expansion into the business of transportation of passengers and express cargo. Congress created an aviation bureau in the Commerce Department to continue developing a federal airways system, complete with emergency landing fields, lighting for night operations, and weather service. (In 1922, the Air Service had begun development of a successful nationwide air system called “Model Airways.”¹⁰ New aircraft designs included closed cabins in consideration of passenger comfort and safety. By the end of 1929, 45 airlines offered scheduled commercial services, flying over 68,000 miles a day that year.¹¹

When political maneuvering in 1934 Washington resulted in President Roosevelt canceling airmail contracts as fraudulent, the Air Corps took on the job of flying the mail.

(Ironically, the Air Corps' predecessor, the Signal Corps, first initiated airmail service on 15 May 1918¹² Accidents which occurred while the Air Corps trained for the mission raised doubts in some eyes about their ability to perform a mission they were not equipped, trained, nor funded for. When operations began, unusually foul weather across the country and a lack of instrument flying skills contributed to more fatal accidents. Reorganization, additional training, and better weather helped turn things around for the Air Corps, but reinstatement of the civilian contracts terminated Air Corps' airmail activities. Several lessons were learned in this important operation. Aircraft designed for (and aviators trained for) combat were not suitable for commercial activities like airmail. Many aircraft did not have the carrying capacity to be efficient, nor did they have the instrumentation needed to fly at night and in the weather. Many pilots simply lacked the skills needed to fly in this regime. But the experience was a valuable test of men, equipment, readiness, and procedures. Funding released to correct the problems of this operation may have been key to the Air Corps' level of readiness, limited though it was, going into World War II.¹³

In the 1920s, the service used bombers to carry passengers and cargo. Finally, in the late 20s, the Air Corps bought some cargo aircraft for use at the depots, but other types of aircraft, particularly bombers continued to be used for transport. Maj Hugh J. Knerr, Chief of the Field Service Section of the Materiel Division, proposed creation of a transport group with squadrons at the major depots. Approved in late 1932, a provisional group (the 1st Air Transport Group (Provisional), under Knerr's command) with four squadrons was formed, primarily to haul engines and equipment to and from the depots.¹⁴ Knerr had recognized the need for military transport aviation and acted. In 1932 he said,

If an Air Force is tied to rail heads and its services of supply dependent upon motor transportation, its mobility is that of the flat car and truck. The ideal situation is one wherein the Air Force is maintained and accomplishes all of its transportation by air.¹⁵

Soon, the Materiel Division realized that its air transportation capability permitted the immediate movement of supplies in an emergency, and allowed supply stocks in the field to be kept at lower, cheaper levels. In addition, cargo sent by air required less packaging than cargo sent by rail (e.g. cardboard cartons vs. wooden crates). In fact, engines could be transported right on their dollies. Real dollar savings was an important consideration in that era of limited funding for aviation activities. The provisional squadrons were such a success that the Air Corps gave them Regular Army status in 1935. In 1937, it organized the 10th Transport Group; each of its squadrons had around 50 enlisted pilots and 1 or 2 officers. Procurement of new airlift aircraft was justified as necessary to move tactical units at the same speed as the planes with which those tactical units were equipped.¹⁶

Additional transport aircraft fell under the control of GHQ Air Force and were used for tactical support. An attempt by the Chief of the Materiel Division to consolidate all airlift under his (10th Transport Group) control was dismissed by GHQ Air Force, foreshadowing future debate on the division between what we would come to call strategic and tactical airlift. Attempts to convince the War Department to purchase more transports (the Air Corps calculated a need for 149 total planes) were unsuccessful. Secretary of War Harry Woodring disapproved the requests, seeing no reason for buying transports “due to their high price,” preferring to spend the money on new bombers.¹⁷ In fact, Woodring sought to save money by converting old bombers to transports. His shortsightedness would be revealed when war broke out in Europe.

Notes

¹ Juliette A. Hennessy, *The United States Army Air Arm, April 1861 to April 1917*. USAF Office of History, Washington DC, 1985. (reprint of a 1958 edition originally published by the USAF Historical Division), 10-11.

² Flint O. Dupre, *Hap Arnold: Architect of American Air Power*, (New York: Macmillan Company, 1972), 12.

³ Juliette A. Hennessy, *The United States Army Air Arm, April 1861 to April 1917*. USAF Office of History, Washington DC, 1985. (reprint of a 1958 edition originally published by the USAF Historical Division), 28-33.

⁴ *Ibid.*, 40.

⁵ *Anything, Anywhere, Anytime: An Illustrated History of the Military Airlift Command, 1941-1991*. (Military Airlift Command Office of History, Scott AFB, IL, May 1991), 1.

⁶ Murdock M. Moore, "Mesopotamia: Being the Cradle of Civilization and Airlift." *Airlift/Tanker Quarterly*, Summer 1995, 6-8.

⁷ *Ibid.*, 3.

⁸ *Ibid.*, 2.

⁹ *Ibid.*, 1,4.

¹⁰ *Ibid.*, 2,5.

¹¹ Maurer Maurer, *Aviation in the U. S. Army, 1919-1939*. (USAF Office of History, Washington, DC, 1987), xxiv.

¹² *Anything, Anywhere, Anytime: An Illustrated History of the Military Airlift Command, 1941-1991*. (Military Airlift Command Office of History, Scott AFB, IL, May 1991), 1.

¹³ Maurer Maurer, *Aviation in the U. S. Army, 1919-1939*. (USAF Office of History, Washington, DC, 1987), 316-317.

¹⁴ *Ibid.*, 367.

¹⁵ *Anything, Anywhere, Anytime: An Illustrated History of the Military Airlift Command, 1941-1991*. (Military Airlift Command Office of History, Scott AFB, IL, May 1991), 7.

¹⁶ Maurer Maurer, *Aviation in the U. S. Army, 1919-1939*. (USAF Office of History, Washington, DC, 1987), 368.

¹⁷ *Anything, Anywhere, Anytime: An Illustrated History of the Military Airlift Command, 1941-1991*. (Military Airlift Command Office of History, Scott AFB, IL, May 1991), 10.

Chapter 3

World War II

Preparing for War

Before World War II, the airline industry provided most of the impetus for the development of air transport technology. Proven cargo aircraft were flying around the world daily. As I've shown, military airlift was not ignored, but it was neglected. Lt Col Charles E. Miller, in *Airlift Doctrine*, describes the unpublished doctrine of the times:

1. The primary purpose of military air transportation is to support the air forces.
2. Military air transportation is important as a logistics tool for the entire air force.
3. Despite its advantages, military air transportation is less important than the development, acquisition, and operation of combat air forces.
4. Although civil transportation aircraft are not designed for military purposes, their abundance will allow the air forces to rely on mobilizing them in wartime, at the expense of building comparable organic capability in peacetime.¹

Clearly, the Air Corps' portion of the interwar years' limited defense budgets was focused on bombers and fighters. The events of the late 1930's spurred the development of the Air Corps, but still, airlift took a back seat to bombers and fighters. In June 1939, the Air Corps had over 2000 aircraft—only 75 were transports.² Air Corps leadership felt that the small military airlift force could handle the Air Corps' requirements, while the civil fleet would take care of any greater needs.

The success of the Nazi blitzkrieg all but ended the isolationist leanings in the United States which began an expansion program initially based on defending the Americas. When France fell in 1940, the expansion program grew and transport aircraft accounted for substantial orders. In September 1940, the Air Corps ordered 545 C-47s and 200 C-46s. Over 500 more transports were ordered the following year. To manage this growing force, the Air Corps created the 50th Transport Wing. The wing faced so much demand for its services that in its first six months, it carried more cargo than all the civil airlines combined.³

When Lend-Lease became a reality in early 1941, General Henry H. Arnold, Chief of the Air Corps, recommended they take over responsibility of flying the new, American-built aircraft, mostly bombers, from the factories. This not only freed the British from having to divert combat pilots from the war, but gave Air Corps pilots the opportunity to improve their flying skills on modern aircraft. The Secretary of War approved the recommendation, and the Air Corps formed the Air Corps Ferrying Command (ACFC). This organization would deliver aircraft and provide airlift of personnel and supplies around the world. ACFC was soon operating regular routes across the North Atlantic, the Pacific, and through South America to Africa and the Middle East.

In October 1941, the Army, while expanding and reorganizing, created the Air Service Command (ASC) to handle maintenance, supplies, and contract airlift for the newly designated Army Air Force. A series of meetings in March 1942 convinced Gen Arnold to delineate the difference between ACFC and ASC by geographic area rather than mission. ASC would handle all transport activities in the Western Hemisphere, while ACFC would operate all transport lines extending beyond the Western Hemisphere, plus

have responsibility for all ferrying operations. In addition, ASC was to build up “transport squadrons capable of carrying out missions with airborne infantry, glider troops and parachute troops.”⁴

Organizationally, military air transportation continued to evolve after America entered the war. In June 1942, ACFC became the Air Transport Command (ATC). Its missions included air transportation for most of the War Department and the contract cargo operations of ASC—it was responsible for air logistics between theaters. The tactical mission of ASC was transferred to the newly-designated Troop Carrier Command (TCC). Troop carrier assets were dedicated as theater resources, primarily responsible for airborne operations. They were also tasked with logistics support within a theater.⁵ This was the formal beginning of an important doctrinal distinction that still exists today—strategic (or *intertheater*) vs. tactical (or *intratheater*) airlift.

The Pacific Theater

The largest and most ambitious airlift operation of the war was the aerial resupply of China and Maj General Claire L. Chennault’s 14th Air Force after Japan had cut off water and land access. Known as “flying the Hump” because of the need for the flights from India to fly over the dangerous Himalayan mountains, C-46s, C-47s, B-24s, and later, C-54s, moved more than 650,000 tons of supplies in just over three years. This operation also saw the first major use of aircraft to evacuate wounded soldiers from the front lines. Resupply aircraft, empty after unloading their much-needed cargo, were used to “backhaul” casualties to the rear areas and better medical care. Contending with high altitudes, violent turbulence, bad weather (including the annual monsoon season), enemy

attacks, morale problems, and primitive conditions, airlift “maintained a logistical pipeline to China, proving that airlift was a viable means of supporting armies in the field.”⁶

The Hump airlift operation also saw what was probably the first use of helicopters for combat rescue, often the first step in the air evacuation process. In one instance, TSgt Ed Hladovcak of the 1st Air Commandos, piloting an L-1 with three wounded British passengers, was forced down over 100 miles behind Japanese lines. Unable to move because of the injured Brits, and deep in the jungle where an airplane could not land and rescue forces were days away, the downed men hid from nearby enemy soldiers. The only option was to dispatch a YR-4 helicopter with its 175hp engine to try a rescue. The YR-4 could only carry one passenger at a time and had to strain its engine past redline just to lift off. Despite the difficulties, after four trips in and out to a sandbar where the men could transfer to an L-5, the mission was a great success. Combat rescue and air evacuation continued throughout the Hump operation.⁷

Although it became a theater operation, the Hump airlift was handled by ATC for most of its operation. It began with Chennault’s “Flying Tigers” of the American Volunteer Group and transferred to the AAF’s 10th Air Force after US entry into the war. Airlift assets grew slowly until, in October 1942, ATC gained responsibility for the operation. ATC retained management of the Hump operation until its termination in November 1945. From September 1944 until it ended, Brig. Gen. William H. Tunner commanded the operation. Later, he would pattern the Berlin Airlift after his Hump operations. The Pacific theater also saw the first successful large scale airborne operation of the war. In early September 1943, C-47s dropped roughly 1,700 troops into Nadzab, New Guinea to cut off the Japanese in the area.

The European Theater

Troop carrier airlift saw most of its use in the European Theater. Germany conducted the first airborne operation of the war in April 1940 when it used over 500 troop carriers in airborne assaults of airfields in Norway and Denmark. The German air assault of Holland in May stirred the British and Americans into creating their own airborne forces. US troop carriers first saw action in North Africa in November 1942. The small force of 530 paratroopers seized two lightly defended airfields, but were decimated in a later attack by German fighters and tanks. Future missions clearly required a greater concentration of troops.⁸

The first large airborne operation involved the joint US-UK invasion of Sicily in July 1943. On the first day, a combination of darkness, strong crosswinds, and crew inexperience resulted in paratroops from the initial mission of 226 C-47s being scattered along 50 miles of coast. A British glider infantry force towed by US troop carriers fared just as poorly. Of 137 gliders, only 12 hit their landing zone, with 65 lost at sea. During a mission two nights later, friendly troops shot at the formation. Twenty-three of 237 aircraft were lost with 37 heavily damaged.

Gen. Eisenhower ordered a full investigation which laid the blame on the need for improved troop carrier proficiency, better means of identifying dropzones, and improved air-to-ground communication. The concept of mass employment of airborne forces was vindicated, but the troop carrier units needed more training. Over the next several months, airborne tactics improved and lessons learned became the doctrinal basis for the airborne operations in the D-Day invasion.⁹

The Normandy invasion was supported by a massive airlift of three parachute divisions. 460 British transports, 900 US aircraft (mostly C-47s), and 3500 gliders dropped or landed over 20,000 men and their equipment. Unfortunately, unexpected weather scattered the formations and only about 10% landed on their dropzones. However, about 60% landed within two miles of their destination. The troops suffered far fewer casualties than expected and were generally successful in achieving their objectives.¹⁰

Subsequent operations helped develop the total theater airlift doctrine. As the Allies began to push across France, the need for aerial logistical resupply mushroomed. Casualties were often evacuated on the return flights. The theater commander had to prioritize his airlift assets between training for airborne missions and logistical transport. Eisenhower chose supply. But when the need arose, airborne operations were conducted, and with much greater success than before D-Day. Operations DRAGOON, VARSITY, and MARKET helped prove the importance and value of airborne forces. The post-Normandy period saw troop carrier resources used for all airlift tasks—airdrop, resupply, logistical support, and aeromedical evacuation.

Doctrinal Developments

World War II saw huge changes and improvements in airlift and its doctrine. The delineation between strategic (intertheater) and tactical (intratheater) airlift became a wall that would not be torn down for nearly 30 years. The concept of centralized control and decentralized execution, one of today's key tenets of airpower, was refined in airlift operations in the second world war. The experiences and lessons learned in World War II

helped form today's airlift doctrine. The lessons of combat had underscored the versatility of airlift. However, it has been refined in many operations since and it was not long until airlift would have its next chance.

Notes

¹ LTC Charles E Miller., *Airlift Doctrine*, (Maxwell AFB, AL, Air University Press, 1988), 19.

² *Ibid*,18.

³ *Ibid*, 21.

⁴ *Ibid*, 32.

⁵ Maj. Ronald G. Boston, "Doctrine by Default: The Historical Origins of Tactical Airlift," A USAF Air Command and Staff College Research Project, 1982, 3-4.

⁶ Dr. Roger D. Launius, *The Military Airlift Command: A Short History, 1941-1988*, (Scott AFB IL, US Air Force, Military Airlift Command, 1989), 2.

⁷ Lt Col Kristin L. Wells, "Luck of the Irish," *Airlifter Magazine*, October 1989, 47-50

⁸ Maj. Ronald G. Boston, "Doctrine by Default: The Historical Origins of Tactical Airlift," A USAF Air Command and Staff College Research Project, 1982, 4.

⁹ *Ibid*, 5-7.

¹⁰ Maj. William E. Heitmeier, "You Call, We Haul—The Airlift Tradition," A USAF Air Command and Staff College Research Project, 1980, 2.

Chapter 4

The Berlin Airlift

After the war, the Air Force finally gained its independence from the Army. But post-war funding was only about half of what air planners had assumed. In organizing the new Air Force, strategic airlift aircraft remained in ATC.¹ Troop carrier assets moved to the new theater commands and the Tactical Air Command (TAC). This was despite an air staff study which recommended consolidation of all air transport activities in one command.² Strategic and tactical airlift remained separate.

The post-war drawdown combined with concern over ATC competition with civil air carriers led Congress to question the need for major air transport services in both the Air Force and the Navy. Attempts by military planners to resolve this dilemma proved fruitless as neither service was willing to give up the mission or assets. President Truman established an Air Policy Commission, also called the Finletter Commission to formulate an integrated national aviation policy. The commission recommended creation of a single military air transport service. On 3 May 1948, a Secretary of Defense Forrestal memorandum created the Military Air Transport Service (MATs) as the single manager of strategic airlift operations. A month later, the Soviets cut off all overland supply routes to the Western zone of divided Berlin.³

“Operation Vittles”

To avoid starting a war with the Soviets, the American response was to begin an airlift of food and supplies into blockaded West Berlin. Brig Gen Joseph Smith became Berlin Airlift Task Force Commander and named the project “Operation Vittles” because “We’re hauling grub.” C-47s and C-54s, moved from all over the world to Europe.⁴ Initially, the airlift was successful, but soon, MATS took over the operation and brought in Maj Gen William Tunner to take charge. Building on the lessons he learned in the “Hump” airlift in World War II, Tunner expanded operations, brought in larger aircraft, streamlined the airlift support system, and improved efficiency through innovative management techniques. He emphasized using every minute of the day and established round-the-clock operations.⁵

Tunner turned Operation Vittles into a joint, combined operation with air and naval units from Britain, New Zealand, Australia, and South Africa. By November 5, the amount of supplies delivered had reached 300,000 tons. The following Easter, Tunner directed a 24 hour maximum effort with a goal of one mission completed every minute. Although they fell just short of that goal (landings in Berlin averaged every 63 seconds), the aircrews set a one day record of 12,941 tons with no accidents or injuries.⁶

Diplomats worked to resolve the crisis, but the Soviets believed the airlift would fail. Sustained operations over the winter, plus Tunner’s Easter Parade maximum effort eroded Soviet determination. Finally, on 4 May 49, officials announced the blockade would end on the 12th of May. The Soviets reopened rail lines as promised but the allies continued the airlift through the summer, stockpiling food and coal supplies in case the Soviets reneged. The last plane flew into Berlin on 30 September. It was the 279,114th flight in

an operation which carried 2,324,257 tons of supplies into the city. 27 accidents had claimed 66 lives.⁷ War had been avoided and airlift was the instrument of national power which had done it.

Doctrinal Developments

Major lessons learned included the need for more airlifters larger than the C-54 (which helped procure the C-124 in 1950), that joint and combined operations could be highly successful, and that airlift could carry people and cargo anywhere in the world, under any conditions. It also reinforced the need for a single commander for the most effective and efficient operation (Tunner exercised operational command, but USAFE retained administrative control, a situation which caused numerous problems).

The Air Force had employed airpower as a diplomatic tool for the first time. Without the airlift option, the United States had only two options—get out or fight. Operation Vittles gave needed time for negotiations and weakened Soviet resolve while boosting German morale.⁸ This operation added another tenet to airlift doctrine—airlift as a non-lethal means to allow decisionmakers time for a negotiated peaceful settlement to conflict. No other nation on earth could have mounted such an extensive operation. “The Berlin Airlift proved what has been confirmed many times since: airlift is a more flexible tool for executing national policy than either fighter or bomber aircraft.”⁹ Unfortunately, not all these lessons would be acted on in time to prepare for a police action in a place called Korea.

Notes

¹ Roland D. Hinds, *The Development of Strategic Airlift for the Armed Forces of the United States, 1941-1965*, (Scott AFB IL, US Air Force, Military Airlift Command, 1968), 6.

² LTC Charles E Miller., *Airlift Doctrine*, (Maxwell AFB, AL, Air University Press, 1988), 164.

³ *Anything, Anywhere, Anytime: An Illustrated History of the Military Airlift Command, 1941-1991*. (Military Airlift Command Office of History, Scott AFB, IL, May 1991), 68.

⁴ Thomas Magstadt, "The Berlin Crisis of 1948: A Case Study," (Air War College, Maxwell AFB, AL, 1992), 14.

⁵ *Anything, Anywhere, Anytime: An Illustrated History of the Military Airlift Command, 1941-1991*. (Military Airlift Command Office of History, Scott AFB, IL, May 1991), 71.

⁶ *Ibid.*

⁷ *Ibid.*, 71-72.

⁸ Lt Col Thomas E. Eichhorst, *Military Airlift: Turbulence, Evolution, and Promise for the Future*, (Air University Press, Maxwell AFB, AL, May 1991), 14-15.

⁹ *Anything, Anywhere, Anytime: An Illustrated History of the Military Airlift Command, 1941-1991*. (Military Airlift Command Office of History, Scott AFB, IL, May 1991), 72.

Chapter 5

Korea

After the Berlin crisis, the Air Force and airlift entered another period of drawdown. Most aircraft were in bad shape, needing extensive repairs and rehabilitation. Crew ratios were reduced and peacetime flying hours were set based on the training requirement for wartime operations. In other words, peacetime airlift capacity was now a by-product of the training needed to prepare crews for war. As a result, when North Korean forces crossed the border into the south in June 1950, MATS was ill-equipped to handle the crisis.¹

Airlift Responds

Almost immediately, the Air Force ordered MATS to move two Strategic Air Command (SAC) medium bomb wings to the region. However, the limited carrying capacity of the C-54 precluded movement of heavy equipment by air. Nonessential personnel were evacuated to the safety of Japan (noncombatant evacuation operations (NEO) would become both an important national political tool and a key mission for airlift). Additionally, the long flying time to the theater took its toll on the reduced number of aircrews. MATS had to rely heavily on commercial airlift for the initial deployment and theater sustainment.²

During the Korean War, strategic airlift from the US to the theater was managed by MATS' Pacific Division augmented by planes and crews from the Continental Division. To handle airlift within the theater, the Air Force created the Combat Cargo Command (CCC) and placed now Maj Gen Tunner in charge. Tunner immediately argued that all airlift aircraft should be placed under one command, and over Army, Navy, and 5th AF objections, CCC ended up with all transport aircraft in the theater.³

Several key airlift operations in this conflict stand out. Emergency supplies were airlifted to the Marines at Inchon when they ran into supply problems. In late 1950, the 1st Marine Division became cut off from its support at the Chosin Reservoir. Airlift was the only reliable means of resupply (1,483 tons of supplies airdropped in—mostly by the new C-119 and 4,600 wounded evacuated in 12 days) and was a prime factor in minimizing US losses. Tactical airlift also conducted two major airborne assaults in Korea. At Sukchon and Sunchon in October 1950, the 187th Airborne Regimental Combat Team was airdropped by C-47s and C-119s with F-51s, F-80s, and B-26s flying in support. In March 1951, 173 aircraft dropped 3,487 troops and 483 tons of cargo at Munsan-ni.⁴

Doctrinal Developments

Lessons learned in Korea included:

1. The ability of the army to move faster and farther than any previous army in history was due to air transport and aerial resupply without regard to lines of ground supply.
2. More than one type of combat support airlift aircraft was needed. The C-47 could land on short, unimproved landing strips, but couldn't carry the loads the C-119 could handle. Specially designed cargo aircraft were needed.
3. If the US was to conduct worldwide operations, a long-range, heavy lift aircraft was needed.

4. Funding neglect and flying time restrictions demonstrated MATS' inability to surge for war.
5. Tactical airlift, proving its value, came through with flying colors.⁵

One of the most important developments to emerge from the experiences of Korea, however, was the formation, in 1952, of the Civil Reserve Air Fleet (CRAF). With a widespread attitude that the strategic airlift force was an airline (and the perception that it was subsidized by the government to compete with commercial carriers) and recognizing that the military could never maintain an airlift fleet large enough to meet its wartime needs, the Air Force sought to formally incorporate some of the civilian airlift resources into MATS operations. The concept was deceptively simple—in exchange for a portion of the military's peacetime airlift business, civil airlines would commit to providing aircraft and crews in a national emergency. When fully mobilized, the CRAF would airlift 95% of the passengers and 35% of the cargo required by overseas theaters. This arrangement has proven beneficial for both the military and the airlines for over 33 years. Until DESERT SHIELD/STORM, the CRAF was never activated. Instead, the airlines had always made aircraft available when crises required more airlift than the military could provide.⁶ The lessons learned put airlift in a much better position to handle the next major crisis, Vietnam.

Notes

¹ Anything, Anywhere, Anytime: An Illustrated History of the Military Airlift Command, 1941-1991. (Military Airlift Command Office of History, Scott AFB, IL, May 1991), 74.

² Ibid., 74-75.

³ Lt Col Thomas E. Eichhorst, Military Airlift: Turbulence, Evolution, and Promise for the Future, (Air University Press, Maxwell AFB, AL, May 1991), 16.

⁴ Ibid., 16-17

⁵ Ibid., 17.

Notes

⁶ Anything, Anywhere, Anytime: An Illustrated History of the Military Airlift Command, 1941-1991. (Military Airlift Command Office of History, Scott AFB, IL, May 1991), 81-86.

Chapter 6

Vietnam

Airlift Matures

As the Air Force matured between Korea and Vietnam, so did airlift. The C-124 was introduced late in the Korean War to both MATS and TAC. However, MATS argued for possession of all C-124s due to the shortage of strategic airlift. TAC wanted the new aircraft to meet Army demands for direct delivery of troops from the US to combat. Finally, in 1956, a DOD directive, *Single Manager for Airlift Service*, designated the SECAF as the single manager for airlift with MATS identified as the operating agency. Some Navy airlift aircraft and all of TAC's C-124s were transferred to MATS.¹ The C-124 would become the workhorse of MATS, but the concept of direct delivery began to blur the distinction between strategic and tactical airlift.

Later, MATS bought C-133s to replace the C-124s, as well as C-118s and C-121s. In 1961, 45 jet C-135s were diverted from SAC to MATS. In 1963, the military budget funded initial procurement of the C-141, destined to become the workhorse of strategic airlift for over 30 years. In 1965, the C-5 was selected to fill the requirement for heavy lift, capable of carrying Army equipment too big for the C-141. On the tactical side, the Air Force acquired C-123s, an assault-type transport capable of short, unimproved field

landings, as a replacement for its glider force. Needing to replace its medium transport C-119s, TAC received its first C-130 Hercules (Herk) in 1955, more than offsetting the loss of the C-124s.² Built to TAC's specifications, the C-130 was the large, long-range, short field capable, heavy lift tactical airlifter that would answer the airlift shortfalls of Korea. Even MATS admitted that, although the Herk was designed as a troop carrier, it could perform the entire spectrum of intertheater as well as intratheater missions.³ The line between strategic and tactical airlift blurred even more. The C-123, C-130, C-141, and later the C-5 would form the airlift backbone to military operations in Vietnam.

Strategic Airlift

MATS became heavily involved in strategic airlift to Vietnam in 1964. Acquisition of the C-141 tripled MATS capability, the most significant increase in airlift capacity in the history of the Air Force. ANG and AFRES units flew stateside cargo missions, aeromedical evacuation flights, and even some missions to Southeast Asia (SEA) to free MATS aircraft and crews for the growing requirements to support the build-up of forces in SEA. MATS also called on commercial airlines for assistance. Since the president had not declared a national emergency activating the CRAF, MATS sought voluntary contract leasing of commercial aircraft. With air superiority over South Vietnam, civil aircraft carried most of the passengers into the theater while MATS carried most of the cargo.⁴

Operation BLUE LIGHT, in late 1965, was the first combat operational test of the C-141. 88 C-141s, 126 C-133s, and 11 C-124 delivered an infantry brigade directly from Hawaii to Pleiku, South Vietnam, where the Viet Cong were massing for a major attack. (Direct delivery continues to blur the lines) In 1967, 369 C-141 and 22 C-133 missions

delivered 10,356 101st Airborne Division troops and 5,118 tons of their equipment from Fort Campbell, KY to Bien Hoa Air Base, South Vietnam. In 1972, the C-5 received its baptism of fire when the Military Assistance Command, Vietnam (MACV) requested an emergency airlift of six 49 ton tanks from Japan to Da Nang Air Base, Vietnam. The C-5 was the obvious choice for the mission. Innovative procedures allowed the tanks to be off-loaded in just seven minutes with the C-5s airborne within 30 minutes after landing.⁵

Tactical Airlift

While the helicopter soon became the primary air assault vehicle of the war, fixed-wing aircraft like the C-7, C-123, and in particular, the C-130 flew the bulk of the theater's tactical airlift missions. By 1966, 44 C-130s were based in Vietnam with another 12 squadrons outside the country supporting theater operations. Most missions involved moving cargo from the main aerial ports to forward bases. In 1967, the only battalion-sized parachute assault of the war occurred when 13 C-130s dropped 60 paratroops each in a search-and-destroy operation called JUNCTION CITY. Later the same day, 10 C-130s dropped 100 tons of heavy equipment and supplies to the force. A huge helicopter assault and more airdrops followed to complete the operation. Overall, C-130s dropped over 1700 tons of supplies and equipment.⁶ Aerial resupply of tactical units had once again proven its worth to a new generation of military leaders.

There were many other tactical airlift successes in Vietnam. In January 1968, a Marine base at Khe San came under attack as the enemy attempted to overrun the area. For 78 days, 15,000-20,000 communist troops attacked the base and its 6000 defenders. Like the British Mesopotamia operation in World War I, aerial resupply was their only

hope. But, unlike Mesopotamia, at Khe San airlift was successful. With American fighters and bombers pounding away at enemy positions, airlift delivered 150 tons per day. When enemy fire and poor weather prevented all but emergency landings, various innovative airdrop techniques were employed. After 11 weeks, the siege was lifted and battle for Khe San was won.⁷

In May of 1968, heavy enemy fire at Kham Duc led to an air evacuation. 500 people got out, but two C-130s and four helicopters were destroyed. Lt Col Joe Jackson landed his C-123 after it had been overrun to rescue three servicemen who had been left behind. He received the Medal of Honor, the only airlifter so honored in Vietnam, for his actions. However, the most difficult C-130 airdrop operation of the war came in 1972 at An Loc. Three communist divisions surrounded and cut off a garrison of South Vietnamese soldiers, civilians, and American advisors. Initial attempts to airdrop supplies were ineffective with several aircraft destroyed and only 25% of the loads recovered. Again, innovative airdrop techniques were tried, including the new Adverse Weather Aerial Delivery System (AWADS) and, after 11 days, the siege was broken.⁸

By the end of the war, the C-130 had become the premier tactical airlifter just as the C-141 and C-5 were now identified with strategic airlift. But the split between tactical and strategic airlift was still present. Back in 1961, MATS Commander Lt Gen Joe W. Kelly suggested unifying airlift forces in one command. In 1965 Congress passed a bill which changed MATS to the Military Airlift Command (MAC), to more accurately reflect the combat role airlift had come to play.⁹

Doctrinal Developments

A MAC presentation to Congress in 1970 represented MAC's primary mission as the deployment of forces with employment and resupply as second and third, respectively. Separate and often conflicting command and control structures during the Vietnam War resulted in numerous inefficiencies. The strategic aircraft force remained under direct authority of MAC supporting the theater. However, it worked closely with the tactical airlift force which belonged to the theater. The official Air Force study of the war, Project CORONA HARVEST, recognized those inefficiencies and recommended combining all strategic and tactical airlift aircraft under a single command. Centralized control of airlift forces made sense, especially as the war saw "strategic" C-141s and C-5s flying into "tactical" combat areas, and "tactical" C-130s, originally designed as a strategic airlifter, often performing "strategic" missions.¹⁰

The CORONA HARVEST recommendations finally got the attention needed, and, in late 1974/early 1975, the Air Force consolidated all its airlift forces under MAC, as TAC and the overseas commands transferred their C-130s to MAC. This consolidation eliminated redundant logistical support and overlapping routes, and streamlined airlift operations worldwide.¹¹ To complete the consolidation, in 1983, the Air Force shifted all of its special operations assets to MAC. This move put most Air Force rotary wing aircraft and most C-130-based airframes and their crews under a single manager. However, this consolidation would not last.

Notes

¹ Lt Col Thomas E. Eichhorst, *Military Airlift: Turbulence, Evolution, and Promise for the Future*, (Air University Press, Maxwell AFB, AL, May 1991), 19-20.

Notes

²LTC Charles E Miller., *Airlift Doctrine*, (Maxwell AFB, AL, Air University Press, 1988), 224-225.

³ *Ibid.* 282.

⁴ *Anything, Anywhere, Anytime: An Illustrated History of the Military Airlift Command, 1941-1991.* (Military Airlift Command Office of History, Scott AFB, IL, May 1991), 117-124.

⁵ *Ibid.*, 128-131.

⁶ Lt Col Thomas E. Eichhorst, *Military Airlift: Turbulence, Evolution, and Promise for the Future*, (Air University Press, Maxwell AFB, AL, May 1991), 27-28.

⁷ *Ibid.*, 28.

⁸ *Ibid.*

⁹ *Anything, Anywhere, Anytime: An Illustrated History of the Military Airlift Command, 1941-1991.* (Military Airlift Command Office of History, Scott AFB, IL, May 1991), 118.

¹⁰ *Ibid.*, 143-145.

¹¹ *Ibid.*, 164-166.

Chapter 7

Post-Vietnam

1973 Arab-Israeli War

As the Vietnam war wound down, MAC was called to support Israel with a massive airlift. On the day of Yom Kippur, 6 Oct 73, Egypt and Syria attacked Israel. Faced with a two-front war and inadequate resources, Israel turned to the US for help. President Nixon directed an aerial resupply effort, code named NICKEL GRASS, starting 13 October. For 32 days, C-141s and C-5s flew 567 missions carrying over 22,000 tons of materiel. NICKEL GRASS constituted the first major test of the C-5, which moved nearly half the tonnage on only 25% of the missions. The C-5 was the only aircraft which could carry outsized equipment, like the Army's 155mm howitzers, M-60 and M-48 tanks, and CH-53 helicopters. ¹

While the C-141s conducted aerial resupply to maintain the pipeline to Israel, this operation also reinforced the need for en route staging bases, primarily Lajes Air Base in the Azores. The C-5 had not yet undergone air refueling in an operational environment. C-141s were not yet air refueling capable. With diplomatic sensitivities surrounding a conflict involving the world's dependence on Arab oil, not only were landing rights in other nations difficult, if not impossible, to attain, (Germany, Spain, Greece, and Turkey

refused clearances), but extra care was made to avoid overflight of any nation's airspace in the region. The operation also emphasized the need for improved ground handling equipment and procedures, especially for the C-5's heavy loads. The CRAF's lack of cargo convertible aircraft and TAC's lack of procedures to allow its C-130s to perform strategic augmentation became apparent. However, MAC was able to complete the operation without compromising its other worldwide mission, without activating the CRAF, and without a Reserve call-up.²

This operation identified critical shortfalls which MAC attempted to correct. While NICKEL GRASS proved the C-5's worth as an airlifter that could carry heavy loads long distances quickly, it recognized the critical role of air refueling in air mobility. MAC directed that all C-5 crews be qualified in air refueling. The lack of airlift capacity was addressed by "stretching" the C-141, adding about 30% to its carrying capability, and by adding an air refueling capability. SECDEF James Schlesinger compared the benefit of the plane's stretching to adding 90 C-141s to the fleet. CRAF enhancement included greater use of civil wide-bodied, long-range jetliners. C-5s underwent a wing modification to increase its service life.

NICKEL GRASS reaffirmed airlift as another tool for the National Command Authority (NCA) to guarantee our nation's commitment when another nation's interests conflict with ours. The airlift fleet had been put to risk (with the threat of missiles from Egypt and terrorists at Lajes) and years of developing an efficient command and control, maintenance, and aerial port system had paid off.³ Finally, this operation confirmed the need to consolidate airlift under one command and, ultimately led to the designation of

MAC as a specified command, giving its commander equal status with the other Commanders-in-Chief (CINCs) he had to support and direct responsibility to the NCA.⁴

Grenada

Airlift played a major role in Operation URGENT FURY in late 1983. With all Air Force airlift and special operations forces now under one command, the mission to Grenada was the “new” MAC’s first combat test. Its special operations MC-130s airdropped two ranger battalions into Point Salines airport with AC-130 gunships providing fire support. Once the rangers controlled the airfield, C-141s began to land, carrying elements of the 82d Airborne Division. C-130s brought in more soldiers which had been moved to Barbados by C-141s and C-5s. During deployment, MAC transports flew 496 missions, carrying 11,389 passengers and 7,709 tons of cargo. Americans on the island were evacuated by C-141, along with other non-combatants and Cuban POWs. 292 missions supported the redeployment.⁵

Despite the success of URGENT FURY, the Senate Armed Service Committee (SASC) staff identified several deficiencies. Communications difficulties between services hampered operations. The failure to appoint a ground commander caused a logistics nightmare as supplies began to stack up at the airfield. For a time, only one MAC aircraft was allowed on the ground at one time. As a result, the SASC recommend creation of separate unified commands for transportation and special operations (to become the US Transportation Command (USTRANSCOM) and the US Special Operations Command (USSOCOM)). Additionally, they prompted MAC to improve its capability for command and control to allow real-time flight following for all its aircraft.⁶

Panama

By October 1989, tension between the US and Panama had increased to the point when the US indicted Panamanian leader Manuel Noriega on drug trafficking charges. Violence and corruption, especially after Noriega nullified the presidential election, posed a serious enough threat to American citizens in Panama that President Bush deployed a brigade-sized augmentation force in May 1989. He also ordered dependents evacuated back to the US. When a coup attempt against Noriega in October failed, Panama declared that a state of war existed with the US. In December, Panamanian security forces killed an US Marine officer and threatened a US Navy officer and his wife. President Bush decided on military intervention.⁷

As planning solidified, a joint simultaneous airdrop/airland operation was prepared. MAC said it needed 60 hours to launch the operation—36 hours to locate and move crews to onload locations, and 24 hours for mission planning and en route flying time. Since the operation was to begin during the Christmas holidays, when MAC had fewer scheduled commitments, most of the needed aircraft were available. Early on 20 December 1989, concurrent air assaults took place at Torrijos/Tocumen Airport, near Panama City, and at Rio Hato airfield, a major Panamanian Defense force base. Operation JUST CAUSE was underway. Over 30 C-130s and C-141s dropped Army troops. 26 additional special operations aircraft provided fire and tactical support, and deployed forces in Panama City.⁸

2,500 more troops were landed the next day and aeromedical evacuation missions began taking wounded back to the US. President Bush announced that the US had restored the properly elected government of Panama. Noriega came out of hiding and, on

3 January 1990, surrendered to US forces. A MAC MC-130 carried the deposed strongman to Homestead AFB, FL and delivered him to federal officials for trial. Humanitarian missions and the airlift of about 10,000 troops back to the US kept MAC busy until 14 February. All told, MAC flew 775 missions to move 39,994 passengers and 20,675 tons of cargo to and from Panama. Special ops flew an additional 796 missions during JUST CAUSE. It was the largest US military operation since Vietnam, and the early morning airfield assault, directly delivered from bases in the US, was the largest personnel airdrop since Korea and the largest nighttime parachute assault in the history of airpower!⁹ However, these three operations, as big as they were, pale in scope when compared to airlift and the war against Iraq.

Notes

¹ Anything, Anywhere, Anytime: An Illustrated History of the Military Airlift Command, 1941-1991. (Military Airlift Command Office of History, Scott AFB, IL, May 1991), 154-157.

² Ibid., 157-159.

³ LTC Charles E Miller., Airlift Doctrine, (Maxwell AFB, AL, Air University Press, 1988), 343.

⁴ Anything, Anywhere, Anytime: An Illustrated History of the Military Airlift Command, 1941-1991. (Military Airlift Command Office of History, Scott AFB, IL, May 1991), 158-166.

⁵ Ibid., 180-183.

⁶ Ibid., 183.

⁷ Ibid., 195.

⁸ Ibid.

⁹ Ibid., 197-198.

Chapter 8

The Gulf War

The ultimate test for airlift came later in 1990 when Iraqi forces invaded and quickly took over Kuwait. For many years, the idea of a southwest Asian (SWA) conflict worried airlift planners. Few places on earth were as far away as the Persian Gulf. An 8,000 mile logistic pipeline would stretch the limits of airlift. President Bush began Operation DESERT SHIELD, deploying hundreds of thousands of troops and tons of equipment to Saudi Arabia, first to deter further aggression, and ultimately to push the Iraqis out of Kuwait.

Within days of the Iraqi invasion, all of MAC's strategic airlift force was committed to the deployment. Soon, crews neared their maximum allowable flying hour limits. On 17 August, CINCMAC activated the first stage of the CRAF, the first time in its history that the CRAF had been activated. By the end of August, even volunteer Reserve crews were not enough to keep up the flow and Reserve units were called to active duty. In the first thirty days, MAC planes had moved 91,000 troops and 72,000 tons of cargo into the area.¹

In the months of deployment and build-up, strategic airlift brought 99% of the personnel into the theater. Only 5% of the supplies and equipment came by air, however, with the rest arriving by sealift. The airlift operation was the greatest such effort in

history. The Gulf War Air Power Survey compares the airlift activity of DESERT SHIELD (the deployment) and DESERT STORM (the war) on the basis of the common measurement of airlift capacity, million ton-miles per day (MTM/day), or the product of aircraft cargo weight in tons and distance flown:

Operation DESERT SHIELD/DESERT STORM (peak period): 17.0 MTM/day
NICKEL GRASS, airlift to Israel during Arab-Israeli War, 1973: 4.4 MTM/day
Operation JUST CAUSE, to Panama, 1989: 2.0 MTM/day
Operation VITTLES, the Berlin Airlift, 1948-1949: 1.7 MTM/day
“Hump” airlift of World War II: 9 MTM/day ²

This effort becomes even more impressive when one considers the 9 month period of the Gulf War as compared to the short-term nature of the next two largest airlifts. One special success story was the creation of “Desert Express,” a daily C-141 mission from Charleston AFB, SC to Saudi Arabia, carrying high priority cargo, like aircraft engines and spare parts. In-commission rates climbed dramatically as groundings for lack of parts rapidly decreased. ³

This conflict also saw the use of air refueling aircraft (KC-10s and KC-135s) for cargo hauling. Their cargo carrying capacity allowed tanker units to be relatively self-sufficient in their deployments. Additionally, KC-10s flew 379 “pure” airlift missions from August 1990 through January 1991. ⁴ This use of tankers for airlift foreshadowed the Air Force reorganization that was to come in 1992.

The CRAF activation was not without its difficulties. Stage I was to provide 38 additional aircraft. However, 28 were already flying support missions under contract to MAC. Stage II, activated by SECDEF on 17 January, authorized 76 more aircraft, but only 9 aircraft were added as the remainder were already contracted and were flying. During the war, CRAF aircraft could not stay overnight at bases within Scud range. Since

the main debarkation base of Dhahran was within this range, CRAF sorties became limited. Also, aircraft insurance policies specified exclusion zones in which rates increased 2,000%, making some trips prohibitively expensive. Keaney and Cohen suggest that an earlier activation of Stage II for personnel deployment might have eased this problem by freeing military aircraft which flew one third of the people for more missions into restricted areas.⁵

Once people and cargo arrived in theater, over 17,000 C-130 sorties moved them from the debarkation sites to the many airfields and staging areas. Due to the size of the theater and the number of bases, intratheater airlift was essential. Tactical transports flew regularly scheduled routes around the area, moving passengers, spare parts, fuel, mail, and food. C-130s were among the first aircraft deployed to the theater and were instrumental in positioning the supplies and equipment needed to set up the bases being established. Not only were the C-130 sorties listed on the air tasking order (ATO), they actually delivered the ATO every day to locations not equipped to receive it electronically. Tactical airlift was critical to the movement of the XVIII Airborne Corp 400 miles to the west to perform the CINC's "Hail Mary" flanking maneuver. In this campaign, C-130s landed every 7 minutes, 24 hours a day, for 14 days. Later, during the ground war, airlift followed the army's advance, including an airdrop of over 100 tons of food and water to the 101st Airborne Division deep in Iraq—the large number of prisoners captured had consumed the division's supplies. C-130s flew more sorties than any other individual aircraft type (16,020 as compared to the F-16's 13,253). And by mission type, intratheater airlift, with 22,064 sorties, ranked second only to interdiction, with 38,277 sorties.⁶

Despite its problems, including early chaos and a lack of precise accountability for a great deal of the supplies and equipment which surged into the theater, airlift forces proved vital to the coalition forces and victory. By the end of the war, strategic airlift had moved over 500,000 people and 540,000 tons of cargo to the theater, an unprecedented amount. Gen Hansford T. Johnson, CINCMAC, often compared it to moving all of Oklahoma City and everything in it halfway around the world! Once in the area, tactical airlift moved over half that amount within the theater.⁷ Airlift had been challenged with the most difficult scenario imaginable, and had succeeded.

Notes

¹ Stewart M Powell, "They Deliver," Air Force Magazine, August 1991, 52.

² Thomas A. Keaney and Eliot A. Cohen, Gulf War Air Power Survey Summary Report, Air University, Maxwell AFB, AL., 186.

³ Ibid., 4, 210.

⁴ Ibid., 187.

⁵ Ibid., 188.

⁶ Ibid., 4, 184-185, 189.

⁷ Ibid., 207-208.

Chapter 9

Doctrine

World War II saw the invention, development, and improvement of both strategic and troop carrier airlift, as well as airlift doctrine. While no formal doctrine existed, airlift was obviously relegated to a position of support for the rest of the air force, less important than the combat air forces. Civilian transports were relied on for mobilization in wartime, at the expense of building comparable organic capability in peacetime. The first formal air doctrine document, FM 100-20, *Command and Employment of Air Power*, 21 July 1943, mentions troop carrier airlift briefly, but provides no concept of employment. However, the differentiation between strategic and tactical airlift soon became obvious and distinct.

Strategic airlift transcended theater boundaries. It was responsible for rapid deployment and resupply between theaters. Doctrinally, it remained a national asset, executed under the central direction of a higher authority, and control of these forces would not be shifted to the theater commander. On the other hand, troop carrier airlift operated within a theater, supporting theater objectives. Its major missions were airdrop of men and equipment for airborne assault, airdrop/airland for resupply, logistic transportation, and aeromedical evacuation. The theater commander controlled the assets and selected the priority of missions.

Despite the recognition of airlift's importance in World War II, it still took a backseat to combat forces. The first official Air Force basic doctrine manual, in 1953, did not even mention airlift. A follow-on manual on air transport operations, designed to expand on the basic doctrine was drafted but never published. But a parallel manual on theater operations, AFM 1-9, *Theater Airlift Operations*, published the following year, finally codified the principles under which tactical airlift had operated for years. Key points included reinforcement of the concept of airlift's employment in support of theater objectives under the theater commander's control rather than any component force in the theater. It stressed the basic principles of centralized control and decentralized execution and outlined basic tasks with "No one task...considered to have an overall priority."¹

By the mid-sixties, airlift doctrine had begun to change. The speed and flexibility airlift offered senior decision-makers was recognized as a critical element of national military strategy. The distinctions between strategic and tactical airlift had blurred as MAC gained new strategic aircraft, like the C-141, capable of direct delivery of forces and supplies nonstop from the US to a combat zone. TAC's C-130s, originally designed for strategic airlift were the backbone of the tactical fleet. And military airlift forces had to be trained and equipped to accomplish unique missions that the civilian air carriers could not perform.²

AFM 1-1, *United States Air Force Basic Doctrine*, 1964, contained airlift mission statements for conventional and nuclear war.³ The individual commands were directed to develop separate documents providing details of their specific missions. MATS submitted a draft of AFM 2-21, *Airlift Doctrine*, which attempted to describe a total airlift system, recognizing that the differences between strategic and tactical airlift had become less

important. The Air Staff disagreed with the concept and directed separate manuals. MATS then produced AFM 2-21, *Strategic Airlift*, while TAC published AFM 2-4, *Tactical Airlift*.⁴ By the end of the Vietnam war, partly in recognition of the transposition of roles that could and did occur, airlift was finally consolidated under one command, but no new doctrine was written to formalize the long-sought after change.

AFM 1-1, *Basic Aerospace Doctrine of the United States Air Force*, 5 January 1984 identified airlift as one of nine Air Force missions. Nonetheless, it continued to separate airlift's twin perspectives, and further specified strategic airlift as *intertheater* under central control of a higher authority, and tactical airlift as *intratheater* in nature, under theater control. But still the distinction was blurred. In Grenada, tactical C-130s delivered troops and supplies directly from the US. The same occurred in Panama, and strategic C-141s airdropped men and equipment in an air assault. Consolidated airlift demonstrated its flexibility and efficiency.

The current AFM 1-1, 1992, lists airlift as one of the Air Force's "typical missions" under the role of "Force Enhancement." "Airlift projects power by transporting people and materiel rapidly without regard to surface obstacles."⁵ It further lists several statements concerning the employment of airlift:

1. Sufficient strategic and theater airlift must be available to respond quickly to worldwide threats and to sustain deployed aerospace and surface forces.
2. Airlift's key enhancement of the campaign is its ability to place properly concentrated combat forces where and when needed.
3. Because strategic and theater airlift capacities are finite, the air component commander must recommend priorities for their use.⁶

The concept of centralized control and decentralized execution, originally developed in World War II, continues to pervade airlift doctrine. In fact, this is one of the tenets of

airpower espoused in today's Air Force basic doctrine. Centralized control minimizes costs and eliminates duplication of effort. It allows optimal use of a limited national asset with unity of purpose and minimizes priority conflicts. Decentralized execution allows the warfighting CINC to control allocated theater assets, optimizes span of control, and makes optimum use of airlift's inherent speed, range, and flexibility.⁷ However, the concept of centralized control in airlift has been distorted in today's organizational structure.

Notes

¹ AFM 1-9, Theater Airlift Operations, (Department of the Air Force, Washington, DC, 1 July 1954), 1-2.

² LTC Charles E Miller., Airlift Doctrine, (Maxwell AFB, AL, Air University Press, 1988), 290.

³ Lt Col Thomas E. Eichhorst, Military Airlift: Turbulence, Evolution, and Promise for the Future, (Air University Press, Maxwell AFB, AL, May 1991), 23.

⁴ LTC Charles E Miller., Airlift Doctrine, (Maxwell AFB, AL, Air University Press, 1988), 299-303.

⁵ AFM 1-1, Basic Aerospace Doctrine of the United States Air Force, Vols. I and II, (Washington, GPO, March 1992), 6-7.

⁶ Ibid., 13-14.

⁷ Ibid., 8.

Chapter 10

Organization

Strategic and tactical airlift have been separate for most of the existence of airpower. When airlift organization began to become formalized just before World War II, it was separated by mission. Strategic airlift, initially in the form of the Air Corps Ferrying Command, and later as Air Transport Command, moved massive amounts of men and material around the world, and did it much faster than any other type of transportation could have. ATC became MATS after the war, and, in 1966, it became MAC, gaining equality with other Air Force commands.

Tactical airlift was originally called “troop carrier airlift” and in 1942 the Troop Carrier Command controlled these assets. After the war, TAC and the new overseas commands took over responsibility for tactical airlift forces. This separation continued until 1974, when the Air Force consolidated all airlift under MAC. Unity of command of all airlift forces remained for nearly two decades.

Throughout most of its existence, strategic airlift was typically CONUS-based and assigned to one, CONUS-based command. Tactical airlift was not only based in the CONUS, but also in the overseas theaters, and assigned to tactical commands. Even after consolidation was finally realized, these two major branches of airlift still remained separated by wing and location. MAC had strategic forces in Military Airlift Wings

(MAWs) and theater forces in Tactical Airlift Wings (TAWs). But, as the lines between strategic and tactical airlift continue to blur, it becomes obvious that most airlift tasks are a mixture of both. A single airlift commander, even in a theater or Joint Task Force (JTF), with dual responsibilities, dual interests, and day-to-day management of both has a more complete picture of the airlift situation. This “big picture” increases flexibility and responsiveness with a seamless system. Consolidation of airlift in 1974 finally provided that seamless system as all the potential efficiencies claimed by airlifters over the years came to fruition. But, in 1993, nearly 20 years of success were rewarded with a return to pre-1974 separation.

The unraveling of consolidated airlift began in May 1990, when the Air Force created the Air Force Special Operations Command (AFSOC). MAC lost its special ops forces to the new command which would be the air component of the joint US Special Operations Command (USSOCOM). In 1992, the Air Force restructured and MAC’s airlift fleet combined with the aerial refueling fleet to form the Air Mobility Command (AMC). AMC began to divest itself of all missions which did not fit its vision of global reach, or strategic mobility. Shortly thereafter, AMC transferred its air rescue forces and its tactical airlift fleet of C-130s away.

First, the overseas units were shifted to the overseas commands, and then stateside units transferred to the new Air Combat Command (ACC) which combined TAC with the strategic bomber force. ACC would be a peacetime command responsible for training and equipping US-based forces to be provided to unified CINCs in time of crisis. Since tactical airlift had always belonged to the theater commander, the rationale drove airlift apart again. The introduction of the C-17 into the inventory, designed, sold, and used (in

Bosnia) for direct delivery from the US into an overseas theater blurred the distinction between strategic and tactical airlift even more. By the end of 1993, airlift was organized just as it had been 45 years earlier and unity of command in airlift was a thing of the past.

AFM 1-1, 1992 makes the clear point the Air Force should be organized in peacetime for wartime effectiveness—the way it intends to fight in war. “Although peacetime efficiencies are in constant demand, they can be self-defeating if they hinder rapid and effective transition from peace to war.”¹ However, it also states that strategic and theater airlift “must be systematically coordinated with each other and with other transportation means to achieve the proper concentration of aerospace and surface forces at the proper time.”² These statements are at odds with one another. While there is no doubt that peacetime organization for wartime effectiveness certainly makes for a more combat-ready force, this concept is most appropriate for those forces who spend all their time in peace training for war—i.e. the “combat air forces” or CAF (predominantly fighters). Airlift does not fit this mold. Its peacetime mission is the same as its wartime one—moving people and things around the globe. It does this mission day in and day out, in peace and in war. In this era of downsized forces and budget battles, it does not make sense to force airlift into an artificial paradigm. History has proven that the “time-tested, consolidated, single-manager, seamless airlift system is the best choice for obtaining maximum performance, effectiveness, and efficiency from this nation’s airlift forces.”³

Arguments that a single airlift command would be reluctant to give up control of its tactical forces are groundless. Tactical airlift has always “CHOPped” to the theater or JFC when needed. In Berlin and Korea, MATS sent aircraft to support those theater operations. In the Gulf War, C-130s from MAC, USAFE, ANG, and AFRES shifted to

theater control. Today, AMC does CHOP tanker assets and would just as easily CHOP airlift forces to a theater commander/JFC, if required. The JFC should control all assets, including airlift, in his area of responsibility.

But since the breakup of airlift in 1993, new problems have surfaced. Guest speakers in Air War College classes have described disruptions in airlift in recent operations in Rwanda and Somalia. In Bosnia, USAFE wanted to handle the entire intratheater effort with its organic C-130s (one squadron). Strategic airlift would bring in troops and their equipment to the large aerial ports in theater and C-130s would then deliver it to the Balkans. USAFE soon realized they were overwhelmed and C-141s and C-17s began delivering directly to Bosnia. But intransit visibility is lost for supplies deposited in Europe for later shipment to Bosnia. The seamless system no longer exists

Command and control in contingencies and the associated wiring diagrams have become incredibly complicated as an Air Mobility Element (AME) working for AMC's Tanker Airlift Control Center (TACC) controls the strategic flow while a theater-assigned Airlift Coordination Cell (ALCC) under the Air Operations Center handles movement within the theater. This convoluted set up works best when the AME and ALCC are collocated, but this is not always the case. Complicating the situation is an AMC-nominated, theater-approved Director of Mobility Forces (DIRMOBFOR) who has only coordinating authority, often comes from AMC, but works for the Joint Force Air Component Commander (JFACC). Complicating matters even further is a lack of consistency in this organizational setup between theaters and even from operation to operation.

To paraphrase the airpower theorists of the pre-World War II era, airlift forces should be commanded by airlifters who maintain an airlift perspective and are not preoccupied with non-airlift matters. Allowing non-airlift commanders control over airlift assets is akin to allowing army division commanders control over their own close air support. Piecemealing airlift fails to take advantage of the inherent characteristics of flexibility and responsiveness airlift can provide. There is simply not enough to go around, nor will there ever be. In peacetime operations, AMC through the TACC can provide this unity. During contingencies or combat, the DIRMOBFOR maintains the broad outlook necessary to effectively employ airlift.

This separation continued until 1974, when the Air Force consolidated all airlift under MAC. Unity of command of all airlift forces remained for nearly two decades. The Air Force reorganization of 1992 was a step back for airlift in a return to the fragmented structure of the post-World War II era. Doctrinally, airlift has always been separate. Organizationally, we are again seeing the same problems that resulted in consolidation in 1974, as well as new difficulties as our seamless system falls apart.

Miller sums up this issue:

...airlift will always be a scarce resource. Within a theater this means that a fast, responsive system for requesting airlift, evaluating airlift requests, prioritizing airlift allocations, and executing airlift missions must be planned for, in existence, and well trained before a conflict. Slow, cumbersome procedures and organizational layering must be removed and/or streamlined.⁴

The solution is obvious. Airlift must again be consolidated under one command. As always, assets will CHOP to a JFC when the situation dictates, but the loss in operational efficiency as we “train in peacetime as we would fight in war” make little sense for airlift.

A recent authoritative guest speaker at the Air War College agreed that “there is a seam in Ramstein” as we support operations in Bosnia. He said, “There is a building body of evidence that we ought to revisit (consolidation)...There are issues in trying to separate strategic and tactical lift. It’s lift! And the C-17 will really show that.”

Airlift should not remain split because of artificial notions of “strategic” and “tactical.” Depending on the context, those terms can indicate different levels of war, the distinction between nuclear and conventional war, different categories of targets, different airframes, or, the case of airlift, the difference between intertheater and intratheater. Using strategic airlifters for operations within a theater, using tactical airlifters for movement between theaters, and the relatively new concept of direct delivery have blurred those terms to near trivial distinction.

In creating (or recreating) a seamless airlift system, all airlift assets must be consolidated under a single command, responsible for standardized training and equipping, and peacetime execution. When required, assets can CHOP to a theater commander/JFC. The Air Force recently fixed a similar problem with its combat controllers who were also all a part of MAC until the 1992 reorganization, when they were split among six commands. On 13 Nov 95, all combat controllers were consolidated under AFSOC.⁵

However, the journey back to reunification will be especially difficult because of the way the Air Force has structured many of its tactical airlift units. C-130 squadrons at Pope, Moody, Dyess, and Elmendorf Air Force Bases are all part of composite wings with non-airlift aircraft. Moving the C-130s back to AMC would mean splitting those wings, recreating a new wing staff structure, and/or moving aircraft to other bases. Similar

actions would be required at Ramstein and Yokota unless USAFE and PACAF, respectively, relinquish those bases to AMC.

Notes

¹ AFM 1-1, Basic Aerospace Doctrine of the United States Air Force, Vols. I and II, (Washington, GPO, March 1992), 17.

² Ibid., 14.

³ Lt Col Chris J. Krisinger, "Towards a Seamless Mobility System: The C-130 and Air Force Reorganization," *Airpower Journal*, Vol. IX, No. 3, Fall 1995, 44.

⁴LTC Charles E Miller., *Airlift Doctrine*, (Maxwell AFB, AL, Air University Press, 1988), 433.

⁵ Steven Watkins, "525 Combat Controllers Now Work for One Command," *Air Force Times*, 4 Dec 95, 4.

Chapter 11

Conclusion

This essay has examined the development of airlift from the Civil War, through World War II, to the present. I set the stage with a brief look at the state of military airlift in the early years, before the second world war, along with the expectations held by the military. I next described the important events which caused airlift to mature and evolve—the varied operations of World War II, Berlin, Korea, Vietnam, Israel, Grenada, Panama, and the Gulf War. A discussion of airlift’s doctrinal and organizational evolution followed, showing how that doctrinal evolution continued, forming the basis for modern airlift doctrine.

Before World War II, airlift doctrine was unwritten, and nearly nonexistent. What little existed was based mostly on experience. However, World War II saw huge changes and improvements in airlift and its doctrine. The experiences and lessons learned in World War II became the foundation of today’s airlift doctrine and it has been refined in many operations since. The value of airlift as an instrument of national and military power became widely recognized in World War II and today’s humanitarian operations like Somalia and Bosnia are continuing examples of airlift’s value. I also examined an issue which has been controversial since the beginnings of military airlift—consolidation of all airlift forces under a single command, and suggested that consolidation was the right thing

to do. However, despite its organizational difficulties, airlift will continue to do its mission and do it well. It strives to respond to the credo, “You call, we haul.” Whether as a tool for power projection, mobility, logistical support, or humanitarian relief, airlift remains a vital element of America’s defense.

Bibliography

- AFM 1-1, *Basic Aerospace Doctrine of the United States Air Force*, Washington, GPO, 5 January 1984.
- AFM 1-1, *Basic Aerospace Doctrine of the United States Air Force, Vols. I and II*, Washington, GPO, March 1992.
- AFM 1-9, *Theater Airlift Operations*, Department of the Air Force, Washington, DC, 1 July 1954.
- Anything, Anywhere, Anytime: An Illustrated History of the Military Airlift Command, 1941-1991*. Military Airlift Command Office of History, Scott AFB, IL, May 1991.
- Boston, Maj. Ronald G., "Doctrine by Default: The Historical Origins of Tactical Airlift," A USAF Air Command and Staff College Research Project, 1982.
- Burkard, Dick J., *Military Airlift Command: Historical Handbook, 1941-1984*, Scott AFB IL, US Air Force, Military Airlift Command, 1984.
- Carlton, General Paul K., "Global Airlift-One Phase of National Strategy," *Defense Transportation Journal*, April 1975, pp. 18-23.
- Carlton, General Paul K., "The Military Airlift Command," *Strategic Review*, Fall 1975, pp. 64-70.
- Canaan, James W., "Blue Christmas Coming Up," an article excerpted from *Air Force Magazine*, January 1984, in *Air Command and Staff College Airlift Elective*, 1985, pp. 85-88.
- Chambers, Everett A., "Airlift: Finding the Plane to Fit the Mission," excerpted from *Armed Forces Journal International*, November 1982, in *Air Command and Staff College Airlift Elective*, 1985, pp. 145-149.
- Downie, Don, "The First Real Airlift," *Airlift*, Vol. IX, No. 4, Winter 1987.
- Dupre, Flint O., *Hap Arnold: Architect of American Air Power*, New York: Macmillan Company, 1972.
- Eichhorst, Lt Col Thomas E., *Military Airlift: Turbulence, Evolution, and Promise for the Future*, Air University Press, Maxwell AFB, AL, May 1991.
- FM 100-20, *Command and Employment of Air Power*, War Department, Washington, DC, 21 July 1943.
- Frisbee, John L., ed., *Makers of the United States Air Force*, Office of Air Force History, Washington, DC, 1987.
- Fuller, John F., "Market Garden: The Operation That Failed," *Airlift Operations Review*, Vol. 2, No. 4, October 1980.
- Futrell, Robert F., *Ideas, Concepts, Doctrine: Basic Thinking in the United States Air Force, Vols. I and II*, Maxwell AFB AL, Air University Press, 1989.
- Gearing, Capt. Rick, "A Yacht Club, The Blue Barons, and World War II," *Airlift*, Vol. X, No. 3, Fall 1988.

- Gropman, Colonel Alan L., "The Compelling Requirement for Combat Airlift," excerpted from *Air University Review*, July-August 1982, in Air Command and Staff College Airlift Elective, 1985, pp. 93-102.
- Heitmeier, Maj. William E., "You Call, We Haul—The Airlift Tradition," A USAF Air Command and Staff College Research Project, 1980.
- Hennessy, Juliette A., *The United States Army Air Arm, April 1861 to April 1917*. USAF Office of History, Washington DC, 1985. (reprint of a 1958 edition originally published by the USAF Historical Division).
- Hess, Colonel Dean A., Jr., "Why We Can't Say No," excerpted from *Airlift Operations Review*, January 1981, in Air Command and Staff College Airlift Elective, 1985, pp. 105-107.
- Hinds, Roland D., *The Development of Strategic Airlift for the Armed Forces of the United States, 1941-1965*, Scott AFB IL, US Air Force, Military Airlift Command, 1968.
- Keaney, Thomas A. and Eliot A. Cohen, *Gulf War Air Power Survey Summary Report*, Air University, Maxwell AFB, AL.
- Knef, SrA Andrew, A HQ MAC Public Affairs News Release in Air Command and Staff College Airlift Elective, 1985, pp. 89-92.
- Krisinger, Lt Col Chris J., "Towards a Seamless Mobility System: The C-130 and Air Force Reorganization," *Airpower Journal*, Vol. IX, No. 3, Fall 1995, pp. 30-45.
- Launius, Dr. Roger D., "Flying the 'Hump'," *Airman*, XXIX, No. 12, Dec 1985.
- Launius, Dr. Roger D., "MAC Airlift: A Brief History," *Decisions*, Oct. 1983.
- Launius, Dr. Roger D., *The Military Airlift Command: A Short History, 1941-1988*, Scott AFB IL, US Air Force, Military Airlift Command, 1989.
- Launius, Dr. Roger D., "The Hump Airlift Operation of WWII," *Airlift*, Vol. VII, No 3, Fall 1985.
- Magstadt, Thomas, "The Berlin Crisis of 1948: A Case Study," Air War College, Maxwell AFB, AL, 1992.
- Maurer, Maurer, *Aviation in the U. S. Army, 1919-1939*. USAF Office of History, Washington, DC, 1987.
- Miller, LTC Charles E., *Airlift Doctrine*, Maxwell AFB, AL, Air University Press, 1988.
- Moore, Murdock M., "Mesopotamia: Being the Cradle of Civilization and Airlift." *Airlift/Tanker Quarterly*, Summer 1995.
- Pilling, Maj. Rick, "Airlift's Corporate Structure," *Airlift*, Vol. X, No. 1, Spring 1988.
- Powell, Stewart M., "They Deliver," *Air Force Magazine*, August 1991, pp. 50-55.
- Saw, David, "Trends in Military Air Transport," *Military Technology*, Nov 1987.
- Sendak, Maj. Theodore T., "The Airborne Antiarmor Defense," *Military Review*, Sep 79.
- Snyder, Maj. D. E., "A History of Tactical Airlift," Unpublished outline, US Army Command & General Staff College, 1987.
- Thum, Marcella and Gladys Thum, *Airlift!: The Story of the Military Airlift Command*, New York, Dodd, Mead & Company, 1986.
- Tunmer, William H., *Over the Hump*, New York: Duell, Sloan, and Pearce, 1964.
- US Air Force Academy, *Military Training, Volume II*, USAF Academy, 1972.
- Watkins, Steven, "525 Combat Controllers Now Work for One Command," *Air Force Times*, 4 Dec 95, p. 4.

Weber, John, "The Roots of Strategic Airlift," *Airlift*, Vol. IX, No. 2, Summer 1987.

Wells, Lt Col Kristin L., "Luck of the Irish," *Airlifter Magazine*, October 1989, pp. 47-50.

Wittel, Maj. Edward F., "Interview: Mr. Airlift, LTG William H. Tunner," *Airlift Operations Review*, Vol. 3, No. 2, April 1981.

Wolf, Richard I., *The United States Air Force Basic Document on Roles and Missions*, Office of Air Force History, 1987.