Roles and Missions and the Strategic Airlift Problem

A MONOGRAPH BY

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ABSTRACT

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The purpose of this monograph is to answer the question; a brigade in 96 hours: can the U.S. Air Force move the U.S. Army in time? In doing so this monograph explores the roles and missions of the U.S. Air Force and its Air Mobility Command (AMC), the Civil Reserve Airlift Fleet (CRAF) and current and future airlift platforms to determine if they meet the future challenges of strategic airlift.

This is important because the U.S. Army relies on the U.S. Air Force to move it troops and equipment globally. General Eric Shinseki established the goal of having a brigade that deploys in 96 hours, a division in 120 hours, and five divisions in 30 days. To meet that goal he is developing the medium weight brigade to lighten heavy brigades and increase the lethality of light brigades. If the U.S. Army has units that are capable of being deployed in 96 hours then the U.S. Air Force must have the requisite assets to move those forces. Although the CRAF program facilitates the movement of forces on a strategic scale those assets are not capable of conducting landings in a hostile environment. Additionally, the U.S. Air Force has only one strategic airlifter capable of landing on austere airfields with limited or no logistics.

The study of roles and missions begins with the National Security Act of 1947 and through the 1952 Secretary of Defense memorandum on roles and missions. This is followed by a discussion on the CRAF program and how it facilitates the movement of troops and equipment. A separate section details the types of airframe available for strategic lift and to include refuelers that facilitate the long-range capacity of many of the U.S Air Forces airlifters. This is followed by a discussion on future strategic airlift systems and the difficulty of developing cargo and personnel aircraft to fit future needs.

Currently, the strategic airlift problem is not solved and will not be in the future unless one of two things happens. First, if the number of airlift assets remain as they are, then U.S. Army units must have the ability to deploy a brigade that weighs under 8,000 short tons. The 8,000 short ton threshold is based on the number of strategic airframes available in the inventory now and moving assets within the 96-hour time frame. Or, second, Congress appropriates more dollars to build a larger strategic airlift fleet. Both are daunting challenges that will vex future planners, developers, and accountants.

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Section I

Introduction

Since the end of the Cold War the Armed Forces of the United States has moved from one that was forward deployed to one that is CONUS based. As global commitments continue to expand for the United States it is clear that CONUS has become a significant power projection platform for the U.S. Army. "The readiness and availability of military forces is critical to our global strategy. However, if the military is to prepare to fight across the entire spectrum of conflict, it must have the deployment tools available to employ our forces in every area of interest that would affect our national policy."[1] In order to support the National Command Authority (NCA) and the National Military Strategy (NMS) outside CONUS the U.S. Army relies on other branches to conduct movement overseas.

Ever since the end of the Cold War the U.S. Army has struggled to define its relevance in a world void of an adversary like the former Soviet Union. The U.S. Army has participated in many confrontations and humanitarian deployments, such as Operations Desert Shield/Desert Storm

from August 1990 to February 1991, Restore Hope in December 1992, and Allied Force from March to June 1999. Currently ground forces are participating in peace keeping and peace enforcement in Bosnia and Kosovo. The U.S. Army accepts the challenges of these missions and expects them to continue into the future. Some believe that since the United States has no peer competitor in the global military arena there is no need for heavy ground forces.

With the collapse of the Soviet the U.S. Army downsized from 18 divisions, with over 750,000 troops, to 10 divisions with 480,000 troops. In doing so many units returned from permanent overseas basing to locations in the United States. Thus the Army changed its posture from one that was primarily forward deployed to one that is now considered a power projection force. National Military Strategy (NMS) describes power projection as follows.

> Power projection is the ability to rapidly and effectively deploy and sustain U.S. forces in and from multiple, dispersed locations. Complementing overseas presence, power projection strives for unconstrained global reach. Power projection assets are tailored to regional requirements and send a clear signal of U.S. commitment. Being able to project power means being able to act even when we have no permanent presence or infrastructure in a region. If necessary, it means fighting our way into a denied theater or creating and protecting forward operating bases. The ability to assemble and move to, through, and between a variety of environments, often while reconfiguring to meet specific mission requirements, is essential to offsetting an adversary's advantages in mass or geographic proximity. Global power projection

> provides our national leaders with options they need to respond to potential crises.[2]

Power projection is critical in executing the strategy of shape, respond, and prepare now. Some believe that the United States Army lost its relevancy during the Kosovo crisis because it could not get to where it was needed in a timely fashion with adequate combat power. "General Hugh Shelton, chairman of the Joint Chiefs of Staff, said it would take four to six months to field an armored force with its support units..."[3] General Shinseki, Army Chief of Staff, believes that the inability of the United States Army to respond quickly is indicative of the weight of its combat vehicles and the heavy logistics required to sustain the force.

General Shinseki, in his 1999 address at the Association of the United States Army (AUSA) annual October convention, described his vision of the future Army. He stated, "We will develop the capability to put combat forces anywhere in the world in 96 hours after liftoff -- in brigade combat teams for both stability and support operations and for warfighting. We will build that capability into a momentum that generates a warfighting division on the ground in 120 hours and five divisions in 30 days."[4] General Shinseki wants to make heavy forces lighter and light forces more lethal and survivable. To do this he has directed that the two separate brigades at Fort Lewis,

Washington become prototype brigades. These brigades serve as the basis for future Army medium weight brigades. To do this quickly he is incorporating "off the shelf" technology and sponsored a competition between lightweight armored wheeled and tracked vehicles at Fort Knox to determine an acceptable interim vehicle.

General Shinseki's desire to make the force more deployable, quicker, will increase its reliance on strategic airlift more so than sealift. Strategic airlift must move the bulk of the initial entry forces in order to accomplish the mission. However, the problem with strategic airlift is that not enough of it exists. "The U.S. Joint Chiefs of Staff have identified strategic lift as one of the most critical obstacles to the USA's ability to fight two near-simultaneous major regional conflicts."[5] A 1993 Joint Military Assessment study concluded that the "implementation of the air and sea-lift programs recommended by the Mobility Requirements Study of the Joint Chiefs of Staff is crucial" to meeting the capability of delivering five divisions in 75 days.[6] This leads to the primary research question of this monograph, "A brigade in 96 hours: Can the U.S. Air Force move the U.S. Army in time?" In order to get a force anywhere in the world, especially a division size element in 120 hours, the U.S. Army must rely on the U.S. Air Force to provide the power projection. However, just as the U.S.

Army reduced its force structure in the 1990's so did the U.S. Air Force. Additionally, the U.S. Air Forces' post Cold War requirements for airlift assets have increased. In this New World Order the requirement to move lethal forces, quickly, is even more vital.

This monograph addresses the U.S. Air Force's ability to move forces in concert with General Shinseki's vision. It discusses the roles and missions of the U.S. Air Force, its relationship to the U.S. Army, and congressional requirements for U.S. strategic airlift. Additionally, this paper looks at current lift capabilities, to include Civil Reserve Air Fleet (CRAF) participation, and discusses future lift assets. Finally, this paper concludes with an answer to the primary research question and any potential recommendations to ameliorate strategic airlift challenges.

Section II

Strategic Airlift

Roles and Missions

The strategic triad is composed of strategic airlift, strategic sealift, and pre-positioned stocks of materiel and supplies. This paper focuses on the strategic airlift portion of the triad with the ability of Air Mobility Command (AMC) to get U.S. Army personnel and equipment to a designated hot spot. This section discusses the genesis of the U.S. Air Force beginning with the National Security Act of 1947, the formation of AMC in 1992, and the role the Civil Reserve Air Fleet plays to supplement current U.S. Air Force capabilities.

The U.S. Air Force and the U.S. Army have shared a unique relationship ever since their designation as separate branches within the Department of Defense in 1947. Since the end of the Cold War the U.S. Army's reliance on the U.S. Air Force for the deployment of forces increased dramatically. Conversely, once the U.S. Air Force deploys one of its expeditionary forces they rely on the U.S. Army for sustainment while on the ground. The U.S. Air Force split from the U.S. Army with its inception evolving from

the National Security Act of 1947. The National Security Act of 1947 became the primary document for the post World War II reorganization of the United States Armed Forces. With this act the National Military Establishment (NME) was designated. The NME formed the office of the Secretary of Defense and the three services; the U.S. Army, U.S. Navy, and the U.S. Air Force. The NME formalized the separation of the Army Air Corps from the U.S. Army and permanently designated the U.S. Air Force as a separate service within the Department of Defense. Believing that it would be restrictive in nature the NSA of 1947 did not formalize the roles and missions of the separate services.[7] It simply stated the following for the U.S. Army.

> In general the United States Army, within the Department of the Army, shall include land combat and service forces and such aviation and water transport as may be organic therein. It shall be organized, trained, and equipped primarily for prompt and sustained combat incident to operations on land. It shall be responsible for the preparation of land forces necessary for the effective prosecution of war except as otherwise assigned and, in accordance with integrated joint mobilization plans, for the expansion of peacetime components of the Army to meet the needs of war.[8]

The NSA of 1947 also gave the U.S. Air Force its own general duty description stating the following.

> In general the United States Air Force shall include aviation forces of both combat and service not otherwise assigned. It shall be organized, trained, and equipped primarily for prompt and sustained offensive and defensive air operations. The Air Force shall be responsible for the preparation of the air forces necessary for the effective

> prosecution of war except as otherwise assigned and, in accordance with integrated joint mobilization plans, for the expansion of the peacetime components of the Air Force to meet the needs of war.[9]

Responsibility for strategic lift was not mentioned in the NSA of 1947. President Truman signed Executive Order (EO) 9877 refining the roles and missions of the services on the same day as the NSA of 1947. However, EO 9877 did not sufficiently define the roles and missions of the separate services. Consequently, due to inter-service rivalry, that EO was revoked by EO 9950 and replaced, in 1948, with a document called *Functions of the Armed Forces and the Joint Chiefs of Staff*.[10] In it, the roles and missions of the separate services were given more specificity. The following was included in the roles and missions of the U.S. Air Force, clarifying its role as the strategic air arm for all services. Thus laying the foundation for U.S. Air Forces ties to the other services and specifically that of the U.S. Army.

> A. *Primary Functions*
>
> 3. To be responsible for strategic air warfare.
>
> 4. To organize and equip Air Force forces for joint amphibious and airborne operations, in coordination with the other Services, and to provide for their training in accordance with policies and doctrines of the Joint Chiefs of Staff.
>
> 5. To furnish close combat and logistical air support to the Army, to include air lift, and re-supply operations, aerial photography, tactical

> reconnaissance, and interdiction of enemy land power and communications.
>
> 6. To provide air transport of the Armed Forces except as otherwise assigned.
>
> 12. To develop, in coordination with the other Services, doctrines, procedures, and equipment employed by Air Force forces in airborne operations.[11]

Although the roles were more defined a clarification of which aviation assets are deemed organic to the U.S. Army was required. Initially, the definitions of U. S. Army aviation assets were categorized in terms of the functions to be performed within the combat zone. The Pace-Finletter Agreement in October 1951 defined the combat zone as the area 50 to 70 miles deep on the battlefield. In November of 1952 a second Pace-Finletter Agreement was written to redefine organic assets by weight rather than function, giving the U.S. Army a 5,000-pound weight limit on their aircraft. This change was due to the U.S. Army acquiring larger and heavier aircraft during the Korean War. Those aircraft, especially the helicopter, performed battlefield functions not previously imagined. The functions included aerial medical evacuation and command and control. This agreement included an allowance for review based on future technological changes or changes in roles and missions of the services.[12]

Further defining the Pace-Finletter Agreements in 1951 and 1952, then Secretary of Defense Charles E. Wilson

assigned four specific functions for Army aviation. The functions included "command/liaison, observation, limited airlift, and medical evacuation."[13] Additionally, Mr. Wilson prohibited the U.S. Army from performing functions that the U.S. Air Force was already assigned. These functions included, "strategic and tactical lift, tactical reconnaissance, battlefield air interdiction, and close air support."[14] Furthermore, Mr. Wilson issued Department of Defense Directive 5160.22 on 18 March 1957 that cancelled the Pace-Finletter Agreement of 1952 and gave more authority to defining the roles and missions of the two services. Specifically it stated the following for the airlift of U.S. Army personnel.

> C. *Airlift of Army personnel and material*--Transportation of Army supplies, equipment, personnel, and small units within the Army combat zone in the course of combat and logistical operation. Includes the movement of small units to execute small-scale air-landed operations, the movement of reserves, and the shifting or relocation of small units and individuals within the combat zone as the situation may dictate. Includes expeditious movement of critically needed supplies or equipment, or both, within the combat zone, supplementing the ground transportation system operating within the field army. Does not include the execution of joint airborne operations.[15]

This solidified and delineated the roles of airlift between the U.S. Army and the U.S. Air Force. It was at this time that the U.S. Army became totally reliant on the U.S. Air Force for all strategic airlift. The delineation of duties

facilitated the efficient use of lift assets and better utilization of United States taxpayer dollars. Most overlap was eliminated between the services and each was free to develop their own air assets as prescribed within the bounds of the agreement between the services. This allowed the U.S. Army to maintain some of its own tactical airlift on the battlefield such as the tactical airlift of heliborne troops. The delineation of responsibilities between the services is important not only from a dollars and cents point of view, but also from a joint perspective. For the United States to have a credible force all branches of the armed forces must have the ability to work with and rely on each other.

Since the delineation of duties several studies were conducted to determine the "correct" tonnage of lift carrying assets required. Strategic lift requirements are expressed in million of ton-miles per day (MTM/D). MTM/D is a standard unit of measure for theoretical airlift capacity. The current Mobility Requirements Study has placed airlift requirements for two major regional conflicts at 49.7 MTM/D.[16] This means that at 49.7 MTM/D the transport of 7,000 tons of cargo over 7,000 nautical miles is required. This is theoretical because the element MTM/D calculations do not take into consideration equipment and/or supplies that cube-out; that is equipment that uses more space on the

aircraft prior to the aircraft's weight being exceeded. The U.S. Air Force is unable to move 49.7 MTM/D by itself. To facilitate the movement of that much cargo and personnel the active duty U.S. Air Force is augmented with lift requirements from the U.S. Air Force Reserve and the Civil Air Reserve Fleet (CRAF) program.

In the past few decades the U.S. Army has established goals within the National Military Strategy for deployment of forces. The strategic deployment of forces has become more critical since the end of the Cold War and the conclusion of Desert Shield/Desert Storm. Since the end of the Cold War the U.S. Army has changed from a force that was "forward deployed" to one that is based in the continental United States and relies on "power projection" as a means to accomplish it's missions. With a "power projection" force the U.S. Army must deploy a lethal force early in order to conduct operations in accordance with the National Military Strategy. FM 100-5 states the following in regards to the deployment of forces.

> An important strategic consideration for planning contingency operations that involve the potential for combat is to introduce credible, lethal forces early. Commanders should be prepared to deploy sufficient combat power to resolve a crisis on favorable terms. From a strategic perspective, the rapid insertion of highly lethal forces can convince a potential adversary that further aggression is too costly, paralyzing the enemy's initiative before he can consolidate his gains.[17]

The forces that require deployment can come from anywhere on the globe. Throughout the early 1990's the number of active duty divisions fell from a high of 18 to the current level of 10. Of the 10 active duty divisions four are headquartered outside of the United States. Those four are the 25th Infantry Division, the 1st Infantry Division, the 2d Infantry Division, and the 1st Armored Division. In order to support two nearly simultaneous major regional conflicts, or any other type of threat requiring several divisions, units must be moved from the United States, or from other positions on the globe, to new overseas locations. The previous goal for projection of forces was a brigade in 96 hours, a division in 30 days, and a five division Corps in 120 days.[18] This was revised after Operation Desert Shield/Desert Storm to a five division Corps in 75 days. The goals were revised with the belief that an adversary would not give U.S. forces the opportunity to build combat power much like they did during Operation Desert Shield/Desert Storm. Additionally, Congress appropriated more dollars to improve and increase strategic airlift, strategic sealift, and pre-positioned material.

Since the end of the Cold War the United States has postured itself to be the only super power in the world. Being the only super power has posed significant challenges with the deployment of U.S. forces worldwide. Events such

as Bosnia, Kosovo, East Timor, and domestic challenges have not just changed the way the U.S. Army operates, but it has also challenged the strategic lift assets of the U.S. Air Force. In light of that challenge the U.S. Army remains totally dependent on the U.S. Air Force to quickly move it's units anywhere in the world. If the U.S. Air Force cannot move the U.S. Army to hot spots across the globe then the U.S. Army remains incapable of performing its missions in accordance with the wishes of the National Command Authority (NCA).

In the FY00 United States Army Posture Statement General Reimer stated the following with regards to the need to have troops on the ground to shape the international environment in accordance with the NMS.

> The Army's most fundamental capability is the exercise of sustained, comprehensive control over people, land, and natural resources. Putting American soldiers on the ground is the most effective method to shape the international environment in ways favorable to our interests. Army shaping activities are executed face-to-face and one-on-one with the armies and people of other nations. Such interaction has a lasting and positive effect that simply cannot be achieved through less direct engagement. Putting American soldiers on the ground is the most credible response to potential aggressors and to those who would exploit instability for their own ends. It is also the most tangible evidence of the nation's commitment to both allies and adversaries. Bombs and missiles can destroy selected targets and temporarily deny control of terrain, but they cannot provide the presence required to compel compliance with the rule of law and the processes of peace. Maintaining the capability to project and employ land power in the information age is essential to

> protecting the nation's interests against the diverse threats likely to emerge in an uncertain future.[19]

The U.S. Army is incapable of accomplishing the above on it's own. It must rely on the U.S. Air Force with it's strategic lift capacity to move forces. Of course the other legs of the deployment triad assist in moving troops by sea and from pre-positioned afloat assets, but none do it faster or are more responsive than the U.S. Air Force. The U.S. Air Force recognizes this and it's former Chief of Staff General Ronald R. Fogleman stated the following at an Air Force Association National Symposium in 1996.

> Our national security strategy of engagement and enlargement calls for our nation to be engaged around the world with the objective of enlarging the family of democratic nations. This strategy depends on maintaining a strong defense and ensuring that America's military forces are ready to deter, fight and win wars. At the same time we are reducing the number of forward deployed forces, and putting increased emphasis on expeditionary, mobile forces that can deploy quickly. Airpower is well-suited to meet these requirements and offers the nation a broad range of capabilities to support its security strategy.[20]

General Fogleman also stated that, "Airlifters and tankers give the NCA the ability to reach out and influence events around the world. This trend will continue as far into the future as we can imagine."[21]

The requirements and stress on strategic airlift assets to fulfill the ground force requirements is enormous. Without conducting a (high intensity) MRC the lift assets of

the U.S. Air Force are already strained. This does not include routine requirements of the U.S. Air Force for the internal support of itself or other recurring missions. Additionally, the U.S. Air Force supports all Presidential and State Department trips nationally and outside the continental United States. The ability of the United States to maintain its super power status is directly related to its ability to deploy a lethal force anywhere in the world. In order to facilitate the quick movement of lethal forces capable of deployment on current U.S. Air Force aircraft the U.S. Army has to restructure itself to take advantage of the limited strategic airlift assets the United States possess.

Since becoming the world's only super power the U.S. Army has had to redefine itself, not to become more relevant, but to become more responsive. The requirement to become more responsive falls out from the National Military Strategy and the National Security Strategy to have the ability to shape, prepare, and respond. In order to facilitate shaping and responding the U.S. Army must be able to move a credible size force in a short time. The Chief of Staff of the Army, General Shinseki, has established new policies in deploying U.S. Army forces. Not only must the deployment of forces be quicker, but also its table of organization and equipment must change contingent upon the requirements of the situation. General Shinseki is changing

the face of the U.S. Army by standing up two medium weight brigades at Fort Lewis. The make up of the brigade is completely new to the U.S. Army. A proposed Table of Organization was printed in the Army Times on 27 December 1999. See Figure 1.[22]

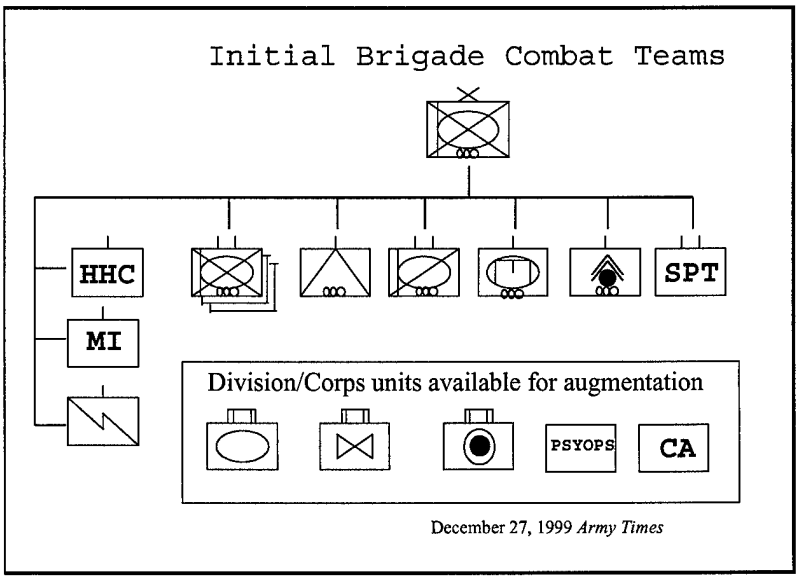

Figure 1

The goal of the Chief of Staff of the Army is to have a brigade ready to deploy in 96 hours, a division in 120 hours, and five divisions in 30 days.[23] This is a significant change to previous policies of having a Corps on the ground in 75 or 120 days. The change not only is derived from the structure of the medium weight brigade, but the vehicle of choice has changed from the 70 ton M1A1 tank to a wheeled or tracked vehicle similar to the ones used by the U.S. Marines.

Moving a brigade of troops has been done in the past within 96 hours. "The deployment of the 1st Brigade (-) of the 3d Infantry Division (Mechanized) to Kuwait in February, 1998, demonstrated such a response. Within 96 hours, the brigade had completed its deployment from the United States and occupied defensive positions in Kuwait."[24] The reason this heavy brigade was able to accomplish this mission in such a short time span was because equipment is pre-positioned in the area. The unit flies to a site where their equipment is pre-positioned. The unit draws its equipment from the draw yard, and then moves into an assembly area or an attack position depending on the situation. The dilemma then becomes, what if troops had to deploy to an area that is void of any pre-positioned stocks? Or deploy to a part of the world that is so far inland anything that is pre-positioned afloat (on board cargo ships at sea) requires more time to get equipment to the troops, therefore not supporting the quick deployment of ground forces. This is one of the challenges the Chief of Staff of the Army is addressing with his vision of the Medium Weight Brigade.

The U.S. Air Force will play a major role in implementing the Chief of Staff of the Army's vision. Global Reach -- Global Power is the strategic architecture of the U.S. Air Force. To support its strategic

architecture the U.S. Air Force developed several core competencies to support their strategic architecture.

- Air and Space Superiority
- Global Attack
- Rapid Global Mobility
- Precision Engagement
- Information Superiority
- Agile Combat Support[25]

Rapid Global Mobility is the core competency the U.S. Air Force that effects the U.S. Army the most. Within the U.S. Air Force there exists several organizations that perform the overall missions of the U.S. Air Force. Those organizations include the Air Force Material Command, Air Combat Command, Air Force Space Command, and the Air Mobility Command. The command concerning airlift is the Air Mobility Command (AMC). AMC was formed on June 1, 1992 and is headquartered at Scott Air Force Base, Illinois.[26] AMC, the air component of the joint command United States Transportation Command (USTRANSCOM), was established due to the problems that existed during Desert Shield/Desert Storm. Specifically their mission is the following.

> Air Mobility Command's primary mission is rapid, global mobility and sustainment for America's armed forces. The command also plays a crucial role in providing humanitarian support at home and around the world. The men and women of Air Mobility Command -- active, Air National Guard, Air Force Reserve and civilians -- provide tactical and

> strategic airlift and aerial refueling for all of America's armed forces.[27]

"When an operation must be carried out quickly, airlift and aerial refueling will be the key players, rapid global mobility builds the air bridge for joint forces, enables peace efforts or speeds tailored forces wherever they are needed.[28] The force structure of AMC is based on the requirement to conduct the following.

-- Support two nearly simultaneous major regional conflicts

-- Maintain the ability to conduct strategic brigade airdrops

-- Support regional contingencies

-- Support peace keeping/peace enforcement operations.[29]

The aircraft within AMC are composed of the C-17, C-5, C-141, C-130, KC-135, and the KC-10.[30] Also, supporting the U.S. Air Force is the CRAF program. CRAF provides civilian aircraft in support of AMC's mission. As previously states, AMC falls under USTRANSCOM. Within USTRANSCOM, all of the United States strategic lift assets are under one command.[31] In addition to airlift, this includes sealift and pre-positioned afloat assets. The major drawback to AMC's mission is that there never seems to be enough aircraft available to do everything for everyone. Additionally, the fleet of aircraft available is aging and decisions have to

be made as to whether the life of the aircraft is extended, new aircraft are purchased, or that aircraft are simply not replaced as they are retired. Since Congress controls the purse strings for the services they play a major role in determining the future to airlift.

In 1997 the United States General Accounting Office (GAO) conducted a study and published a report, upon the request of Congress, titled, *Military Airlift: Options for Meeting Requirements While Acquiring Fewer C-17s*. This report was based on a November 1995 recommendation of the Defense Acquisition Board that a "fleet of 120 C-17s [down from 210] be acquired to meet airlift needs, focusing on: (1) whether less costly options exist to meet airlift needs; and (2) the use of the C-17 to support a strategic airdrop."[32]

The GAO report concludes, to the disagreement of DOD, that a fleet of 100 C-17s is capable of conducting the two MRC scenario if DOD implemented one or more of the following reported measures.

> -- Increase the amount of Army combat support and combat service support material planned for pre-positioning. For example, DOD could slightly increase the amount of pre-positioned materiel planned for afloat pre-positioned ships beyond that recommended in the MRS BURU.
>
> -- Use airlift assets not considered available in the study, such as C-17 and C-5 training aircraft and increased numbers of Civil Reserve Air Fleet aircraft.

> -- Extend by a day or two the time frame in which a small amount of Army combat support and combat service support materiel would be delivered during the initial phase of the Mobility Requirements Study's major regional contingencies.[33]

This report focuses on the overall potential saving to the United States federal government rather than on the ability of the military to conduct specific missions other than moving a certain tonnage of cargo. A situation may occur where CRAF aircraft, C-5s or even C-141s may not have the ability to land due to restrictions of the airfield. Suggesting that training aircraft be used to conduct a two MRC scenario does not leave any aircraft to train new pilots. Rather, it leaves novice pilots to train in simulators with their first real flight in a U.S. Air Force aircraft could potentially also be their baptism under fire. The GAO report made the assumption that since training aircraft were used in Operation Desert Shield/Desert Storm, it follows that their use is justified in the event of two MRCs. Each mission received by DOD is different and to make a decision to use training aircraft without first evaluating the threat level does not leave DOD with many options. DOD stated the following in response to the GAO report.

> ...DOD indicated that (1) CRAF aircraft cannot carry outsized or oversized equipment, (2) KC-10s may be needed for refueling, (3) training aircraft are needed to ensure a continuous pipeline of trained crews, (4) additional pre-positioning would reduce flexibility, and (5) extension of the delivery time by 1 or 2 days would create unacceptable risks.

> DOD agreed that 100 C-17s would be adequate to meet lesser regional contingency requirements. However, DOD indicated that an extended range brigade airdrop could not be accomplished with a fleet that included only 100 C-17s. DOD stated that pre-positioning airdrop forces is not a realistic option because of time constraints, the need to obtain agreement from other nations for use of their territory, and the loss of the element of surprise.[34]

The bottom line is that the federal government saves 7 billion dollars over the lifetime of the contract if they purchase 100 C-17s versus 120 of the aircraft.[35]

Another option Congress has is the extension of the service life of the current fleet of aircraft or improving current air fleet capabilities. The goal of DOD is to find ways to fly current aircraft less in order to preserve their life span for use during wartime. This does not mean the aircraft will sit on flight lines waiting for the outbreak of war. This means that missions that were once specifically carried out by the C-141 and C-5 fleet, both of which make up the current backbone of the U.S. Air Force's strategic airlift capacity, are transferred to commercial aircraft, the tanker fleet, and to the use of more simulators.

These are important issues to the U.S. Army, and DOD in particular, because the U.S. Army's ability to get anywhere in the world, quickly, with sufficient force, is directly related to the number of airframes available at any one time. These reports do not take into account the number or

airframes lost to maintenance, the threat, or to any unforeseen event. A truck can be driven until it completely breaks down or is stopped by a bullet, it then stops in its tracks. An aircraft, on the other hand, falls from the sky and crashes. The likelihood of it being brought back to its previous cargo carry capacity, or its complete recovery, as compared to a wheeled vehicle on the ground, is very unlikely.

Activation of the Civil Reserve Air Fleet (CRAF) assists the U.S. Air Force in it's ability to project combat power. President Truman through an EO to supplement strategic airlift created CRAF in 1952. "CRAF is a voluntary partnership between DOD and commercial air carriers designed to provide additional passenger and cargo planes and aeromedical evacuation services to the military during times of crisis."[36] The CRAF fleet was first activated on 17 August 1990 in support of Operation Desert Shield and Desert Storm.[37]

> During Operation Desert Shield, CRAF carriers flew 774 missions, moving nearly 35,000 tons of cargo and 110,000 passengers. In the second phase of the deployment, Operation Desert Storm, CRAF carriers flew 1,150 missions, moving 42,000 tons of cargo and 140,000 passengers. During this phase of the deployment in January and February 1991, there was a total of 70 cargo aircraft operating, representing more than 40 percent of the country's long-range cargo fleet. By 1 February, CRAF was flying more missions than the C-5 fleet, and during the 28 days of that month, CRAF flew 740 missions. Over the more than nine months the CRAF was activated, the carriers flew in excess of 5,000 missions. During the overall

> deployment, the CRAF accounted for 20 percent of the missions, moving 62 percent of the passengers and 27 percent of the cargo. During the redeployment phase, CRAF carriers flew 28 percent of the missions, accounting for 84 percent for he passengers and 40 percent of the cargo.[38]

Relying on CRAF as a means to deploy forces and equipment allows the U.S. Air Force to maintain a smaller fleet of aircraft. The U.S. Air Force relies on CRAF to carry a maximum of 20.5 MTM/D for planning purposes.[39] Commercial airlines participate in DOD's CRAF program primarily based on its monetary incentives. In 1997 AMC awarded over $650 million in contracts to the commercial air sector.[40] Airlines that participate in the program also receive priority in providing travel and package delivery to all federal government entities.

While military aircraft provide a full range of cargo carrying capacity, aircraft in the CRAF program are limited only by their commercial aircraft design.

> For example commercial aircraft are unable to carry tanks, air defense weapons, many helicopters, and most trucks. Additionally, civil aircraft cannot airdrop cargo or personnel, nor can they provide specialized capabilities, such as the rapid off-load required in combat situation. Commercial planes also require relatively long runways and special material-handling equipment and there cannot operate in austere airfields.[41]

The ability of aircraft to operate in austere airfields is important to the deployment of U.S. Army forces in a crisis situation. It is also critical in the deployment of forces within a 96-hour timeline. The C-17 is designed to operate

in austere environments in order to deploy lethal forces quickly. CRAF has the ability to support subsequent deployments to hot spots only after adequate air field facilities are acquired.

The CRAF program is made up of three segments and is activated in three stages. These segments and activation stages are discussed in Section III of this paper under the capabilities of CRAF. Without CRAF the overall rapid deployment of forces overseas would be nearly impossible. In order to move a brigade size unit of personnel the military must move approximately 5,000 soldiers. In February 1998 it required over 20 commercial 747's, MD-11's, and L-1011's to ferry 5,000 soldiers from Hunter Army Air Field, Georgia to Southwest Asia.[42] Although, at the time, the airlines volunteered for this mission it is critical to the deployment of forces that the CRAF system is exercised. Exercising the CRAF system is similar the call up of reserve forces to prevent unforeseen events or to train personnel on the loading and unloading of military personnel and cargo on commercial aircraft.

This section focused on the inception of the U.S. Air Force and its relationship to the U.S. Army. It is evident that for U.S. Army forces to deploy globally they must rely on the U.S. Air Force. This section also discussed the role of USTRANSCOM, AMC, and the CRAF program. The following

section will discuss the types of aircraft currently in the U.S. Air Force's inventory and the capabilities and limitations of those aircraft.

Section III

Capabilities and Limitations Of Strategic Airlift and the CRAF

The purpose of this section is to describe the capabilities and limitations of the current inventory of U.S. Air Force aircraft and the CRAF program. Airlift policymakers and planners determine the types and numbers of aircraft available for strategic airlift. Factors taken into consideration to determine lift requirements are based on time, distance, infrastructure, and load configurations.

> Even minor changes to any of these factors in a planning scenario can drastically alter the daily capacity and routing of an airlift movement and can thus alter the characteristics and size of the aircraft fleet, support structure, and even the crew needed to support that movement.[43]

In recent years the demand for airlift has increased commensurate with successive NMS. Throughout the 1990's the requirements to shape and respond increased the number of deployments and highlighted the greater importance of strategic airlift worldwide. The current inventory of U.S. Air Force aircraft consists of the following families of aircraft for strategic airlift; the C-5, the C-141, the C-17, the KC-10, the KC-135, and the aircraft in the CRAF program.

C-5

The C-5 Galaxy aircraft was conceived in the late 1960's to supplement the C-141A Starlifter. It was designed as a heavy lift aircraft to carry bulky and heavy military equipment over long ranges that exceeded the capabilities of the C-141.[44] The C-5 provides a significant portion of AMC's cargo carrying capability and is capable of carrying both outsize and oversize cargo as well as personnel. Current limitations of the C-5A are that it has the lowest mission capable rate and departure reliability rates of all AMC systems. Additionally, its operating costs are increasing and its man-hours per flight-hour are almost twice as high as other aircraft.[45] Its size and lack of ground maneuverability limit the C-5 to generally operating on normal operating bases with mature infrastructure.

Operational Characteristics[46]

Length	247 feet 10 inches
Height	65 feet 1 inch
Wingspan	222 feet 9 inches
Maximum Takeoff Gross Weight	769,000 pounds
Operating Weight	374,000 pounds
Maximum Useable Fuel	332,500 pounds
Maximum Allowable Cabin Load	291,00 pounds

Normal Passenger Seats Available	73
Maximum Number of Pallets	36
Range (with maximum payload)	830 Nautical Miles
Range (with no payload)	6,320 Nautical Miles
Average Cruise True Airspeed	450 Knots
Minimum Crew Complement	Six
Augmented Crew Complement	Eight

Although the C-5 is capable of moving heavy and oversized equipment great distances its primary limiting factor in the movement of a medium weight brigade is the need for mature operating bases with solid runways. Not all contingency situations occur in mature theaters. However, the C-5 can move forces and material to mature forward staging bases for further shipment by other means.

C-141

The C-141 is has served as the backbone of AMC's strategic lift capability since its maiden flight on 17 December 1963.[47] As large jet transport came of age in the 1950's the C-141 began its development as the military's first jet cargo air carrier with strategic implications. The aircraft is capable of carrying cargo and personnel with the ability to conduct airdrops of both. Most aircraft in the C-141 have logged over 36,000 flight hours. The active

duty fleet is expected to retire by fiscal year 2003. The C-141 is being replaced by the C-17 Globemaster.

Operational Characteristics[48]

Length	168 feet 4 inches
Height	39 feet 3 inches
Wingspan	160 feet
Maximum Takeoff Gross Weight	323,100
Operating Weight	150,000
Maximum Useable Fuel	153,352
Maximum Allowable Cabin Load	68,725
Normal Passenger Seats Available	143
Maximum Number of Pallets	13
Range (with maximum payload)	2,170 Nautical Miles
Range (with no payload)	4,600 Nautical Miles
Average Cruise True Airspeed	425 Knots
Minimum Crew Complement	Five
Augmented Crew Complement	Seven

Although the C-141 has the capability of moving the medium weight brigade to more locations than the C-5 its limiting factor in moving the medium weight brigade is its impending retirement.

C-17

The C-17 is the U.S. Air Force's modern cargo carrying aircraft. It is designated to take over the duties of the aging C-141 fleet. The C-17 "is the key to meeting the nation's strategic mobility requirements for the twenty-first century."[49] Currently the U.S. Air Force will acquire 120 C-17s to replace the C-141. The C-17 improves the U.S. Air Forces ability to conduct global reach by landing on austere airfields in hostile environments. The C-17 is capable of landing on 2,000 feet of runway and taking off using up to 3,000 feet.[50]

> Strategic airlifters, such as the C-5, are intended to deliver cargo to a main operating base, such as Mildenhall. Loads are then broken down and either trucked to the front lines or flown in on C-130s. The C-17, however, can cut out that intermediate stop by flying into forward operating bases.[51]

Operating Characteristics[52]

Length	173 feet 11 inches
Height	55 feet 1 inch
Wingspan	169 feet 8 inches
Maximum Takeoff Gross Weight	585,000 pounds
Operating Weight	276,500 pounds
Maximum Useable Fuel	184,000 pounds
Maximum Allowable Cabin Load	170,900 pounds
Normal Passenger Seats Available	102
Maximum Number of Pallets	18

Range (with maximum payload)	2,400 Nautical Miles
Range (with no payload)	4,600 Nautical Miles
Average Cruise True Airspeed	450 Knots
Minimum Crew Complement	Three
Augmented Crew Complement	Five

The C-17 has many more advantages over the C-5 and the C-141 in the strategic deployment of U.S. Army personnel and material. "The C-17 loads more efficiently than a C-5, carries twice the cargo of a C-141, and can land on the same short, unimproved airstrips as a C-130."[53] The C-17 Globemaster will play a critical role with the deployment of the medium weight brigade. "Long range, outsized and oversized cargo capacity, the ability to operate on austere congested airfields, to efficiently on-load and off-load, to airdrop and airland troops and equipment, and excellent defensive [force protection] systems" will allow the U.S. Air Force to move a medium weight brigade into locations never imagined in the past.[54]

KC-135 Stratotanker

The KC-135 is an aerial refueler. This aircraft has the ability to carry limited cargo and equipment, it is a critical component of global reach and global engagement. Without the use of aerial refuelers all strategic lift

aircraft may have to make several stops enroute to their destination. The stops would increase the time it requires moving forces and material. Additionally, the take off and landing of aircraft would put greater stress on the aircraft thus increasing the likelihood of breakdowns and decreasing the overall service life of the aircraft. U.S. Air Force received its first KC-135 in June of 1957 and the last of the 442 air refuelers was delivered in 1965. The age of the fleet has forced it to undergo modifications. Current modifications will extend the service life of the aircraft well into the 21st century.[55] The KC-135 is key in moving the medium weight brigade to any location in the world.

KC-10A Extender

The KC-10A Extender is a versatile aircraft designed to provide increased global mobility for U.S. forces. The KC-10 fleet is more modern than the KC-135 fleet and is expected to serve the U.S. Air Force to 2043.[56] The U.S. Air Force primarily uses the KC-10 to transport its expeditionary forces overseas. With its unique capabilities the KC-10 can refuel fighter aircraft and carry fighter support personnel and equipment at the same time. The KC-10 has six fuel tanks aboard which carry 356,000 pounds of fuels, this is nearly twice as much as the KC-135 and enough to completely refuel a C-5 with some fuel remaining.

Additionally, the KC-10 can be air-refueled to extend its 4,000 nautical mile range.[57] This aircraft may have the potential to provide fuel on the ground to forces already delivered to the theater.

CRAF

As stated in the previous section the CRAF program is a voluntary program between DOD and commercial airlines. These aircraft provide additional lift capacity when the U.S. Air Force is not capable of moving all of the required forces and material to a specific theater. Aircraft in the CRAF program do not posses the same capabilities as military aircraft. They are not capable of carrying the full range of military equipment, only about 45 percent of the required tonnage for a major regional conflict are capable of fitting in the largest of commercial aircraft. The design of commercial aircraft prohibits the movement of outsized cargo or extremely heavy equipment.[58]

> Commercial airliners are designed primarily to produce maximum profit on developed route systems terminating at modern airfields designed for their use. Consequently, the fuselage of a typical long-range commercial aircraft is long and narrow to maximize seating and cruising speeds. Its wings typically are mounted through the lower fuselage to improve aerodynamics and to save weight by allowing the wing support structure to carry simultaneously the weight of the aircraft, its engines, and its landing gear. In concert, these features make the typical commercial aircraft a profitable carrier of passengers and package cargo. But they also sharply limit the size and weight of military vehicles and

> material that a commercial design can carry, as well as its ability to operate at high capacity on the rough airfields typically found in forward battle zones.[59]

Another limitation to the use of CRAF aircraft is in the fact that the program is voluntary. The airlines are typically held to a contract that is renewed annually. Additionally, the pilots that fly the aircraft are also volunteers. This can produce problems when the threat level is high and the aircraft owners and pilots decide they do not want to participate in the program. "Policymakers generally have assumed that airlines will not accept even moderate risks to their aircraft and that civilian crews are less obligated and less likely than military crews to risk the dangers of active areas of combat."[60] This was evident when, during Operation Desert Shield and Desert Storm, the number of volunteer pilots decreased when Scud missiles were falling around Riyadh and Dhahran.[61]

Aircraft in the CRAF program are divided into three segments and are activated in three stages. The three segments are International, National, and Aeromedical. They are described as follows.

> International -- The international segment is divided into long-range segment and short-range segment. The Long-Range International (LRI) segment supports AMC's global operations and requires aircraft capable of extended over-water operations in all three stages. The long-range international capability is computed in terms of wide body equivalents (WBE); where a WBE is equal to the capability of one B-747-100 aircraft. The Short

Range International (SRI) segment supports short haul operations from CONUS to near offshore locations in stages II and III.

National -- The national segment is divided into a domestic services section and an Alaska section. The domestic section provides domestic use-only passenger capability in the CONUS and Hawaii in stage III only. The Alaskan section supports 11th AF (PACAF) in the Alaska region.

Aeromedical -- The aeromedical segment provides aeromedical evacuation capability during contingencies and war using B-767 aircraft in stages II and III. They will be tasked to transport casualties from the field hospitals in the AOR to major CONUS medical facilities, then return to the AOR with supplies and crews, freeing military aircraft to support cargo flow requirements.[62]

Current polices limit the availability of these aircraft to the military. It requires the commander (CINC) of USTRANSCOM and the Secretary of Defense to authorize the utilization of these valuable assets. The CINC of USTRANSCOM has the authority to activate these aircraft for Stage I use. All other stages require the approval of the Secretary of Defense. CRAF are activated in the following three stages.

Stage I -- This stage is designated for Minor Regional Crisis and can be activated by the AMC/CC. Stage I requires a 24 hour response time for carriers to provide the designated airlift.

Stage II -- This stage is initiated for Major Regional Contingencies (Defense Airlift Emergency). Stage II also requires a 24 hour (48 hours for aeromedical) response time for carriers to provide pre-designated airlift.

Stage III -- This stage supports National Mobilization (National Emergency). Stage III

> requires a 48 hour response time for carriers to provide the designated airlift.[63]

The CRAF program has been activated only once since its inception and that was during Desert Shield and Desert Storm when first Stage I aircraft and then Stage II were called upon for duty.[64] As noted in the previous section airlines can volunteer their aircraft at any time to assist in the deployment of forces such as occurred during the deployment of troops and equipment to Southwest Asia in February 1998. The number of aircraft involved in the CRAF program fluctuates annually but generally consists of approximately 30 cargo and personnel carrying airline volunteers.

The major benefit of the CRAF program is that it expands the ability of AMC to deploy forces and material without maintaining a large fleet of aircraft. With the current types of aircraft in the program, their required availability timeline, and their inability to land on austere airfields limits their use for the deployment of U.S. Army forces under a 96 hour timeline. Additionally, if airfields were available and the aircraft were used the security and force protection of the civilian aircrews and aircraft becomes a limiting factor.

This section described the capabilities and limitations of the current inventory of U.S. Air Force aircraft and the CRAF program. The limitations of the aircraft presented severely hamper their use in the deployment of forces under

a 96 hour scenario. This limits the deployment of forces primarily to the C-17 because of the following reasons.

-- It has the capability to land on austere airfields.

-- Its has the cargo carrying capability for the type of equipment envisioned for the medium weight brigades.

-- It has its own ability to provide limited force protection.

-- Once on the ground it has the ability to discharge fuel, thus supplying a limited amount of bulk Class III.

-- Its ramp design allows the offload of equipment with limited to no material handling equipment.

The next section will discuss future aircraft capable of providing strategic airlift. Because of technological advances newer aircraft should have a greater carrying capacity with the requirements for shorter runways.

Section IV

Future Airlift Systems

The purpose of this section is to discuss the future of cargo airlift systems and the role that commercial enterprises play in the development of aircraft. It discusses the challenges of research and development, as well as, budgeting constraints.

Since the end of the Cold War the need to transport troops and equipment across the globe has increased dramatically. European armies have never required a large amount of strategic airlift and most nations use various C-130 versions or refitted commercial aircraft to conduct movement of troops and equipment around the European continent. Today, the Europeans have discussed the need for strategic airlift and the development of the Future Large Aircraft. Unfortunately very little money is devoted to the development of this aircraft.[65]

> Historically, there are no markets for strategic lift outside the U.S. Other nations have had neither the funding nor the requirement for a transport in this class. In the past, outside of the U.S. and Russia, the only money spent on military airlift has gone to C-130s, smaller turboprop aircraft and a few converted airliners. When long-range, high-capacity lift is needed, it is borrowed from the U.S. Air Force, further

highlighting NATO's reliance on the U.S. for strategic requirements.[66]

The bottom line comes down to money. Governments cannot afford to develop strategic airlift on their own because the expense of developing and maintaining large fleets of strategic lift assets is enormous. Consequently, governments may rely on industry to develop long-range aircraft that carry C-17 type of loads or greater to purchase for militarization rather than spend billions of dollars on their own research and development.

The world air market for freight hauling will have an effect on the availability of future CRAF members and on the ability for developers in the commercial sector to continue putting money into research and development of long haul cargo carriers. As the world grows closer into a global community the call for moving products and people to more locations across the globe continues to increase. The air freight market, excluding mail, is expected to grow at an annual rate of 6.5 percent through 2017.[67] Additionally, by 2017 it is expected that the world's air cargo fleet will double, with the greatest increases occurring in the large and medium class freighters.[68] Large and medium weight air cargo freighters fall into the 40 to over 65 ton range. In some cases these loads can meet or exceed those of the current fleet of military aircraft. Additionally, the

commercial market is experiencing a demand for outsized cargo carrying capability.

> A further issue that may be affecting future fleet composition is the "outsized" freight market. Some freight is too large to pass through the cargo doors of today's fleet. Two approaches are being applied to satisfy this increasing market segment: significantly modifying existing passenger airplanes or adopting military designs to accommodate commercial outsize loads.[69]

This is important to the U.S. Air Force and the CRAF program because the availability of these airframes may increase the amount of equipment shipped by the commercial aircraft into secured areas while aircraft like the C-17 are used for inserting forces into a hostile combat zone.

The Boeing Company sells a current version of the C-17 Globemaster named the MD-17. This aircraft has the same capabilities as the C-17 without as many redundant on board systems or its force protection components. The MD-17 was designed for the commercial industry to carry the increasing amount of heavy and outsized cargo. Using aircraft similar to both the military and commercial sector is advantageous to the military airlift program. The commercialization of the airlift allows companies like Boeing to continue to upgrade and conduct research and development on the aircraft without having to secure government contracts to provide the required dollars.[70] It also produces economies of scale

reducing the cost of each aircraft over contracts that cater strictly to the military.

Lockheed Martin is also developing long-range cargo carrying aircraft that may have military utility. By changing the wing design on aircraft Lockheed Martin hopes to develop a "super freighter" capable of hauling 160 tons of cargo without having to change the current set of ground equipment. "Wing designs have been relatively unchanged for decades, but engineers are working on new outlines that would vastly improve aerodynamic efficiency, capacity and range."[71] Not only can these aircraft be designed to carry 160 tons of freight but they can also be converted to carry up to 600 passengers.[72] Also, Airbus Industries, the European consortium, is developing an aircraft that has the capability to carry 150 tons of cargo over 5,000 nautical miles. Airbus' developmental aircraft is believed to save 45 percent in operating costs over the current popular 747-400 series aircraft.[73] The ability to save money on routine operating costs will give a boost to the overseas long-haul large capacity airfreight industry.

This type of research and development between commercial industries could pay big dividends to the military. Having companies develop large airframes that have the ability to haul heavy outsize cargo increases the

ability of the military to purchase future aircraft to fulfill expected increases in strategic airlift.

The U.S. Air Force knows and understands that the airlift requirements that currently exist are insufficient to meet future requirements. In a research paper titled *Airlift 2025: The First with the Most* General Fogelman is quoted as saying, "The single biggest deficiency in the Department of Defense is lift."[74] The research paper goes on to state that, "A dilemma exists, however, and threats to undermine America's military strength even while evidence of that strength is undeniable. The dilemma is air mobility."[75] With the end of the Cold War and the increased deployment of forces it is plausible to expect that as the world's only super power the number of deployments of U.S. forces will continue to increase. The U.S. Air Force must have the capability to maintain the edge in the strategic deployment of forces across the globe.

In order to maintain the edge in the deployment of forces the U.S. Air Force must have the dollars necessary to develop and procure aircraft for a power projection force.

> Ways must be found to minimize costs and while exploiting technology to conform to the future needs of air mobility forces. Systems with multi-mission capability, flexibility, and reliability will be key to meeting the challenges in the twenty-first century. This will be particularly true in developing future airlift and aerial refueling aircraft. Continued privatization efforts and the use of off-the-shelf technology will be necessary to meet the fiscal challenges of tomorrow.[76]

The U.S. Air Force hopes to develop systems that can fly 12,500 nautical miles without refueling, aircraft that are survivable in hostile environments, maximize compatibility of systems with other governments and commercial enterprises, the use of supersonic airframes, the development of airships, or the use of very large aircraft (VLA) capable of carrying up to 1,000,000 pounds of cargo.[77] To conduct the research and development on these types of projects the U.S. Air Force will have to enlist the help of commercial developers and even the international community. The costs of such programs and the feasibility of their implementation can be quite daunting.

The U.S. Air Force has committed itself to maintaining its core competency of Rapid Global Mobility well into the future. They understand that the need for the quick transport of troops and equipment anywhere in the world is crucial to maintaining the United States role as a super power. The U.S. Air Force plans to continue working on current power projection challenges now and those expected in future decades.

Section V

Conclusion

The problem of not having sufficient strategic airlift has existed since the military began incorporating airlift as a means to conduct military operations. The use of strategic airlift is costly but, its tradeoff of moving ground forces and their associated material quickly helps maintain the super power status of the United States. In order to use the U.S. Army the United States must possess the airlift resources to move it to any location on the globe and conduct missions in accordance with the wishes of the National Command Authority. The U.S. Army is incapable of moving itself simply because it does not possess the strategic airlift assets to do so. It must rely on the U.S. Air Force. The U.S. Air Force has an aging fleet of strategic airlift aircraft that are slowing being replaced by the C-17. While other aircraft are having their service life extended. The dollars for a complete modernization of the strategic airlift fleet do not exist in the current peacetime environment. However, this does not preclude the U.S. Air Force from having the responsibility to move ground forces. Nor does it preclude the U.S. Army from being more

responsive and capable of the immediate deployment of forces.

In response to these challenges the Chief of Staff of the Army, General Eric Shinseki, announced the formation of the Medium Weight Brigades at Fort Lewis, Washington. His goal for these, lighter than a heavy division, and more lethal than a light division, units is the deployment of a brigade size element in 96 hours, a division in 120 hours and five division in 30 days. The question then remains, "A brigade in 96 hours: Can the U.S. Air Force move the U.S. Army in time?" Currently, the answer is no. There simply is not enough airlift available to move a medium weight brigade. See Figure 2[78].

Figure 2 depicts that, with current airlift assets, a unit would have to weigh less than 7,798 short tons to move within 96 hours. This does not include water or bulk fuel, both of which are required to sustain the mechanical and human force. This figure, 7,798, is based on the number of strategic airframes available and the 96-hour timeline established by General Shinseki. Currently, as depicted in Figure 2, the Medium Weight Brigade would weigh in over 17,000 short tons and would take 9.6 days to deploy in a Kosovo scenario.

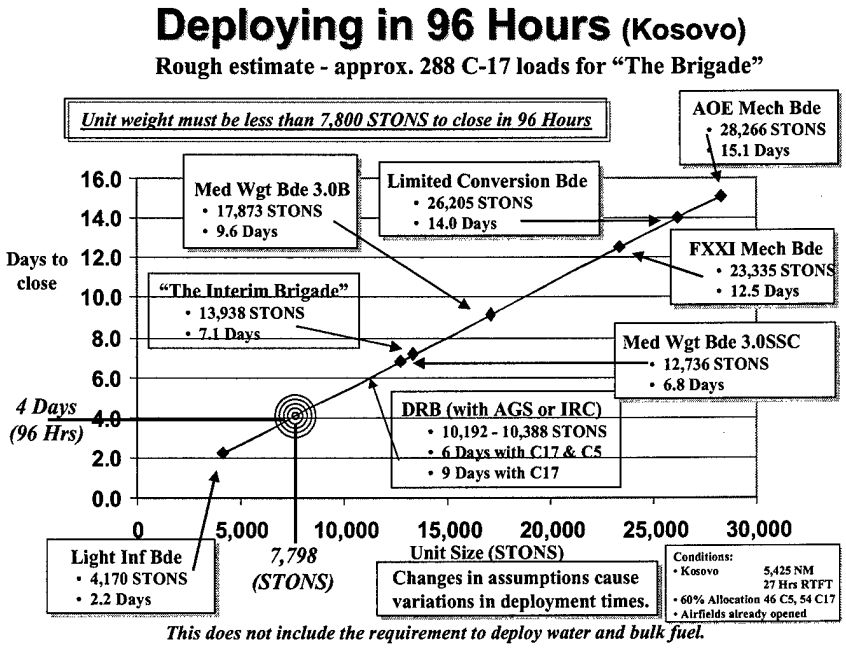

Figure 2

Other considerations that must be taken into account, when determining deployment times, are as follows.

-- MOG, or Mission on Ground. This term is used to describe the number of aircraft an airfield is capable of handling at one time. A MOG of one means that one aircraft can land, unload, and then must take-off again prior to a second aircraft landing.

-- Host Nation Support. Countries surrounding a crisis area may not support U.S. forces in their country. If this were to occur, additional combat forces may be required to support an initial landing of aircraft in a forced entry operation. This may mean that Marines may have to make an amphibious landing, naval gunfire may be used to support the

landing of aircraft, both of which may require more than 96 hours of steaming to reach their destination. Additionally, landing in a hostile environment, or in a country that will not provide support the aircraft may have to conduct additional aerial refueling prior to landing to ensure enough fuel is on board to take off.

--Runways and airfields. In Figure 2 C5s were used to move troops and equipment to Kosovo. In an austere environment C5s may not be able to land. Since its lack of agility requires it to use main operating bases they may have to land in a host nation and trans-load troops or equipment to other aircraft. This would increase the deployment timeline of the U.S. Army.

-- A comparison of the four aircraft capable of conducting strategic airlift is depicted below in Figure 3. It is apparent from the chart that the C-17 is the most agile aircraft and the only aircraft that can land and takeoff with a runway as short as 3000 feet. The C-17 also has the greatest cruising range, which means fewer aerial refuels and/or landings to fuel the aircraft. This capability allows the KC-135 Stratotankers to conduct other global missions rather than focusing solely on the C-17 fleet. Finally, the C-17 carries a greater payload than both the C-141 and the KC-10, while it is only 8 tons short of the capability of the C-5.

AIRLIFT AIRCRAFT COMPARISON	C-5A	C-5B	C-17	C-141B	KC-10
1. MAX TAKEOFF 2.25G	769,000	769,000	570,000	343,000	.....
GROSS WEIGHT (LBS) 2.5G	769,000	76 9,000	523,000	323,000	593,000
2. OPR WT EMPTY (LBS)	372,5000	374,000	236,600	149,000	244,500
3. MAX ACL (LBS) 2.25G	261,000	261,000	172,200	90,000	.....
2.5G	197,500	216,000	140,800	69,725	169,500
4. MAX PALLET LOAD	36	36	18	13	27
5. WARTIME PALOAD DELIVERED 2,900 NM (LBS)	188,000	188,000	172,200	72,000	169,50 0
6. RANGE (NM) 2.25G	1650	1530	2940	1970	.....
WITH MAX ACL 2.5G	2600	2250	2840	2160	3100
7. FERRY RANGE (NM)	6200	6200	5290	4600	9800
8. AVG CRUISE SPEED/MACH	450/.77	450/.77	450/.77	425/.74	481/.82
9. TO GND RUN (FT):	7780	7800	7600	5900	9300
10. LND ROLL (FT): MAX ACL & 500 NMS FUEL (SL/STD DAY)	2750	2780	1880	2180	2800
11. AMC MIN WARTIME RUNWAY LXW (FT)	5000x90	5000x90	3000x90	5000x90	6000x90
12. MIN 180 DEGREE TURN FT	143	143	90	137	142
13. AIRCRAFT SIZE: LENGTH	248	24 8	175.2	168	182
(FT) WING SPAN	223	223	171	160	165
HEIGHT	65	65	55	40	58
14. CARGO COMPT: WIDTH	19	19	18	10.2	18
(FT) HEIGHT	13.5	13.5	12.3	9.1	8
LENGTH (INCLUDE RAMPS)	144.7	144.7	88	104.4	125
15. THRUST (LBS)	41,000	41,000	40,700	21,000	52,500

Figure 3

--Unforeseen events. Unforeseen events could run the gauntlet of severe weather restricting aircraft from flying or the grounding of aircraft due to a severe maintenance or manufacturing problem. Although the latter two considerations are rarely taken into account the recent grounding of MD-80s and Apache helicopters demonstrate that it can happen. The U.S. Air Force does not have a redundant strategic airlift system with the same capabilities as the C-17.

Currently the US Air Force is incapable of moving a medium weight brigade in 96 hours. Without more lift assets or the development of a medium weight brigade that is considerably lighter in weight, the U.S. Air Force will not be able to move the medium weight brigade of the future.

However, with future technology and the development of larger airframes capable of meeting the similar support criteria of the C-17 it is plausible that a heavier medium weight brigade might be deployed in 96 hours. Ultimately it will depend on committing national treasure to the development of larger, more versatile aircraft capable of lifting heavier forces or making ground forces lighter with increased lethality.

[1] Thomas M. Baker, "As Military Cuts Grow, So Does Dependence on Future Airlift," *Transportation Corps, July 1994*, 27.

[2] "National Military Strategy," Available from http://www.Dtic.mil/jcs/core/nms.htm#Top; Internet accessed on 2 December 1999.

[3] Sloyan, Army Learning Tough Lessons, 2.

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