STRATEGY RESEARCH PROJECT

STRATEGIC AIRLIFT: STRENGTHS AND WEAKNESSES

BY

LIEUTENANT COLONEL JAMES P. STURCH
United States Air Force

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LIEUTENANT COLONEL JAMES P. STURCH, USAF

COLONEL MICHAEL J. MESTEMAKER
Project Advisor

U.S. Army War College
CARLISLE BARRACKS, PENNSYLVANIA 17013

ABSTRACT

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Since 1981, there have been scores of studies written on how much airlift capability this nation needs to execute its national and military security strategies. What none of these studies focused on are the fundamental benefits that strategic airlift has over the other two components of strategic mobility—sealift and prepositioning. This paper will highlight these fundamental benefits by breaking strategic airlift into the basic components of airlift doctrine, organic military airlift, the Civil reserve Airlift Fleet (CRAF), and the en route system, then evaluate the strengths and weaknesses of each component. From this assessment, recommendations will be made to improve strategic airlift in the future.

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"Air mobility assets provide the National Command Authorities an array of options to achieve national security objectives. Air mobility's unique characteristics of range, flexibility, and speed enable the US to posture forces decisively to stem aggression, demonstrate resolve, or send a strong message to deter potential opponents."[1]

— General Rutherford, USAF
Commander in Chief, US Transportation Command

There is little debate over the importance of strategic airlift in achieving national objectives and executing the national and military security strategies of the United States.[2] Since 1981, however, there have been scores of studies written on how much airlift capability this nation needs to execute these security strategies. The focus of these studies is on striking a fiscal and capability balance between the amount of strategic airlift, sealift, and prepositioning equipment we need to meet our two Major Theater War (2 MTW) strategy. They concentrate on million-ton-miles and short-tons of capability and the numbers and types of transport aircraft and surface vessels, along with the amount of prepositioned equipment we need to move our forces. What none of these studies focused on are the fundamental benefits that strategic airlift has over the other two components of strategic lift. This paper will highlight these fundamental benefits by breaking strategic airlift into its basic components of airlift doctrine, organic military airlift, the Civil Reserve Airlift Fleet (CRAF), and the en route system and then evaluate the strengths and weaknesses of each component. From this assessment, recommendations will be made on how to improve it in the future. All too often, people discuss the importance of strategic airlift without considering what makes it so important. To truly understand airlift, the first area one should consider is airlift doctrine.

AIRLIFT DOCTRINE

One of the fundamental components of strategic airlift is doctrine. Doctrine determines how airlift should be utilized and developed. The core tenets of airlift doctrine allow our nation to execute its national and military strategies of global engagement and rapid power projection.[3] These core tenets are speed, responsiveness, range, and flexibility.[4,5] Collectively, it is these doctrinal tenets that give airlift an advantage over other forms of strategic lift.

Over 2,000 years ago, Sun Tzu said, *"he who occupies the field of battle first and awaits his enemy is at ease; he who comes later...is weary."*[6] This need for speed in the business of national defense has not changed over time. We still live in a fast-paced world where one of the most precious commodities is time. For defense, time is distance--time is strategy--time is the ability to respond to an immediate crisis.[7] Because it is easier to stop an assault early than dislodge an enemy from a territory it has already taken, the speed inherent in airlift provides commanders' the tool necessary to deliver forces more quickly and creates a higher probability of a decisive win. This point could not be clearer than during the 1973 Arab-Israeli Yom Kippur War. When Egypt and Syria attacked Israel with little warning, it appeared the Arabs would be victorious in defeating the Israeli Jewish state. However, Israel quickly called for US help and within 48 hours, the first airlift aircraft were touching down in Tel Aviv with essential combat supplies. In less than 30 days, US aircraft delivered over 21,000 tons of supplies, and even though the first ship to arrive delivered more tonnage than the entire airlift operation to date, the first ship arrived four days after the cease-fire began. It was the speed of airlift that allowed Israel to survive.[8]

As military strategies have changed, the importance of speed increased. Since 1989, the US Air Force has closed 66 percent of its overseas bases and the US Army is in the process of closing 664 of its overseas bases, while deployments have increased 300 percent. Because of these changes, current strategy emphasizes delivering heavy forces to prepositioned equipment sooner so those troops will be better prepared to withstand an attack.[9] The Army's goal for 2001 is to project a light brigade in four days, a light division in 12 days, two heavy divisions in 30 days, and follow-on forces in 75 days.[10] The only way to meet the early timelines associated with these plans is to utilize the speed of strategic airlift to deliver the forces and their equipment or deliver the forces to their prepositioned equipment.

Speed is definitely a force enabler that has kept pace with time. As military planners hone the 2 MTW strategy, speed will be key to rapidly deploying and blunting the initial assault of an aggressor. Throughout time, the speed inherent in airlift doctrine has proven its strength, but there is another strength to doctrine that is just as important--responsiveness.

The concept of responsiveness is easiest to explain by simply looking at the motto of strategic airlift: "You call, we haul—anything, anytime, anyplace." The ability to carry out this motto is not derived by keeping airlift aircraft on alert status or developing contingency plans to rapidly train-up a unit for a particular mission. Rather, the concept of responsiveness is derived from the fact that the peacetime mission for strategic airlift is exactly the same as its wartime mission. The only difference between the two is the pace and tempo at which it is executed. Whether delivering troops to Saudi Arabia, conducting a forced entry into Grenada, medically evacuating patients from Viet Nam, delivering humanitarian supplies to Somalia, delivering a killer whale to Iceland, or anything in-between, the mission for strategic airlift is the same and does not require special

training or a lengthy force build-up. One of the best examples of responsiveness in airlift history took place in 1948. The Soviets had blockaded all ground access to Berlin in an attempt to starve the city and sue for peace. Airlift, although untested in the scenario, responded by building an air bridge and delivered over 2.3 million tons of supplies over a 15-month period. The fact that airlift's peacetime mission is the same as its wartime mission allowed a rapid and enduring response to this crisis and is credited with saving over 2.5 million Germans in western Berlin.[11] Strategic airlift's motto is driven from its doctrinal foundation of responsiveness, but also inherent in this motto is the doctrinal strength of range.

Range to a war fighter implies no geographic boundaries and no distance limitations. With most weapon systems, range is a critical limitation, but for airlift, range is an advantage. With existing worldwide infrastructure along with the ability to operate from locations with little to no ground support, airlift aircraft can travel to anyplace in the world. If aerial refueling is added, these global locations can be reached non-stop. Another positive aspect of range for airlift aircraft is that unlike ships and ground transportation, airplanes can fly "as the crow flies." The CENTCOM AOR, for example, is some 7,500 air miles from major ports of embarkation in the US. This same AOR is about 8,000 miles away by ship via the Suez Canal and 12,000 miles away around the Cape of Good Hope.[12] The ability to go further without stopping and by more direct routing means less time necessary to reach destinations. It's range that gives airlift a one-dimensional advantage, but the last doctrinal strength of flexibility gives airlift a multi-dimensional advantage.

Employing strategic sealift gives war planners one option--to move massive amounts of cargo from one port to another. Diverting sealift to alternate ports or destinations could be

difficult and often times logistically impossible. Airlift, on the other hand, provides military planners significant flexibility. With the speed and range that airlift moves, along with the thousands of airfields around the world, strategic airlift can be routed, and if necessary, quickly diverted to nearly any place on the globe. Add the fact that military aircraft are dual-rolled with both an airland and airdrop capability, planners have the flexibility to build up at main forward bases or proceed directly to forward operating areas. It is the tremendous flexibility of airlift that provides the capability to deliver combat forces as close to their area of operations as possible, as early in the conflict as possible, and complicates the planning for potential adversaries.[13]

Airlift doctrine encompasses the strengths of speed, responsiveness, range and flexibility, but there are two inherent weaknesses to these doctrinal tenets. Airlift is expensive when compared to other means of strategic lift and it has a limited cargo capacity.

Although it is difficult to specifically determine how much it costs to use airlift verses sealift, a speaker at the USAWC from USTRANSCOM stated it costs about $1.50 per pound to use airlift, while sealift only costs about $.20 per pound to use.[14] Not only is airlift expensive to operate, but the acquisition cost is just as alarming. According to a congressional study, one C-17 costs about $256 million while one LMSR (Large, medium-speed, roll-on/roll-off) ship costs about $303 million.[15] It's obvious that speed, response, range and flexibility are significant advantages, but to acquire these traits, it costs more money.

Beyond expense, airlift is also limited by its capacity to move large amounts of cargo. Comparatively, a C-17 has about 1,500 ft^2 of cargo capacity while an LMSR ship has over 250,000 ft^2 of capacity. In terms of sorties, it would take between 38

and 52 C-17 sorties to equal the lift capacity of one LMSR ship.[16] Another advantage of shipping is that there is no limitation on outsized cargo, whereas airlift is restricted by the type of aircraft used. Because of these limits, it is obvious why 90 percent of all cargo destined for a region during a contingency will move by sealift and only 10 percent will move by airlift.[17]

Doctrine is at the core of strategic airlift. The tenets of speed, responsiveness, range and flexibility give doctrine its strength, while expense and capacity give it weakness. But there are other components of strategic airlift that provide strength and weakness.

ORGANIC AIRLIFT

Another component of strategic airlift is the airplanes themselves, specifically organic aircraft. In order to discuss the strengths and weaknesses of organic airlift, one must first define organic airlift. This term simply refers to the C-5, C-17, C-141, and KC-10 airlift aircraft in the military force structure. With this reference, their strengths evolve from design characteristics, their muti-role feature, the concept of air refueling, and their diverse cargo capacity.

Military transport aircraft have distinctive design characteristics that give it significant advantages over civilian aircraft. First, and most notable are their visible characteristics. Military aircraft have high-wings to allow their cargo floors to be close to the ground to ease in loading operations. They have built-in loading ramps which minimize the amount material handling equipment (MHE) required for loading/unloading, plus these built-in loading ramps can be lowered in flight for airdrop operations. Their cargo floors are

reinforced and can withstand axle loads and tread loads as heavy as 100,000 pounds.[18]

Not quite so obvious to the eye is that military aircraft are combat-wired and possess redundant on-board systems to minimize the effects of battle damage. They are built with high-stress wings designed to operate in low-altitude environments which minimizes their exposure to threats, plus they possess on-board defensive avionics to deter threats. Once on the ground, military airlift aircraft are designed for tight maneuverability which increases the MOG (maximum on ground) and throughput capability.[19] Lastly, these aircraft can use airfields with no pre-existing infrastructure and with runways shorter than those used by long-range civil aircraft.

Aside from design characteristics, organic aircraft gain an advantage with their multi-role capability. Unlike civil aircraft that are primarily designed to carry either all passengers or all cargo, organic aircraft possess multi-role capability. An aircraft may be used one day to haul humanitarian relief supplies and used the next day to perform a strategic brigade airdrop. Other muti-role capabilities include the ability to simultaneously haul passengers and large cargo on the same aircraft and the ability to quickly convert to an aeromedical evacuation role. KC-10 aircraft, for example, can transfer 200,000 pounds of fuel at a range of 2,700 NM while carrying 27 standard military pallets. In one case, the muti-role feature of this aircraft saved the equivalent of 8 KC-135 and 2 C-141 aircraft when moving 6 F-15 fighters from the US to Japan.[20]

Another strength of organic aircraft is their ability to refuel inflight. Air refueling increases an aircraft's productivity and reduces its dependence on staging airfields and overflight rights. During the Gulf War, to complete one round trip from the US to Saudi Arabia, military transports had to make

from three to five en route stops for fuel, fresh crews, or maintenance. Each stop introduced the opportunity for further delays. With air refueling, airlift aircraft could provide 30 percent more airlift capability than without aerial refueling.[21]

The final strength of organic airlift is the sheer ability to move massive amounts of cargo by air. Combined, the organic lift of the active and reserve components provides 61 percent of DoD's entire cargo airlift capability.[22] Incredibly, the C-5 can carry 112.7 short-tons 2,000 miles unrefueled while the C-141 and KC-10 can carry 34.4 and 33 short-tons respectively over the same distance.[23] Organic lift is not limited to just bulk cargo, like commercial air carriers. Instead, it possesses the unique ability to also carry outsized and oversized cargo. This is important because in the halting phase of a 2 MTW scenario, 70 percent of the cargo airlifted will be outsized or oversized.[24] Additionally, during the early part of the Gulf War, more than 25 percent of the cargo delivered by air was outsized and another 60 percent of the cargo was oversized.[25] The capability to move these categories of cargo only resides in the organic airlift fleet.

Organic airlift possesses several advantages over other forms of airlift and strategic lift forces, but while it enjoys strengths, there are some drawbacks. Specifically, the organic fleet is aging, normally requires tanker support, and is very oriented to the reserve component.

Excluding the C-17, the Air Force has not had a new airlift aircraft in over 28 years.[26] Because of this, much of the current fleet is approaching the end of its usable service life. Within the next 10 years, AMC will decrease its total airlift inventory from 392 to 246 aircraft by acquiring 120 C-17s and retiring 266 C-141s. The loss of 146 aircraft represents a significant loss in airlift flexibility.[27] Not only is the Air Force losing inventory, but also many of the aircraft they currently have are

not operating at full capacity. C-5 mission capability rate is 62 percent overall even though it still has 80 percent of its usable service life remaining and planners base the C-5 ability to support a 2 MTW scenario at 75 percent mission capability.[28] During DESERT SHIELD/STORM, C-5s and C-141s were restricted to flying only about 75 percent of their maximum load capacity because of aircraft fatigue. The stress imposed by the Gulf War aged our airlift fleet about 1½ times faster than their normal operational tempo.[29] Aging is a definite weakness with organic airlift, but another weakness lies in the tanker support they need.

Similar to organic airlift aircraft, the average age of the tanker fleet is 36 years. This does not, however, paint the whole picture. Much of the tanker's service life was spent sitting alert rather than accumulating hours, but what is unknown are the effects of corrosion on the aircraft. Studies are underway, but if the Air Force is forced to retire the KC-135, it would lose more than 90 percent of its entire tanker fleet, unless it acquires a replacement.[30] Without tankers, organic aircraft lose the advantage gained by inflight refueling which decreases en route time and infrastructure.

The last weakness of organic airlift lies in the fact that 57 percent of all organic airlift assets reside in the Air Reserve Components (ARC), thus strategic airlift is very dependent on the call-up of ARC forces during even small contingencies. Had the ARC not been available during the Gulf War, the airlift system would have fallen apart because over 80 percent of the organic airlift assets came from the ARC, plus there were not enough active duty crews to fly to required active duty optempo.[31] People tend to think of strategic airlift capability in terms of full-scale contingency mobilizations, but the reality is the US gets involved in scores of small scale,

non-mobilized contingencies and operations that quickly surpass the active duty's strategic airlift capability.

Organic airlift provides incredible strategic capability derived from its strengths of design characteristics, multi-role features, inflight refueling and cargo capacity. These strengths must not be negated by the age of the current organic fleet, the support required from an aging tanker force and the dependence of the ARC to provide organic capability. Strategic airlift is more than doctrine and organic airlift. It derives great strength from the contributions of the Civil Reserve Air Fleet.

CIVIL RESERVE AIR FLEET

Established in 1952, the CRAF program provides a system for augmenting military airlift with commercial airlift during emergencies. Although the organic fleet is a strength of strategic airlift by itself, the CRAF adds additional capability, can be called up in incremental stages, is an inexpensive reserve airlift force and is based on incentives and contractual agreements. Together, these features of CRAF strengthen strategic airlift.

The most important aspect of the CRAF program is the amount of airlift it provides. War planners claim that when fully mobilized, CRAF will airlift 93 percent of the passengers and 32 percent of the cargo to a contingency.[32] In terms of MTM/D, CRAF could provide 27.8 MTM/D capability (dependent on program participation) compared to only 14 MTM/D from the active duty forces and 17 MTM/D from the ARC.[33] CRAF's contribution was clearly evident during the Gulf War when activated for the first time in history, it moved 62 percent of the passengers and 27 percent of the cargo during deployment and 84 percent of the passengers and 41 percent of the cargo during redeployment.[34]

Providing 39 percent of AMC's total airlift capability, CRAF's contribution is a definite strength of strategic airlift.[35]

Another strength of the CRAF program is that it can be called-up in incremental stages, rather than all at once. The CRAF program is composed of three stages and six segments. The stages identify the numbers of aircraft that will be called-up, while the segment determines the type of aircraft that will be called-up within each stage. The segments include long-range international (Pax), long-rang international (Cargo), short-range international, domestic, Alaskan and aeromedical.[36] Stage I (Committed Airlift Expansion), is used to support substantially expanded peacetime military airlift requirements or to support a minor regional crisis.[37] During this stage AMC receives 9 percent of the US commercial passenger capability and 21 percent of its cargo capacity within 24 hours after activation.[38] Stage II (Defense Airlift Emergency) is activated to support an airlift emergency or a major regional conflict and provides about 187 aircraft, compared to 38 aircraft in Stage I.[39] Finally, Stage III (National Emergency) is used to support a declared national defense-oriented emergency or war, or when otherwise necessary for national defense.[40] This stage brings about 500 aircraft from all segments to the CRAF program.[41] The ability to incrementally call-up different amounts and types of reserve civil aircraft provides great strength to strategic airlift and gives planners tremendous flexibility in dealing with a full range of contingencies or crisisses.

Besides simply having hundreds of civil reserve aircraft available for use when a need arises, another strength of this program is that these reserves are relatively inexpensive when compared to organic aircraft. Trying to possess this additional capability in the organic fleet would be extremely expensive and compete for already tight defense dollars. One study asserts that it would cost about $3 billion annually to maintain this

amount of additional airlift in the military fleet.[42] The annual cost in dollars per ton-mile per day for the CRAF is less than $12 while the same capability in the organic fleet is $152, thus for a very small cost (peacetime incentives), the DoD has on-call a very substantial airlift capacity.[43]

Another strength of the CRAF comes from the fact the program is paid for through the use of peacetime contracts and incentive agreements. In this fashion, the DoD not only utilizes CRAF's benefits during contingencies or crisisses, but also during peacetime operations. Between 1989 and 1996, AMC contracted an average of $536 million per year worth of international airlift business on civil carriers. In order to compete for this business, civil carriers have to commit a minimum of 30 percent of their passenger fleet and 15 percent of their cargo fleet to the CRAF program.[44] In 1995, the General Services Administration sweetened the incentive program by implementing a program called "City Pairs" that requires federal government air travelers to fly aboard CRAF carriers when on official business. This program expanded the CRAF's peacetime passenger business from about $345 million a year to more than $1.5 billion.[45] A second order beneficial effect of this part of the program is that by flying peacetime military contracts, CRAF participants are already integrated and familiar with the existing military infrastructure should the CRAF program be formally activated. There are several advantages of the contract and incentive concept and they become clear when comparing the expense and benefits of AMC's peacetime airlift business with the cost of maintaining the CRAF's capability in the organic fleet. The expenses are further justified because the DoD not only has significant civil airlift capability in reserve, but it gets to reap the benefits even during peacetime.

There is no doubt about the strength of the CRAF program. It is critical to meeting our national airlift requirements. So

what are the drawbacks to this facet of strategic airlift? Civil aircraft are not designed to the same specifications as organic aircraft and there are contractual issues that must be resolved.

There have been scores of studies that have looked at replacing aging military aircraft with newer, cheaper commercial models. So why doesn't the military possess a fleet of DC-10s, B-747s, A300s, etc.? The design characteristics of these commercial aircraft are not the most suited for military operations. Commercial operations are driven by cost; therefore, the goal of civil carriers is to reduce weight and maximize fuel efficiency as much as possible. To do this, commercial aircraft are designed with slender, tapered fuselages, with low wings and high floors to accommodate passengers on top and baggage below. Weight is reduced by minimizing the size of doors (cargo & passenger), constructing floors of plywood and other light weight materials, and eliminating the need for built in stairs by necessitating their availability at en route terminals. The combination of these characteristics adds tremendous stress to military operations. Civil carriers require special Material Handling Equipment (MHE) and since they do not possess drive-on, drive-off loading capability, all cargo must be lifted well off the ground, some as much as 14 feet and stair vehicles must be available for passengers. They cannot carry outsized and oversized cargo, cannot air refuel and are not self supportable on the ground. All these characteristics limit civil aircraft's ability to operate in remote airfields where bare-base military operations might be in effect. Additionally, they have poor ground maneuverability and need to operate from runways in excess of 6,000 feet long by 150 feet wide. Even though civil carriers possess a great amount of airlift capability, the nature of their design can quickly impact strategic airlift operations.[46]

Another concern with the CRAF program is contractual issues, specifically foreign leases and insurance policies. CRAF

participation requires that the aircraft committed to the program be owned by a US company. Unfortunately over 30 percent of the US commercial air fleet is leased from foreign countries and this could increase to 60-70 percent in the next ten years.[47] Leasing gives airline companies flexibility to change aircraft types and save costs associated with purchasing airplanes, but impacts the availability of aircraft for the CRAF program. Another contractual concern is that some airlines have pulled out of the CRAF program because they fear too much future US reliance on the CRAF. CRAF in the Gulf War was a general success primarily because it was the first time it had ever been activated. If planes are called away more frequently in the future, civil carriers are worried they might lose a market share to foreign rivals and never gain it back.

A weakness not highlighted until the Gulf War was that some air carriers operated several flights without proper insurance coverage and the ones that were covered had inadequate coverage.[48] Normal commercial insurance policies generally exclude insurance coverage for air carriers operating in war zones or during CRAF activation periods. Therefore, if commercial carriers participate in combat operations or get activated under the CRAF program, they must rely on supplemental government insurance. This supplement is provided under the Aviation War Risk Insurance Program (AWRIP) managed by the FAA, but it only covers losses due to war, capture, seizure, nuclear detonation, hijacking, strikes and vandalism.[49] The problems occurred because AWRIP does not cover liabilities incurred while commercial aircraft are returning from the AOR, and many of the carriers used their aircraft for business purposes on the return flight and either flew without insurance or bought expensive short-term policies.[50] Additionally, AWRIP only maintains about $60 million to cover all claims, which is less than half of what it would cost to replace one commercial aircraft. Finally, there are gray areas in AWRIP

regarding life insurance policies on the commercial pilots. Many airlines had to pay extra premiums to ensure proper coverage while others simply accepted the risk of the low-threat environment.[51]

Together the issues of foreign leases and insurance were minimal during the Gulf War, simply because it was the first time the CRAF had ever been activated. If the airline's assumption is correct and the DoD will depend more on the CRAF in the future, these issues could prevent companies from participating or volunteering in the CRAF program and have a dramatic effect on the capability of strategic airlift.

Aircraft design characteristics and contractual issues of CRAF are important issues to overcome to further enhance an already strong program. There is one final component of strategic airlift, though, that pulls all the other components together. It is the en route system made up of aerial ports and command and control.

EN ROUTE SYSTEM

The en route system is comprised of numerous elements that provides today's air breathing machines the same benefits that the complex system of way stations provided the Pony Express over 100 years ago. Even though airlift airplanes go farther and are more dependable, they still require vast amounts of support along the way. The airlift system can be dissected into various components, but two that provide the greatest strength are aerial ports and command and control.

One strength of the en route system is the 13 fixed aerial ports scattered around the world. These ports are located at forward main operating bases and process the volumes of cargo and passengers that transit back and forth between the US and an AOR. In addition to their cargo/passenger handling duties, these ports

provide fuel and maintenance for the airplanes, and lodging, messing, and technical support to the crews.[52] These pre-existing fixed sites are extremely important. During Desert Storm, 84 percent of all aircraft mission to and from the Gulf flowed through Torrejon and Rhein Main Air Bases.[53] Without these bases, the 30-day requirement to close the Mobility Requirements Study East scenario would extend from the current ability of 39 days to 71 days.[54] In addition to these 13 sites, AMC maintains 17 smaller military or contract detachments that can be expanded, if necessary to support larger airlift operations.[55] If a crisis requires operating in an area where no existing en route infrastructure exists, AMC can rapidly deploy one of its two Airlift Mobility Operations Groups (AMOGs), two Airlift Control Squadrons (ALCSs), two Theater Airlift Control Elements (TALCEs) or a multiple of Mobility Support Teams (MSTs).[56]

One feature of the aerial ports is the new 60,000-pound (60K) "Tunner" loader. This loader has 33 percent more lift capacity than current loaders, and can be used on all airlift aircraft, including CRAF. It has the ability to download cargo from a B-747 aircraft and upload an awaiting C-130 aircraft without having to return to the freight yard for cargo redistribution. Additionally, unlike other USAF loaders, the new 60K loader can be transported on all military strategic airlift aircraft without disassembling or the need for additional shoring. This means the loader can be delivered to an airfield, drive off the airplane and go immediately into operation.[57]

The ability for AMC to execute a "Global Reach Laydown" using fixed and mobile aerial ports, along with the advantages of the new 60K loader provides great strength the to en route system. Another key aspect is the command and control network.

Centralized control and decentralized execution is a tenet of airpower and the heart of strategic airlift operations. The hub for all airlift command and control is the Tanker Airlift

Control Center (TACC) located at Scott AFB IL. The TACC provides a centralized focal point regarding any aspect of an airlift mission, no matter what the issue. The formation of the TACC eliminated redundant command and control formerly conducted by two airlift divisions and two numbered air forces.[58] With TACC as the nerve center, as airlift forces move forward, management responsibility is usually transferred to a DIRMOBFOR (Director of Mobility Forces) who establishes an Air Mobility Element in the theater's Air Operations Center and assists the theater staff with airlift planning and issues. If there is no theater staff designated for a particular mission, the AME may be deployed as a single element to track, coordinate, and direct air mobility assets from a forward based location or the responsibilities can be executed by a highly mobile TALCE, MST, or Combat Control Team (CCT).[59] Command and control is a critical component of strategic airlift and the strength comes from AMC's ability to manage airlift assets around the world with both fixed and mobile control elements, regardless of where the operation is taking place or what kind of existing infrastructure is present. Another strength associated with command and control is the concept of "in-transit visibility."

There is little value to strategic airlift if the only information known is where the airplane is located. More important is knowing what cargo and passengers are on board the aircraft before it arrives. The process of tracking aircraft loads is called In-Transit Visibility (ITV). The changing nature of a contingency often causes a commander to modify his plans while his forces are in transit. ITV not only gives the commander the ability to specifically locate his forces in-transit, but the ability to quickly and efficiently divert them, if necessary. During the initial deployments to Bosnia, on-scene commanders often were unaware what cargo was inbound to their station until the aircraft opened its doors after landing. This

caused significant problems in having the correct MHE and storage space available for the cargo and delayed ground operations, or in some cases, left aircraft stranded at main operating bases. With ITV tied to the Global Transportation Network (GTN), commanders anywhere in the world can now locate and track any single piece of cargo from departure to destination and overcome the problems encountered in Bosnia.[60]

The aerial ports and command and control aspects of strategic airlift provide strength to ensure the en route system operates efficiently. However, there are some problems that must be overcome. Fixed aerial ports require basing rights and some of the equipment associated with these sites is in need of upgrade or replacement.

Since 1994, AMC has reduced it overseas locations from 39 to 13.[61] Soon that number will go to twelve.[62] As the current overseas drawdown continues, the concern with theater off-load points will increase and the US will rely even more on bilateral agreements with foreign nations for access to key locations. Current plans call for using 34 off-load locations in a Gulf War scenario, but due to physical and political restrictions, AMC was limited to about 10 during the Gulf War.[63] In fact, 61 to 84 percent of all US airlift traffic transited three European bases of which one is now available only on a case-by-case basis.[64] Basing rights is a critical issue and because of the distances involved in deployments to either the Persian Gulf or Korea, the Air Force must have access to foreign bases to stage tankers, refuel aircraft and change-out aircrews. Without them, strategic airlift becomes a liability.

Air Mobility Command is also facing major equipment problems in the en route system. For nearly 50 years, the infrastructure at AMC's en route bases has been neglected and the problems are compounding because of the increased use due to fewer available locations.[65] A survey team recently identified over $1 billion in

needed improvements, primarily in fuels infrastructure, at key European and Pacific regions. Although AMC declared FY97 the "Year of the En Route System" to identify needed improvements and diverted $50 million per year to infrastructure upgrades, these are mere Band-Aids to fixing the problems that could develop into vital chokepoints to the en route system.[66]

Another weakness of the airlift system is the availability of MHE. According to the 1998 Air Mobility Master Plan, MHE represents the weakest link in the air mobility process. Although the new "Tunner" loader will solve the large cargo handler shortfall, the aging fleet of 40K and 25K loaders are becoming more unreliable.[67] A 1996 report states that AMC's fleet of loaders could only meet 77 percent of the total loading requirements and possessed only 61 percent of the required wide-body loaders necessary to load B-747 and DC-10 aircraft.[68] During the Gulf War, the lack or late arrival of MHE at some locations caused flight delays and in other cases, valuable airlift aircraft were tied up transporting MHE to locations throughout the system. Although AMC has begun to deal with its loader problems in acquiring the 60K "Tunner" loader, there is still a disturbing shortage of MHE within the en route system.

Doctrine, organic airlift, the CRAF and the en route system encompass a strategic airlift system with incredible capacity and capability. But while there are strengths and weaknesses to these components, there are some things that can be done in the future to enhance strategic airlift.

RECOMMENDATIONS

According to Airlift Magazine, "Air mobility forces are among the oldest and most neglected of the Air Force assets. The final QDR report concluded that without a healthy and up-to-date

air mobility force, hopes of achieving the 2 MTW scenario would be little more than wishful thinking."[69] From this study it is clear that strategic airlift is critical to meeting the current two MTW scenario. To ensure it can meet our future requirements, actions must be taken to benefit from the inherent strengths of airlift and overcome the weaknesses.

Airlift doctrine is solid with the tenets of speed, responsiveness, range, and flexibility. Improvements can be made, however, by addressing the weaknesses of these doctrinal tenets in the areas of expense and capacity. A speaker at the USAWC briefly discussed the ongoing development of a new airplane called the "Aerocraft." Due to proprietary reasons, details of this project could not be discussed. What was discussed, though, is that this Aerocraft will have the capability to airlift 500 tons of outsized, oversized, and bulk cargo from the US to the Persian Gulf in about two days at the cost of $.30 per pound. Although this airship concept will sacrifice some speed, flexibility and responsiveness when compared to today's airlift capability, it will overcome the issues of capacity and expense. The proper mix of these Aerocraft with our current 400 Kt inventory of strategic aircraft would change airlift doctrine and provide war fighters the capability they need today to rapidly move large masses of combat power into a theater of operations.

It is obvious that with the exception of the C-17, the Air Force's organic fleet will need replacing in the next 10 to 15 years. The question becomes what should it be replaced with? On an interim measure, one option is to buy additional C-17s since they possess the advantages of military design, are multi-role aircraft, are air refuelable and can move all forms of military equipment. Another short-term prospect could be the use of multinational agreements with countries that possess strategic military airlift aircraft. Russia and Ukraine, for example, have over 800 IL-76 aircraft (C-141 equivalent) and 54 AN-124 aircraft

(C-5 equivalent). Additionally, these countries are building the IL-106 (C-17 equivalent). This represents a significant strategic airlift capability that the US could utilize, if necessary.

On a long-term endeavor, the focus should be on acquiring a new aircraft along the lines of what Lockheed-Martin and McDonnell Douglas are experimenting with today. These companies have developed a scale model aircraft that can carry 120,000 pounds of cargo more than 4,000 NM unrefueled, and airdrop 150 paratroopers and a second version that can fly 12,000 NM with a 150,000 pound payload.[70] The advantage of an aircraft like this is the idea of a joint military/commercial venture since the interest in this capability has increased on the civilian side by 500 percent since 1989.[71] Beyond what is already in experimentation, aerodynamic and propulsion technology, along with composite designs have now reached a point where airlifting a 70-ton payload 14,300 NM, unrefueled by conventional means is not out of the question.[72] If this technology could be incorporated into a military transport, air refueling and en route infrastructure could become a thing of the past.

If tankers remain a part of the future airlift system, it is evident that they, too, will have to be replaced due to their age. One concept for this is to instill the technology of Unmanned Aerial Vehicles (UAV) into a future tanker design. The Air Force's current Global Hawk UAV is operating at 65,000 feet with an endurance of 40 hours at a speed of 350 Kts and a 1,800-pound payload.[73] If technology would allow a greater payload with shorter endurance and at a lower altitude, it would make sense to apply it to our tanker fleet since their mission is to fly a refueling track somewhere in space and wait for other aircraft to hit its refueling probes. Why would a mission of this type require a manned crew force if the aircraft could be flown and

operated from a ground site for the sole purpose of flying a fixed orbit and dispensing fuel in the air?

The Civil Reserve Air Fleet is another area where improvements could be made to enhance strategic airlift. Improvements should not come in the form of aircraft enhancements and modifications like were done in the 1980's. Rather than modify airplanes and lose the entire investment when the airline goes bankrupt, changes should be made in the processes of the CRAF program through incentives, call-up procedures, and contracts.

The first place to improve the CRAF program is in the area of incentives. This concept, discussed earlier, is a tool to entice civil carriers to join and participate in the program. In the US alone, estimates conclude there needs to be a 200 to 300 percent increase in airport capacity in the next two decades to overcome the burden commercial demands are putting on existing infrastructure.[74] If this is the case, one incentive that has merit is to offer civil carriers greater use of military airfields where the carrier is allowed to lease military basing rights in return for CRAF participation. This concept is already in use at Scott AFB IL where there are joint-use agreements between the USAF and the civil cargo carriers of St Louis' Lambert International Airport. Another incentive might be to offer a CRAF activation surcharge assessed to the government if a carrier is activated.[75] This might force closer scrutiny of CRAF usage and could help alleviate civil carriers' fears that the US will call on the CRAF more often in the future. Finally, the US should consider purchasing either organic military aircraft or civilian wide-body cargo aircraft and lease them to civil carriers for peacetime use. This provides commercial carriers with incredible amounts of cargo capability, yet if an airlift need arose, a recall feature in the contract would allow the

military to regain this capability without having to maintain it on a day-to-day peacetime basis.

Another improvement to the CRAF program is to modify the current call-up procedures. Currently, if a stage of the CRAF is activated, every aircraft within that stage is activated and available for use, regardless of the military need. Problems arose during the Gulf War when CRAF Stage II was activated to gain additional cargo capability, but passenger aircraft were left sitting idle. Carriers became frustrated because AMC was not utilizing their airplanes and they could not use them for commercial business.[76] One modification to the call-up procedures could be to prioritize aircraft within each stage, which would allow airlines to better anticipate their vulnerability within the stage. Furthermore, rules should be established that identify what would happen if an aircraft is activated and not used within a reasonable length of time. Together, these changes to the CRAF call-up procedures might offer carriers more incentive to participate if they had a better understanding of their vulnerability to be activated and had a chance to have their aircraft returned if not used.

The last recommendation is to extend the contracts of CRAF participants. In 1990, most participants signed 3-year contracts, but only resigned 9-month contracts following the Gulf War.[77] Today, the CRAF program is based on 1-year contracts that have to be negotiated every year.[78] Although shorter contracts increased carrier participation, it makes deliberate planning much more difficult. The CRAF possesses 27.8 MTM/D capability, but because of the annual fluctuations in CRAF contracts, the Air Force only plans on getting about 20.5 MTM/D capability.[79] The DoD needs to integrate incentives, especially with the commercial cargo carriers, so they commit to longer, more determinant contracts.

The last area where improvements need to be made is in the en route system. It is clear that AMC is aware of many of the problems engrossing the en route infrastructure and is taking steps to correct them. Dedicating $50 million a year against a $1 billion backlog of deteriorating fuel pipelines, hydrants, and storage tanks around the world is far from the effort needed.[80] The tempo of this resolve needs to be turned up before this nation finds itself futilely trying to mobilize to a contingency without the ability to support the strategic airlift fleet.

In addition to fixing the physical infrastructure, AMC needs to attain a more self-sufficient deployable capability to ramp-up mothballed air bases to accomplish the strategic airlift mission. We have decreased our overseas presence significantly and find ourselves operating more and more in regions where we have no en route structure, like Africa. To ensure we have the ability to deploy our forces when and where they are needed, AMC should invest in more on-the-shelf capability that can be moved into a bare-base environment and handle a major size airflow.

Lastly, AMC is well on the way to solving its problem with wide-body aircraft MHE through the acquisition of the 60K "Tunner" loader. This machine is capable of handling all forms of airlift aircraft but is not the right tool to meet all the requirements of forward based and contingency operations currently handled by the 40K and 25K loaders. What AMC needs to acquire is a Next Generation Small Loader that encompasses off-the-shelf technology and will provide high-reach, wide-body offload capability at forward bases. This loader is very air-transportable and will support all military and commercial aircraft from the B-747 to the C-130.[81]

Strategic airlift has proven its capability for decades. There has not been a war, a contingency, or a military or humanitarian operation where strategic airlift did not contribute in some way. The strength of strategic airlift is evident, but

implementing these recommendations would provide either more capability or extend the strength of the current capabilities.

CONCLUSION

For nearly 20 years, strategic mobility debates have focused on the proper balance of airlift, sealift, and prepositioned equipment necessary to meet our national and military strategies. Within strategic airlift itself, the debates have focused on the proper types and amounts of aircraft, both within and outside the military. What has not been debated are the benefits that strategic airlift has over the other mobility components. This paper attempted to assess these benefits by investigating airlift doctrine, the organic fleet, the CRAF, and the en route system, and analyzing their strengths and weaknesses. It followed with recommendations to further strengthen this incredible capability and diminish its weaknesses. There is room to improve, but it can only happen if our leadership recognizes what we already have and what needs to be done.

Strategic airlift is vital to the future ability of our nation to protect and defend its national interests. All too often its strength is taken for granted and weaknesses ignored, but one thing must never be forgotten:

> **"Air mobility allows us to be there first and to control the 'battlefield'--it is the air bridge to engagement with aerial refuellers as girders. In the past year alone air mobility forces delivered forces early and decisively to over 30 operations around the world.... There are only eleven countries in the world where we did not find American air mobility forces in the past year; two of them did not have airfields! Nothing moves without mobility. Nothing moves quickly and decisively without air mobility."**[82]

(7,644 Words)

ENDNOTES

[1] Chairman of the Joint Chiefs of Staff, Joint Tactics, Techniques and Procedures for Airlift Support to Joint Operations, Joint Publication 4-01.1 (Washington, D.C.: Joint Chiefs of Staff, 20 July 1996), II-1.

[2] There are two kinds of airlift capability, strategic (inter-theater) and theater (intra-theater or tactical). Since the focus of this paper is "strategic" airlift, the term airlift may be used without the "strategic" identifier to imply strategic airlift.

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[4] Charles E. Miller, Airlift Doctrine (Maxwell AFB, AL: Air University Press, 1988), 1.

[5] Air Mobility Master Plan-1996 (Scott AFB, IL: Air Mobility Command, October 1995), 1-9.

[6] Daniel Goure and Christopher M. Szara, eds, Air and Space Power in the New Millennium (Washington, D.C.: The Center for Strategic and International Studies, 1997), 141.

[7] Mary T. Bonnet, "Strategic Airlift is Air Power," (Air War College Report. Alexandria, VA: Defense Technical Information Center, May 1993), 3.

[8] F. Clifton Berry, "Massive Airlift Stabilized Situation," National Defense, December 1990, 6-8.

[9] "The Army Posture Statement," Army Logistician 30, no. 4 (July-August 1998): 1, 45.

[10] Togo D. West and General Dennis J. Reimer, A Statement on the Posture of the United States Army Fiscal Year 1998 (Washington, D.C.: Department of the Army, 1997), 14.

[11] Ronald N. Priddy, A History of the Civil Reserve Air Fleet in Operations Desert Shield, Desert Storm, and Desert Sortie, (Cambridge, MA: Volpe National Transportation Systems Center, December 1993), 11.

[12] Keith Chapman, Military Air Transport Operations (United Kingdom: Brassey's, 1989), 8.

[13] Miller, 370,415.

[14] Due to academic freedom speakers possess at the US Army War College, the speaker who stated these figures cannot be identified.

[15] Congress of the United States, Congressional Budget Office, Moving US Forces: Options for Strategic Mobility, (Washington, D.C.: US Government Printing Office, February 1997), xiii.

[16] Ibid., xvi.

[17] United States Army War College Selected Readings, Core Curriculum Course 4, Vol IIb: Implementing National Strategy, (19 November 1998-25 January 1999), 18-110.

[18] Chapman, 6-7.

[19] MOG stands for "maximum on ground" which means the maximum aircraft that can be parked on a given airfield at one time. Throughput relates to the amount of cargo that be moved through an airfield in a given day and is based on the formula (# acft times the amount of cargo on each aircraft divided by 24 hours equals throughput/day).

[20] Chapman, 58-61.

[21] Jean R. Gebman, Lois J. Batchelder, and Katherine M. Poehlmann, Finding the Right Mix of Military and Civil Airlift, Issues and Implications, Volume 1. Executive Summary (Santa Monica, MA: Rand Corporation, 1994), 30.

[22] Secretary of the Air Force Legislative Liaison, 1998 Congressional Issue Papers, available from <http://www.af.mil/lib/afissues/1998/issue98.html>; Internet; accessed 21 July 1998, 13.

[23] Ibid.

[24] Walter Kross, "Keynote Address," speech, Airlift/Tanker Association Convention, Orlando, FL, 24 October 1998.

[25] United States Army War College Selected Readings, 18-132.

[26] Mark W. Dille, "Improving Our Strategic Mobility Posture for the XXI Century," USAWC Strategy Research Project Student Papers (Carlisle, PA: US Army War College, 15 April 1996), 8.

[27] 1998 Air Mobility Master Plan (Scott AFB, IL: Air Mobility Command, 24 October 1997), 2-29.

[28] Kross.

[29] Dille, 8.

[30] Secretary of the Air Force Legislative Liaison, 13.

[31] United States Army War College Selected Readings, 18-132.

[32] Mark F. Johnston, "Strategic Mobility: An Assessment," USAWC Strategy Research Project Student Papers (Carlisle, PA: US Army War College, 15 April 1996), 9.

[33] Congress of the United States, 15.

[34] Donn P. Kegal, "Improving the Civil Reserve Air Fleet (CRAF) Program," USAWC Strategy Research Project Student Papers (Carlisle, PA: US Army War College, 15 April 1993), 16.

[35] Secretary of the Air Force Legislative Liaison, 13.

[36] Brooks L. Bash, "CRAF: The Persian Gulf War and Implications for the Future," US Naval War College Report (Alexandria, VA: Defense Technical Information Center, 19 June 1992), 6.

[37] Chairman of the Joint Chiefs of Staff, Joint Tactics, Techniques and Procedures for Airlift Support to Joint Operations, II-9.

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[41] Chenoweth, 7-8.

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[44] United States General Accounting Office, Report to Committee on Armed Services, Military Airlift: Observations on the Civil Reserve Air Fleet Program (Washington, D.C.: General Accounting Office, March 1996), 2.

[45] Congress of the United States, 16.

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[47] Dille, 8.

[48] Kegal, 20.

[49] United States General Accounting Office, Report to Committee on Armed Services, Military Airlift: Observations on the Civil Reserve Air Fleet Program, 4-5.

[50] Chenoweth, 24.

[51] United States General Accounting Office, Report to Committee on Armed Services, Military Airlift: Observations on the Civil Reserve Air Fleet Program, 4-5.

[52] United States Air Force Air Mobility Warfare Center, "The Global Air Mobility Support System (GAMSS)," Course briefing #GRLC 201. Ft Dix, NJ, 1999.

[53] United States Army War College Selected Readings, 18-131.

[54] Bonnet, 8.

[55] 1998 Air Mobility Master Plan, 4-16.

[56] United States Air Force Air Mobility Warfare Center.

[57] John L. Cirafici, Airhead Operations: Where AMC Delivers (Maxwell AFB, AL: Air University Press, March 1995), 79.

[58] "Tanker Airlift Control Center," The MAC Forum 1, no. 2 (March 1992): 5.

[59] Cirafici, 9-13.

[60] Ibid., 79-81.

[61] Mike Mcnease, "'Focus' on the FY '97 Year of the En Route System," The Mobility Forum 6, no. 2 (March-April 1997): 14.

[62] Kross.

[63] United States General Accounting Office, Report to the Chairman, Committee on Armed Services, US Senate, Desert Shield/Storm: Air Mobility Command's Achievements and Lessons for the Future, Prepared by Frank C. Conahan, Assistant Comptroller General (Washington, D.C.: General Accounting Office, January 1993), 19.

[64] Congress of the United States, 91.

[65] Mcnease, 14.

[66] 1998 Air Mobility Master Plan, 4-17-18.

[67] Ibid., Commander's Intent.

[68] Johnston, 15.

[69] "Airlift Gets a Boost," Air Force Magazine, December 1997, 26.

[70] David A. Fulghum, "Future Airlifters Promise Global Range," Aviation Weekly & Space Technology, 20 January 1997, 51.

[71] Ian G. S. Curtis, "Airlift is Still the Only Rapid Response Option to Crisis, But Doctrine is Unclear," Defense & Foreign Affairs Strategic Policy 24, no. 1 (January 1996): 6.

[72] Bill Sweetman, "A Rising Imperative: More Demands for Airlift," Jane's International Defense Review 32 (February 1998): 28.

[73] Secretary of the Air Force Legislative Liaison, 28.

[74] Chenoweth, 63-64.

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[77] Congress of the United States, 86.

[78] "Rutherford on Lift," Air Force Magazine, November 1995, 47.

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[80] "Airlift Gets a Boost, 27.

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