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IMPROVING THE CIVIL RESERVE AIR FLEET (CRAF) PROGRAM

BY

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IMPROVING THE CIVIL RESERVE AIR FLEET (CRAF) PROGRAM

AN INDIVIDUAL STUDY PROJECT

by

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ABSTRACT

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The need for a strong military and civilian air carrier partnership is fundamental to our nation's ability to project military power throughout the world. This paper studies the development of the Civil Reserve Air Fleet from the late 1940s to present. The author reviews current national security strategy and a series of mobility studies that have supported a strong need for flexible and responsive strategic air mobility. The National Airlift Policy developmental process and resulting compromises between civil and military transportation requirements is also reviewed in the study. The author provides a summary of the CRAF's first combat test in Operation DESERT SHIELD and DESERT STORM. The paper includes a review of lessons learned and management actions occurring to "fine tune" the CRAF. The author looks at non-traditional business incentives to aid the airline industry and encourage continued voluntary participation in the highly successful CRAF program. The civilian industry provides an efficient and effective augmentation for military airlift capability when needed for peacetime or wartime airlift. This study is intended to provide a greater understanding of options available to continue a healthy business atmosphere for civil carriers. A strong CRAF program is essential to national security planning and execution.

INTRODUCTION

The French were in desperate need of reinforcements as the Germany Army threatened their capitol during September 1914. The soldiers were present for duty, but the problem was how to transport the troops to the front lines from Paris. The French solved the problem by using civilian taxicabs as troop transports. General Gallieni's Army officers quickly briefed the newly recruited drivers on procedures to move reinforcements to the battle that held the Germans at the Marne River. The use of more than 1,000 taxis saved the Allies from defeat and proved that mobility is essential to victory.[1]

During the Gulf War, our nation's strategic mobility capability demonstrated the effective use of military and civilian resources to deliver, sustain, and redeploy combat forces. The United States (U.S.) responded quickly to King Fadh's request for assistance as Iraq's army massed along the border between Saudi Arabia and Kuwait. Strategic mobility forces composed of airlift, sealift, and prepositioned military material maintained a viable military capability throughout the conflict. Equipment, parts, and ammunition flowed over supply lines of nearly 8,700 nautical miles by sea and 7,500 nautical miles by air to the 500,000-strong combat forces.[2] The Civil Reserve Air Fleet (CRAF), activated on 17 August 1990, was a key national asset used to build and sustain military forces to stop aggression and accomplish the military objective of removing the Iraqi Army from Kuwait.

Our nation faces new challenges in a post-Cold War environment. As our military forces decrease at foreign bases, our nation must maintain a strategic capability to respond to future conflicts, peacekeeping operations, or humanitarian efforts worldwide. Likewise, the U.S. must provide a robust level of support throughout the operation. A global transportation system is essential for deployment of forces to any region in support of national interests. Today, U.S. airlift capability is the mainstay of United Nations (U.N.) operations in several regions of the world. For example, air transportation missions from European bases have aided 24 ex-Soviet cities, the Balkins, Somalia, and Angola since early 1991.[3]

A global transportation system requires both military and civilian resources to meet frequently tasked missions. The Department of Defense (DoD) seeks cost effective ways to maintain and improve our overall strategic air mobility capability. This paper will review one part of our nation's strategic mobility force structure, specifically the CRAF program, and examine innovative ways in which to encourage greater participation and utilization of our commercial airline industry.

A NEW ERA FOR MOBILITY

The break up of the Soviet Union and demise of the Warsaw Pact in 1989 greatly reduced the threat of North Atlantic Treaty Organization (NATO)-Warsaw Pact global war. Our national

strategy of containment is no longer valid as we shift from a global threat to an uncertain world. Regional instabilities continue to threaten our interest and security. The world remains unpredictable and over-armed, and many emerging nations have not eliminated the use of force or intimidation to achieve political objectives. Our military forces must deter or prevail in those situations when the National Command Authority (NCA) deems use of the military arm is necessary. Forward presence of U.S. forces provides a more credible deterrence, promotes regional stability, and provides an initial capability for crisis response and escalation control. However, we must maintain the capability to project power and sustain operations should other efforts fail to deter conflict.

The National Security Strategy of the United States sums up the defense agenda for the 1990s with the following statement:

> As the war in the Gulf made clear, the easing of the Soviet threat does not mean an end to all hazards. As we seek to build a new world order in the aftermath of the Cold War, we will likely discover that the enemy we face is less an expansionist communism than it is instability itself. And, in the face of multiple and varied threats to stability, we will increasingly find our military strength a source of reassurance and a foundation for security, regionally and globally.[4]

The regional defense strategy and the Base Force structure help support democracy and our national security interests in a post-Cold War world. While the Soviet threat in Europe is eliminated, regional defense strategy recognizes nations may try to achieve power in areas of vital interests to the U.S. with little warning. These potential regional conflicts may occur in

any area of the world coupled with differences in the nature of the threat and level of support from allies. U.S. leadership will continue in a new world order as our policies move from a threat based strategy to one that is interest and capabilities based.

Our national security depends on four fundamental elements: strategic nuclear deterrence and defense, forward presence, crisis response, and reconstitution. A highly responsive military force must be available with little or no notice to respond to regional crisis. The nation must be ready to deploy a predominately continental U.S. (CONUS) based force (army, air force, naval, and special operations) when protecting vital interests from unexpected or sudden challenges.[5] A cost effective national air transportation system provides a means for rapid response to meet a crisis in any part of the world. The requirement for CRAF, as an integral part of this air transportation system, offers a tremendous airlift capability that can augment limited military resources in a crisis.

NATIONAL TRANSPORTATION POLICY

National transportation policy has provided resources for a U.S. response to conflicts for the past 40 years. Recognizing the strategic importance of global air transportation, President Truman issued Executive Order Number 10219 on 28 February 1951 directing DoD and the Department of Commerce to build a plan to

supplement military airlift with commercial airlines in times of national emergencies. The order specifically authorized the Secretary of Commerce to "allocate aircraft of the types used by civil carriers as required to meet the needs of the armed forces and to maintain essential civil routes and services."[6]

The airlines and the military reached a compromise in December 1951 by creating the CRAF. Why the CRAF? The airlines feared a military take over of commercial aircraft that created havoc with airline plans during World War II. On the other hand, the military wanted to militarize the commercial fleet during times of national emergencies. The CRAF plan finally resolved the issue of militarization of the commercial fleet by allowing civilian operation of the airlines. The concept also permitted regular crews to fly civil aircraft under contract to the government. In addition, the airlines agreed to provide air transportation at no increase in rates during a national emergency. The Air Force supported the concept and directed the entire program to include sizing of the CRAF fleet.[7]

In the post-Korean environment, the airlines and Military Air Transportation Service (MATS) entered turbulent times as a debate focused on the role of the military in air transportation during peacetime operations. The commercial aviation industry obtained support from Congressional leaders for a review of military capability with interests centered on protecting commercial business. The military favored a robust peacetime airlift force to quickly respond to future crisis.

Two government reports fueled the controversy during the 1950s and eventually brought change to MATS and the CRAF. The airlines viewed one, the 1954 Air Coordinating Committee report on Civil Air Policy, as support for more government business. The President requested this report, but he did not endorse its findings. The White House viewed the report as useful in only evaluating future airlift policy issues. The Hoover Commission report of 1955 added another dimension to the airlift debate. It primarily looked at cost saving measures in the government. The Commission favored consolidation of all military transportation activities as a sound management practice in DoD and regarded commercial participation as beneficial. Therefore, the two reports reinforced the need for consolidated military airlift while allowing the civil airlines to assume a greater role in airlift for the nation.[8]

The debate on the size and modernization of military airlift continued into the late 1950s. There was an investigation and hearing by the Military Operations Subcommittee to review the policies, procedures, and operations of DoD in the transportation of cargo and passengers. The commercial carriers believed the Air Force was unfairly competitive with their business and detrimental to their economic well-being. The airlines simply wanted more DoD business and continued to block efforts by MATS to modernize its fleet. In the end, the subcommittee made 22 recommendations that forced the military to concentrate only on the outsized cargo or unusual missions. In addition, the

subcommittee supported commercial aviation's pursuit for a greater role in passenger and conventional cargo movement.[9]

The Congressional climate, which supported commercial airlines, finally began to change when the Air Force responded to dual crises in Lebanon and Taiwan in 1958. Turmoil in Iraq led Lebanon to seek military assistance from America. As the Middle East crisis began to resolve, the Chinese Communists threatened Taiwan. The Lebanon crisis did not require civil aircraft, but cargo bound for the Pacific piled up at Travis Air Force Base while MATS solicited help from commercial aviation. The airlines submitted high bids or refused to participate because of the vacation season. General Curtis Lemay, in a powerful statement to Congress, expressed the need for military transports because the free world cannot wait for the acquisition of commercial airlift when suddenly threatened.[10] The issue ended with a presidentially directed study of MATS' peace and war responsibilities.

This study, The Role of Military Air Transport Service in Peace and War, February 1960, contained nine presidentially approved courses of action. A major thrust of the study encouraged DoD to develop and use commercial airlift augmentation. Additionally, the study established major policy in two controversial areas. First, the study established CRAF as a national capability for augmenting military airlift. Second, military transportation needed modern equipment. In 1963 MATS developed policies to improve reliance on the private sector with

procedures to call up civil air in stages.[11] Since the 1960s, civil carriers have completed more than 90 percent of DoD's peacetime passenger movements.[12]

The next two decades saw little controversy with the national transportation policy. The airlift doctrine of the 1970s recognized CRAF's limitation in carrying outsized cargo and need for sophisticated ground equipment. DoD also recognized their superb capability as a people mover during large scale deployments and a cargo bulk carrier between major air terminals.[13] In the meantime, DoD built a modern military jet transportation fleet to move special missions and bulky or outsized cargo over long distances.

The most recent change to our national transportation policy occurred on June 24, 1987, when the White House issued National Security Decision Directive (NSDD) Number 280. It included nine policy guidelines for the U.S. to efficiently and effectively meet airlift requirements in peace or war. This directive replaced the Presidentially approved courses of action contained in The Role of Military Air Transportation Service in Peace and War. A copy of NSDD Number 280 is at Appendix 1.

MOBILITY STUDIES

The civil air carriers provided sufficient commercial airlift during the Vietnam conflict and throughout the 1973 Israeli Airlift by backfilling military airlift on scheduled

routes. They provided about half of the U.S. strategic airlift capability by 1975.[14] However, the Iranian revolution and growing Soviet threat stirred Congress to commission a mobility study to investigate the military's ability to respond to worldwide events. The Defense Authorization Act of 1981 directed a study to address strategic mobility needs.

The Congressionally Mandated Mobility Study (CMMS), submitted to Congress on 21 May 1981, was an extensive effort to evaluate strategic mobility requirements for the 1990s. CMMS examined four airlift scenarios: a regional conflict in the Persian Gulf, a Soviet invasion of Iran, a NATO-Warsaw Pact conflict, and a conflict in the Persian Gulf accompanied by a precautionary reinforcement in Europe. The study concluded current airlift capability could not achieve the required delivery dates of the least demanding scenario of 88 million ton-miles per day (MTM/D).[15] The Military Airlift Command (MAC) analyzed CMMS and published the Master Airlift Plan in March 1983. MAC established a fiscally constrained goal of 66 MTM/D by adding 20 MTM/D to the projected 1986 intertheater airlift capability of 46 MTM/D. Therefore, the study recommended the minimum goal for airlift capability of at least 66 MTM/D which was constrained by fiscal pressure. Furthermore, the analysis of CMMS showed that half of the recommended increase should be in outsize cargo capability.[16]

As such, CMMS guided policy decisions for all mobility programs in the 1980s. There were many programs focused upon

improving airlift capability. The CRAF enhancement program, completed in 1990, modified commercial jet aircraft to carry cargo for the military. Twenty-three DC-10 and B-747 CRAF enhanced jets added 3.4 MTM/D to cargo airlift capability.[17] Congress also funded new C-5Bs, KC-10s, the C-141 air refueling and stretch program, and a C-5A wing modification to increase and sustain airlift capability. Finally, CMMS emphasized the advantages of an aircraft that could fly long distances and deliver cargo in forward operating areas. Secretary of Defense (SECDEF) Weinberger confirmed the need for the C-17 when he certified a need for additional military airlift capability under Section 203 of the Defense Authorization Act of 1981. Without SECDEF certification, funds would not have been obligated for the full-scale engineering development or procurement of the C-X (or any other new transport aircraft). The C-17 continues to receive support from the Services and Congress today, even in a fiscally constrained environment.[18]

The Revised Intertheater Mobility Study (RIMS) was an update to the CMMS and the 1984 DoD Sealift Study. RIMS reviewed four cases that included varying mixes of mobility assets. Each case used a single scenario of a global war following a Soviet invasion of Iran. Again, the results of RIMS showed a significant shortfall in strategic mobility resources. DoD, however, never approved the report because it would have created severe programmatic problems.[19]

Congress directed another study of strategic mobility in the National Defense Authorization Act for fiscal year (FY) 1991. The Mobility Requirements Study (MRS) examined airlift, sealift, amphibious lift, surface transportation, and prepositioning to support operations in the 1999 time frame. It also included an integrated plan to meet requirements including cost factors. The MRS used the Base Force structure and crisis response strategy as the framework of the study. Various scenarios were used to determine forces required to resolve conflict with varying degrees of confidence. Scenarios involving the Middle East or Persian Gulf, Korea, Europe, Southeast Asia, and Western Hemisphere used the regional contingency concept. The study also evaluated two regional contingencies beginning sequentially. Overall, the planners conducted more than 90 war games. Each game included mobility data from DESERT SHIELD, DESERT STORM, JUST CAUSE, and Grenada. The CRAF data included 406 aircraft available in three stages.[20]

MRS presented three mobility options to meet requirements of the worst case scenario involving the Middle East or Persian Gulf area. DoD rejected the low-confidence/low-cost option because it did not meet criteria of a support ratio of 1.5 tons of deployed support equipment to one ton of deployed combat equipment. MRS recommended the medium-confidence/medium-cost option because it offered balanced intertheater requirements, confidence in achieving mobility goals, and lower cost. It is projected to cost $6.98 billion above the FY 1999 mobility baseline.

Therefore, it is a fiscally prudent program developed to move four and two-thirds army divisions, 8,700 nautical miles, in six weeks. The high-confidence/high cost option met criteria but not cost at a price tag of $10.47 billion more than the baseline force over the FY 1993-1999 time frame.[21]

Unlike the CMMS, MRS considered costs in all of its options to build a prudent mobility force structure. Study methodology consisted of both war fighting analysis and cost analysis.[22] The study assumed continued support for both the C-17 and the CRAF programs. The U.S. should achieve a combined military and civilian capacity of 57 MTM/D by 1999 which includes 20 MTM/D provided by civil air and procurement of 120 C-17s. The C-17 is key in reaching out from today's 48 MTM/D capacity.[23] Above all, MRS gives strong advocacy to sealift forces over the next several years while taking fiscal constraints into account. MRS will likely be a benchmark document for an improved sealift fleet in the decade of the 1990s.

CRAF BACKGROUND

MRS examined several scenarios using data from previous contingencies in the war fighting analysis study. The CRAF activation during DESERT SHIELD and DESERT STORM allowed use of factual data that moved CRAF from theory into practice. In four decades, the concept was never tested as a source of national

transportation capability, but it was found to be sound. Civil air added significant airlift capability during the Gulf War.

The U.S. has depended on commercial carriers since World War II where they provided more than 85 percent of the airlift.[24] Since the CRAF's beginning in the early 1950s, it has only experienced two major changes. In 1963 a memorandum between DoD and the Department of Commerce outlined three stages of incremental activation of civil air to provide for measured response actions (see Appendix 2). Stage I, Committed Expansion, provides long-range international aircraft to augment military airlift. The Commander-in-Chief, Air Mobility Command (AMC), formerly Military Airlift Command (MAC), has authority to activate Stage I. Stage II, Airlift Emergency, provides additional airlift short of national mobilization. The Secretary of Defense activates this stage. At Stage III, National Emergency, SECDEF activates all aircraft in the CRAF after a national emergency is declared by the President or Congress.[25] Currently, the number of aircraft assigned to each stage varies by month due to maintenance schedules, sales, and other factors.

A second management change occurred in 1969 with the transfer of responsibility to the Department of Transportation (DoT) from the Department of Commerce. DoT maintains responsibility to assign civil air resources to national needs. AMC continues to coordinate the CRAF plan with commercial carriers and award contracts. AMC awards contracts to carriers in almost direct proportion to their commitment to the CRAF.

Thus, each carrier shares the annual military business according to the number and types of aircraft offered to the CRAF.[26]

Today, the civil reserve program provides more than 50 percent of DoD's strategic airlift capability. About 32 percent is cargo capability and 93 percent is passenger capability. In addition to CRAF stages, there are several segments used to support military requirements in peacetime or at stages of an activation. The long-range international (LRI) segment supports global passenger and cargo operations with extended overwater operations. The short-range international (SRI) segment supports passenger and cargo missions with B-727 type aircraft for short-haul operations from CONUS to near off shore locations. A domestic segment supplies cargo aircraft in support of CONUS DoD supply distribution systems. A fourth segment, Alaskan, provides cargo aircraft to support Alaska. Finally, the aeromedical segment uses B-767 aircraft to provide global aeromedical evacuation capability. A listing of CRAF carriers is at Appendix 2.[27]

The CRAF is strictly a voluntary program, no law requires participation. The success of the program simply lies in the cooperative arrangement between the government and private industry. The airlines receive points based on the percentage of capacity provided to DoD for augmentation. In theory, the greater percentage of CRAF capacity provided by the airlines should equate into a larger share of peacetime military business. If an airline provides 10 percent of CRAF capability, it should receive 10 percent of the military's peacetime business

contracts. Of course, mission requirements will affect the business arrangement since the airline may not have the type of capability required for the mission. In addition, each CRAF carrier must be Federal Aviation Administration (FAA) certified. All carriers must respond within 24 to 48 hours of activation. Finally, the carrier also must have a four to one crew ratio exclusive of members belonging to the Air National Guard or Air Reserve.[28]

AMC awards contracts to CRAF participants for international service. CRAF carriers received about $615 million of airlift contracts during FY 1990-1992. The result of these contracts exposes CRAF carriers to military operations and keeps the military in close contact with civilian industry.[29]

CRAF IN THE GULF WAR

When military resources were unable to meet the growing requirements for Operation DESERT SHIELD, General Johnson, Commander-in-Chief of MAC (CINCMAC), activated CRAF to support the deployment of forces. General Johnson activated Stage I on 17 August 1990 which provided 23 cargo and 18 passenger aircraft. With the onset of DESERT STORM, Secretary Cheney declared an airlift emergency that authorized MAC to activate Stage II on 17 January 1991. As a result, CRAF flew nearly 5500 missions in support of the Gulf War by the time the activation was over on 24 May 1991.[30] This effort represented 20 percent of the

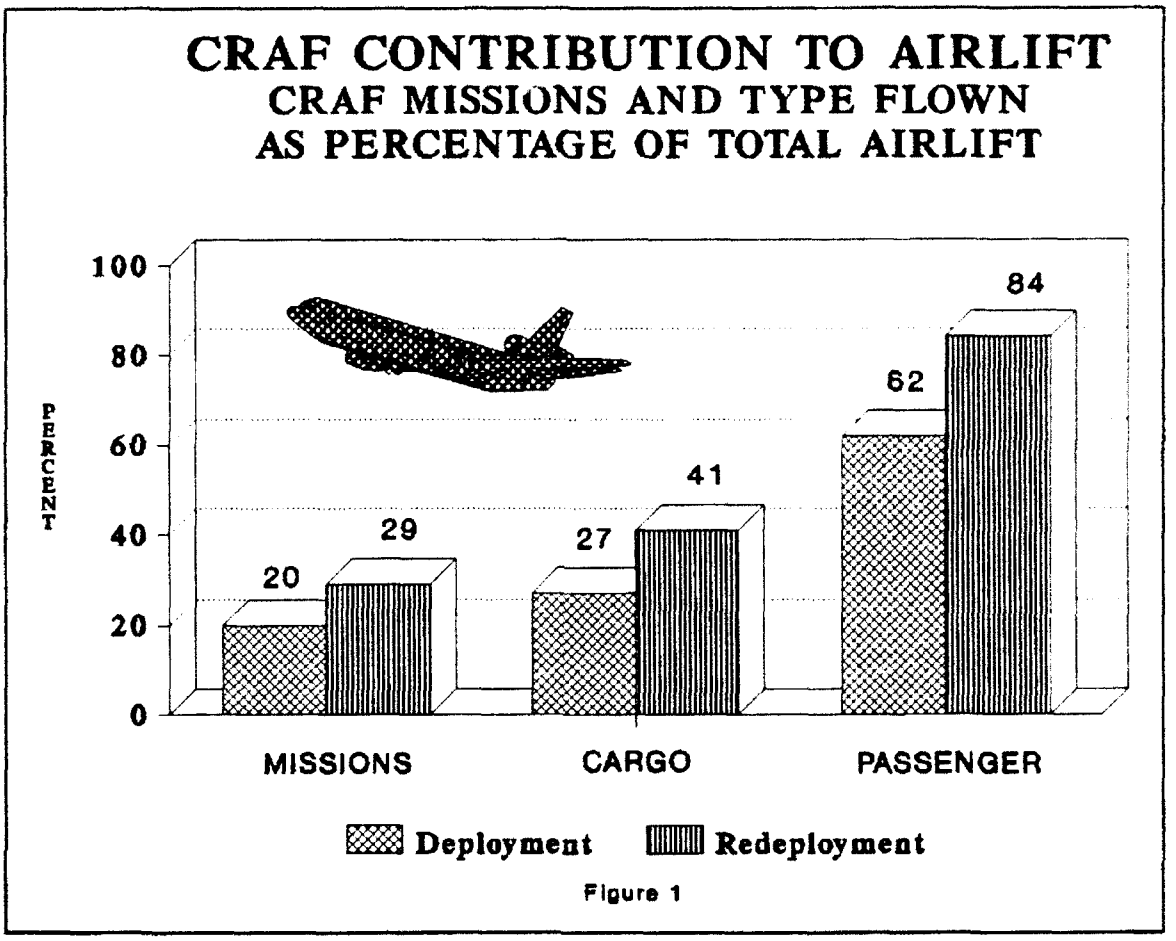

Figure 1

deployment and 29 percent of the redeployment missions. Civil air carried over 700,000 passengers that represented 62 percent of deployment and 84 percent of redeployment passenger capacity. In cargo capability, CRAF carried over 230,000 tons equating to 27 percent of deployment and 41 percent of redeployment mission support (see Figure 1). Commercial airlines received more than $1.35 billion of contracts from DoD.[31]

Air carriers eagerly volunteered aircraft throughout the Gulf War. Volunteer airlines were flying some of the first DESERT SHIELD missions. Airlines continued to volunteer additional aircraft to make 55 aircraft available for military

missions by December 1990. Activation of Stage II made about 125 more aircraft available, however, only 20 to 30 were actually used.[32] The airlines also provided an additional 30 cargo aircraft above those required by activation of Stage II.[33] For a list of carriers flying missions in the Gulf War, refer to Appendix 3.[34]

This first activation of the CRAF is considered a complete success by many people in government. The true test of the CRAF in the Gulf War proved that a nation's transportation resources are a critical factor in a military campaign. They provided a significant percentage of the airlift requirement as an integral part of DoD's airlift capacity. The carriers were happy since they were making more money than operating in the depressed 1990-1991 civil airline market.[35] The carriers were prompt and proved invaluable in meeting DoD's surge, deployment, sustainment, and redeployment during Operation DESERT SHIELD and DESERT STORM.

The activation of the CRAF did not occur without some problems, and there are several recommendations for improvements to the program. General Johnson stated, "There is a need to fine tune the CRAF for the future." A Pentagon-sponsored study by the Logistics Management Institute (LMI) recommended changes in management affecting the three stage approach to activate the CRAF and aircraft use. The report found stage activation "troublesome" for MAC and inflexible in meeting capabilities required in each stage. MAC and civil carriers experienced

scheduling conflicts with airlift requirements and available aircraft that sometimes caused lower aircraft utilization rates. LMI recommended independent segments for passenger, cargo, and aeromedical aircraft that are divided into short and long-range categories. In short, LMI's recommendation sought to create more specialized call-up categories to match the airlift requirement.[36]

According to the LMI study, a large pool of volunteer aircraft also caused management problems at MAC concerning priority of use, length of availability, and use. While LMI supported MAC's use of these volunteers, they suggested a more formal incorporation of these aircraft into a revised CRAF structure. The concept recommends use of volunteer carriers before commitment of aircraft in a CRAF stage or segment. In addition, LMI recommended a lottery system to select volunteers and help remove bias in aircraft selection.[37]

The Air Force did not agree with dropping the three stages nor with the proposed lottery process. Mr. Lloyd Mosemann, Deputy Assistant Secretary for Communications, Computers, and Logistics in a memo to the Assistant Secretary of Defense for Production and Logistics stated, "The airlines are not about to commit their business base to the vagaries of a lottery."[38] However, the Air Force is improving CRAF management. AMC recently revised the types of airplanes assigned to each stage to include 30 passenger and 30 cargo in Stage I; 75 passenger and 75 cargo in Stage II; and 225 passenger and unlimited cargo in

Stage III. An aeromedical segment now exists in Stage II and III. Also, a volunteer policy is now formalized that will allow activation of volunteers first. In addition, aircraft not used within 72 hours of activation are released. These carriers receive a five day notice if required at a later time unless a higher stage of the CRAF is activated. Finally, carriers are guaranteed an average of eight hours per day for the duration of activation or minimum of 30 days, whichever is longer. A 15 day notification is given before release of aircraft.[39]

Coupled to CRAF, the senior lodger concept also needs refinement. The senior lodger is a CRAF carrier agent responsible for supporting all missions going through their station. The senior lodger provides ground support, services, and crews for the mission. Currently, the senior lodger is used only in Stage III. Since the Gulf War did not use Stage III, several carriers reported ground servicing delays caused by military personnel supporting military airlift operations at a higher priority level. The LMI report states, "The civil carriers had nobody to represent their interests on the ground." Additional, LMI reported carriers were unsure of their responsibilities, not assessed in their capability to meet senior lodger tasking, and tied to specific airports.[40] AMC now makes the senior lodger program active in all stages.[41]

From the carrier's viewpoint, the most significant lesson learned was the need for comprehensive war risk insurance. Air carriers operated several flights without proper insurance

coverage. Some volunteer airlines were unwilling to accept the risk since nonpremium insurance was only available on the inbound flight before activation. Once aircraft activate under CRAF provisions, carriers receive nonpremium, full-liability insurance coverage under Title XIII of the Federal Aviation Act of 1958. However, the FAA did not provide timely support and lacked knowledge of insurance practices according to the carriers. The carriers found the FAA insurance coverage administrative process cumbersome which resulted in some flights being delayed or rescheduled. The Air Force supports changes to Title XIII to ensure private industry does not assume unnecessary legal or insurance risk.[42]

LMI's report also identified concerns with the carrier's ability to provide enough crews for each aircraft committed to the CRAF. The program requires four crews per aircraft. LMI recommended MAC modify contracts to require all CRAF carriers to report crew information. They also recommended MAC revalidate the four crew requirement per aircraft and set up new criteria as required.[43] AMC and the airlines do not expect change in the four crew per aircraft ratio.[44]

Finally, LMI reported problems between military and civil communication systems.[45] AMC is working to develop automatic interfaces between military and civilian systems. Carriers are now receiving secure facsimile machines and telephone systems. The Air Force and carriers are working issues to install secure air-to-ground communications systems in aircraft.[46]

CRAF INCENTIVES

In the aftermath of DESERT STORM, the nation's airlines faced a declining and more competitive market. Several airlines have disappeared from a market where they once dominated in the global transportation arena. A few airlines considered the CRAF activation to have been detrimental as they lost business to foreign carriers because of their participation in CRAF. There is a growing concern that carriers may be reluctant to continue their voluntary participation in CRAF. To further complicate the problem, the military is in the middle of a draw down and forces are returning to CONUS. These actions will certainly decrease the amount of peacetime business available to CRAF carriers that drives their participation in the CRAF. A smaller CRAF program means less capability in times of crisis. Major General McCombs, MAC's Chief of Staff, Plans and Programs, states, "Our problem is going to be how do we motivate carriers in a decreasing market."[47]

CRAF incentives have existed for several years. The most successful incentive is DoD business when volunteering aircraft for the CRAF program. The airlines provide nearly all long-range peacetime passenger movement to overseas locations. Many military members and family have experienced this travel mode during assignments to and from overseas locations. AMC contracts air fares with the carrier for charter flights or blocks seats on scheduled flights. Currently, AMC works on a three year contract

and plans to guarantee airlines a certain amount of business each year as a further incentive.[48] Finally, joint ventures, formed in the 1980s, give smaller airlines an opportunity to become CRAF carriers. This successful program allows employment of personnel from other joint venture CRAF participants in any four crew complement per aircraft. Joint ventures provide increase flexibility for the smaller carrier that wants business with DoD.

Public Law 97-86 authorizes the CRAF enhancement program. It authorizes the Air Force to pay for the modifications of civil passenger aircraft to carry cargo. The program includes reinforced floors, side cargo doors, and rollers to allow use of pallets. The Air Force pays the carrier for additional fuel costs due to the increased operating weight of the aircraft after modification.[49]

The results of the enhancement program are mixed. First, some carriers do not support modifications because it would "place them in a noncompetitive situation within the commercial marketplace." Second, airlines with modified aircraft may go out of business. As demonstrated by Pan American's business failure, the government lost access to enhanced jets. The enhanced jets are not available until a new U.S. buyer purchases the jets and volunteers them to the CRAF program. A foreign carrier cannot participate in the program. Thus, there is a business risk with CRAF enhancement. Third, only four CRAF enhanced aircraft were used in more than 5,000 DESERT SHIELD/STORM missions.[50] This low utilization rate may raise questions about the cost effec-

tiveness of future enhancement programs. Finally, there is very little money to continue the enhancement program with reduced military budgets and dollars already allocated to the C-17.

United States Transportation Command (USTRANSCOM), DoD's unified transportation command, and civilian airlines now focus on non-traditional incentives that are worked within the spirit of the National Airlift Policy. There is a growing concern in the airline industry with their ability to attract capital for new aircraft to meet new noise regulations and projected growth. The airlines have incurred high operating losses over the past three years with American Airlines reporting a net loss of $935 million in 1992.[51] DoD concerns are that carriers may no longer volunteer aircraft for CRAF. Therefore, a key objective of USTRANSCOM's White Paper on CRAF Incentives is "to establish additional business incentives while eliminating obstacles that impede CRAF participation." [52]

DoD desires business incentives and contractual agreements that will strengthen the program. DoD believes at least 15 percent of a carrier's long-range international fleet should be offered and applied to all stages of the CRAF before a carrier is eligible for an air contract. If a carrier does not have long-range aircraft, DoD wants 15 percent of its large, turbine-powered aircraft offered to the program. With this criteria, DoD can meet Stage I and most of Stage II passenger and cargo requirements assuring a strong strategic mobility program for the future.[53]

As discussed above, DoD's peacetime business incentive is the primary method to attract and maintain volunteers in the CRAF program. USTRANSCOM supports efforts within DoD to expand or tie all military business with CRAF carriers. For example, USTRANSCOM thinks the General Services Administration and Military Traffic Management Command (MTMC) should use only CRAF carriers in the future. A change to DoD regulations could force a significant amount of business to the CRAF carriers. Other agencies and departments can follow DoD's lead after DoD links routine business to the CRAF carriers.[54]

In other short-term programs, USTRANSCOM proposes several actions to strengthen the business arrangement with the carriers. First, AMC should offer CRAF participants $100 million of long-range international cargo business each year. There are many external factors surrounding this concept, but experience shows this goal to be realistic. With a refinement to the domestic passenger system, MTMC plans to link all government travel to the CRAF carriers. In the international market, DoD will continue to direct all passenger business to AMC reservation systems. Finally, the domestic logistics distribution business will include rules that mandate use of CRAF carriers.[55]

Long-term business incentives also include several proposals. The concept to move all government business to the CRAF carriers will take time since the government must ensure a fair price for service. Additionally, contracting policies require changes to enforce and support our national

transportation system and the CRAF. Tax incentives can provide capital for future air carrier investments in modern equipment and improved profit margins. Tax laws are complex issues, but changes to the corporate alternative minimum tax, investment tax credit, and accelerated capital depreciation provides a "bottom line" incentive to volunteer air carriers.

In two areas not related to business incentives, USTRANSCOM supports use of military airfields by CRAF carriers for technical stops, weather alternates, or commercial activities. Most of these incentives require legislative changes.[56] Overseas air base access is also included under this proposal which needs host country coordination and approval.[57]

There are three disincentives for the air carriers. We have already discussed the need to change laws by streamlining procedures and providing appropriate war risk insurance coverage for carriers. An efficient government indemnity program is needed to cover the shortfall in insurance programs. The indemnity program requires the carrier to claim any loss through the contracting agency; however, the response is bureaucratic and simply too slow for the airline industry. AMC is studying a contractual table of reimbursable expenses that would provide a quick response for common losses. For example, a contract "CRAF activated compensation table" could reimburse operators for mileage, vectoring, and one-way mission rate adjustments to avoid lengthy claims processing. Finally, USTRANSCOM advocates use of simple

simple contract instruments and will work within the law to modify the process and documents.[58]

Are there other means to improve our military and civilian partnership? The purchase of C-17 aircraft by air carriers offers a capability to "package express" carriers. The civilian C-17s would offer additional capability for DoD outsized cargo and a forward delivery military benefit. The enhancement of commercial aircraft during production also could aid military operations in the future. For example, the proposed Boeing 777 wide-body aircraft could carry light, bulk cargo with minor structural strengthening instead of a more sophisticated modification to carry heavier cargo.[59]

An increase in DoD business will draw more carriers to the CRAF. This option may require some reduction of military flying hours which must be studied by AMC. Finally, increasing compensation for CRAF carriers when activated could be an incentive to volunteer aircraft for the CRAF. However, an immediate business incentive for the carrier is not available with this concept.

The options available to attract airlines to the CRAF vary and sometimes are beyond the capability of USTRANSCOM and DoD to set in motion. Although DoD faces a decreasing budget over the next several years, incentives that focus on the air carriers "bottom line" are certain to attract the carrier's interest.

CONCLUSION

The French solution to a mobility problem is still valid in U.S. security strategy. Civilian transportation resources provide a rapid means to move troops to hot spots around the world. The CRAF program remains an important element of our nation's strategic airlift. It is an effective and efficient program in meeting military mobility requirements under severe budget constraints. The first true test of the CRAF concept is now complete after the successful activation of air carriers in support of Operation DESERT SHIELD/STORM. Today, CRAF carriers continue to support our military transportation requirements as we respond to contingencies in our rapidly changing world.

Our emerging military strategy to meet the "new world order" demands an increased need for mobility capability from our responsive airlift resources to satisfy national interests and objectives. Peacemaking, peacekeeping, and humanitarian operations are in progress in several regions. Humanitarian efforts now substitute pure combat power and still require support via airlift modes of transportation.

Airlift continues to meet growing needs as our nation responds to a world in disorder. The nation's air transportation resources will continue to play a significant role in meeting future U.S. interests. A responsive military transport system needs augmentation from the more cost effective civil airlift fleet in peace and war. The National Airlift Policy emphasizes

cooperation and a close working relationship between DoD and private business. We must now focus our efforts to "fine tune" the CRAF and balance DoD air carrier business between military and private industry.

The CRAF volunteer program should remain viable to support any crisis. However, a competitive airline industry needs strong incentives to encourage volunteers for the program. Every mobility study supports air transportation as an essential leg in the strategic mobility triad. Our nation cannot afford a large military air transportation fleet, nor the loss of volunteers in the CRAF program. A strong civilian airline industry is as important as a strong military. Operation DESERT SHIELD and DESERT STORM validated the concept and our need for civil augmentation. *DoD support of incentives is necessary to* safeguard a robust airline industry for future airlift mobility.

APPENDIX 1

THE WHITE HOUSE

WASHINGTON

June 24, 1987

NATIONAL SECURITY DECISION
DIRECTIVE NUMBER 280

NATIONAL AIRLIFT POLICY

The United States' national airlift capability is provided from military and commercial air carrier resources. The national defense airlift objective is to ensure that military and civil airlift resources will be able to meet defense mobilization and deployment requirements in support of U.S. defense and foreign policies. Military and commercial resources are equally important and interdependent in the fulfillment of this national objective.

Our basic national security strategy recognizes the importance of strategic lift and the need to reduce current shortfalls. The broad purpose of this directive is to provide a framework for implementing actions in both the private and public sectors that will enable the U.S. efficiently and effectively to meet established requirements for airlift in both peacetime and in the event of crisis or war. Toward this end, the following policy guidelines are established:

1. United States policies shall be designed to strengthen and improve the organic airlift capability of the Department of Defense and, where appropriate, enhance the mobilization base of the U.S. commercial air carrier industry. A U.S. commercial air carrier is an air carrier holding a certificate issued pursuant to section 401 of the Federal Aviation Act of 1958, as amended.

2. The goal of the United States Government is to maintain in peacetime organic military airlift resources, manned, equipped, trained and operated to ensure the capability to meet approved requirements for military airlift in wartime, contingencies, and emergencies. Minimum utilization rates shall be established within the Department of Defense which will provide for levels of operation and training sufficient to realize this goal.

3. The Department of Defense shall determine which airlift requirements must move in military airlift manned and operated by military crews because of special military considerations, security, or because of limiting physical characteristics such as size, density, or dangerous properties; and which airlift

requirements can be appropriately fulfilled by commercial air carriers.

4. The commercial air carrier industry will be relied upon to provide the airlift capability required beyond that available in the organic military airlift fleet. It is therefore the policy of the United States to recognize the interdependence of military and civilian airlift capabilities in meeting wartime airlift requirements, and to protect those national security interests contained within the commercial air carrier industry.

5. During peacetime, Department of Defense requirements for passenger and/or cargo airlift augmentation shall be satisfied by the procurement of airlift from commercial air carriers participating in the Civil Reserve Air Fleet program, to the extent that the Department of Defense determines that such airlift is suitable and responsive to the military requirement. Consistent with the requirement to maintain the proficiency and operational readiness of organic military airlift, the Department of Defense shall establish appropriate levels for peacetime cargo airlift augmentation in order to promote the effectiveness of the Civil Reserve Air Fleet and provide training within the military airlift system.

6. Short-term airlift capability required to meet contingency requirements which might be considered minor surges shall be provided by increased utilization of aircraft in the organic sector, as well as by the increased utilization of the commercial air carriers regularly providing service to the Department of Defense.

7. United States Government policies should provide a framework for dialogue and cooperation with our national aviation industry. It is of particular importance that the aviation industry be apprised by the Department of Defense of long-term requirements for airlift in support of national defense. The Department of Defense and the Department of Transportation shall jointly develop policies and programs to increase participation in the Civil Reserve Air Fleet and promote the incorporation of national defense features in commercial aircraft. Government policies should also support research programs which promote the development of technologically advanced transport aircraft and related equipment.

8. The Department of State and other appropriate agencies shall ensure that international agreements and federal policies and regulations governing foreign air carriers foster fair competition, safeguard important U.S. economic rights, and protect US national security interests in commercial cargo capabilities. Such agencies should also promote among U.S. friends and allies an appreciation of the importance of intercontinental airlift and other transportation capabilities,

and work to obtain further commitments from such countries and foreign air carriers in support of our mutual security interests.

9. United States aviation policy, both international and domestic, shall be designed to strengthen the nation's airlift capability and where appropriate promote the global position of the United States aviation industry.

The Department of State, the Department of Defense, the Department of Commerce, the Department of Transportation, the Federal Emergency Management Agency, and the National Aeronautics and Space Administration shall provide leadership within the executive branch in implementing these objectives.

This directive replaces the Presidentially approved Courses of Action contained in the February 1960 Department of Defense study, The Role of Military Air Transportation Service in Peace and War.

/S/ Ronald Reagan

APPENDIX 2

CRAF LONG-RANGE PASSENGER AIRCRAFT

Carrier	Type Acft	Stage I	Stage II	Stage III
American	DC-10	0	0	1
American	L-1011	2	4	10
Trans Air	B-757	0	0	6
Buffalo Airways	DC-8	1	1	1
Continental	B-747	3	7	7
	DC-10	0	0	18
Delta	L-1011	1	7	22
	A-310	0	0	12
	B-767	3	3	3
Hawaiian	DC-8	2	3	6
	L-1011	0	0	4
Northwest	B-747	6	20	42
	DC-10	0	0	29
Rich Int'l	DC-8	1	1	2
	L-1011	0	0	2
Tower Air	B-747	1	2	6
TWA	B-747	2	4	9
	L-1011	0	0	3
United	B-747	7	22	55
	DC-10	0	0	22
World	DC-10	1	1	2
Total		30	75	262

Note: Totals of aircraft listed for Stage I, II, and III represent 3%, 8%, and 28% of total U.S. long-range passenger fleet.

CRAF LONG-RANGE CARGO AIRCRAFT

Carrier	Type Acft	Stage I	Stage II	Stage III
Air Transport Int'l	DC-8	1	2	4
American Int'l Airways	DC-8	0	5	13
	B-747	3	3	3
Arrow Air	DC-8	1	3	7
Buffalo Airways	B-707	1	1	2
Burlington Air Express	DC-8	1	1	2
Emery	DC-8	4	11	21
Evergreen	B-747	3	8	13
	DC-8	0	0	3
Federal Express	B-747	7	8	8
	DC-10	0	7	30
	MD-11	0	8	8
Florida West	B-707	1	2	4
Northwest	B-747	2	4	8
Southern Air	B-707	0	1	4
	DC-8	1	2	2
Tower Air	B-747	1	1	2
United Parcel Service	B-747	1	2	4
World	DC-10	2	5	9
Zantop	DC-8	1	1	1
Total		30	75	148

Note: Totals of aircraft listed for Stage I, II, and III represent 11%, 28%, and 55% of total U.S. long-range cargo fleet.

CRAF SHORT-RANGE AIRCRAFT

Carrier	Type Acft	Stage I	Stage II	Stage III
American Trans Air	B-727	N/A	7	7
Evergreen	B-727F	N/A	2	2
Markair	B-727F	N/A	1	1
Express One	B-727C/F	N/A	2	2
	B-727	N/A	5	5
Private Jet	B-727	N/A	2	2
Sun Country	B-727	N/A	6	6
Trans World Airlines	B-727	N/A	4	4
	DC-9	N/A	4	4
Total			33	33

CRAF AEROMEDICAL EVACUATION AIRCRAFT

Carrier	Type Acft	Stage I	Stage II	Stage III
TWA	B-767	N/A	5	5
US Air	B-767	N/A	2	2
Delta	B-767	N/A	6	6
Total			13	13

CRAF DOMESTIC AIRCRAFT

Carrier	Type Acft	Stage I	Stage II	Stage III
Southern Air	L-100	N/A	7	7
Total			7	7

CRAF ALASKAN AIRCRAFT

Carrier	Type Acft	Stage I	Stage II	Stage III
Northern Air Cargo	DC-9F	N/A	2	2
Reeve Aleutian	L-100	N/A	2	2
Markair	B-737C/F	N/A	6	6
	DC-8	N/A	2	2
Total			12	12

APPENDIX 3

CRAF MISSIONS FLOWN IN THE GULF WAR

Carrier	Passenger Missions	Cargo Missions
American West	39	0
American	98	0
American Trans Air	494	0
Arrow	0	119
ATI	0	156
Buffalo	0	22
Connie Kalitta	0	370
Continental	91	0
Delta	26	0
Eastern	33	0
Emery Worldwide	0	152
Evergreen International	0	347
Federal Express	29	576
Florida West	0	54
Hawaiian	263	0
Northwest	268	117
Pan Am	335	69
Rich International	14	0
Rosenbalm	0	252
Southern Air Transportation	0	252
Sun Country	30	0
Tower Air	242	1
Trans Continental	5	0
TWA	236	0
United	177	0
United Parcel Service	0	123
World	188	149
Alitalia (Italy)	0	27
Cargolux (Luxembourg)	17	0
KAL (South Korea)	0	70
Kuwait Airways	0	1
Martinair Holland	0	16
Total Missions	2,585	2,870

ENDNOTES

[1]Steven A. Roser, "To the Front! Taxis & Planes. A Lesson from the Past," Airlift, Fall 1984, 16.

[2]Department of Defense, Annual Report to the President and the Congress, by Dick Cheney, Secretary of Defense (Washington, D. C.: GPO, 1992), 92.

[3]Michael Mecham, "USAF Fills New Role With U.N. Relief Flights," Aviation Week & Space Technology, 28 November 1992, 104-105.

[4]The White House, National Security Strategy of the United States, August 1991, 25.

[5]Annual Report to the President and the Congress, February 1992, 5-9.

[6]President, Executive Order No. 10219, "Defining Certain Responsibilities of Federal Agencies With Respect to Transportation and Storage," Federal Register 16, 2 March 1951, 1005.

[7]Herbert M. Levine, "The Politics of Strategic Airlift" (Ph.D. diss., Columbia University, 1969), 387-388.

[8]Betty R. Kennedy ed., Anything, Anywhere, Anytime: An Illustrated History of the Military Airlift Command, 1941-1991 (Scott Air Force Base, IL: Headquarters Military Airlift Command, 1991), 89-91.

[9]Congress, House of Representative, Committee on Government Operations, Military Air Transportation: Hearing Before the Subcommittee on Military Operations, 85th Cong., 2d Sess., 25 June 1958, 1-12.

[10] Kennedy, 97.

[11] Ibid., 98.

[12] Hansford T. Johnson, "White Paper on Incentives for Civil Reserve Air Fleet (CRAF)," Scott Air Force Base, IL, 25 August 1992, i.

[13] Charles E. Miller, Airlift Doctrine (Maxwell Air Force Base, AL: Air University Press, 1988), 338.

[14] Kennedy, 162.

[15] A ton mile requirement is what it would take to move one ton one nautical mile. For example, 10 tons moved 10,000 nautical miles equals 100,000 ton miles or 0.1 MTM. A mechanized Army division weighing 50 thousand short tons requires about 150 million ton-miles to get to Europe. Frederick J. Kroesen, Strategic Mobility Getting There is the Big Problem (Arlington, VA: Association of the United States Army, 1989), 11.

[16] Kennedy, 175-177.

[17] Ibid.

[18] Miller, 373.

[19] Andrew E. Gibson and Jacob L. Shuford, "Desert Shield and Strategic Sealift," Naval War College Review, Spring 1991, 9.

[20] Robin E. Rathbun, "Strategic Mobility for the 1990s: The Mobility Requirements Study," Strategic Review, Summer 1992, 51-52.

[21] Ibid., 53.

[22] Sandy Detering, "Mobility Requirements Study," Point Paper for Headquarters Military Airlift Command, Scott Air Force Base, IL, 6 March 1992.

[23] Peter Grier, "The Ton-Mile Gap," Air Force Magazine, November 1992, 31.

[24] James W. Becker, European Civil Air: Can NATO Count On It? (Washington, D.C.: National Defense University Press, 1989), 13.

[25] Kroesen, 9-10.

[26] Becker, 14.

[27] Nels Wilt, "Civil Reserve Air Fleet (CRAF) Program," Point Paper for Headquarters Air Mobility Command, Scott Air Force Base, IL, 11 January 1993.

[28] Douglas Nelms, "Answering the Call," Air Transport World, October 1990, 69.

[29] Kent N. Gourdin and Robert E. Trempe, "Contingency Transportation in a Changing World: Meeting the Challenge," Logistics Spectrum, Spring 1992, 10.

[30] "Airlift--First on the Scene," Defense Transportation Journal, December 1991, 27.

[31] Tom Fraley, "Civil Reserve Air Fleet (CRAF)," Point Paper for Headquarters Military Airlift Command, Scott Air Force Base, IL, 30 April 1992.

[32] Gourdin, 12.

[33] "Desert Shield/Desert Storm: USTRANSCOM's First Great Challenge," Defense Transportation Journal, June 1991, 16.

[34] Richard Mackenzie, "More Stormy Weather for the Airlines," Air Force Magazine, March 1992, 22.

[35] Gourdin, 12.

[36] John D. Morrocco, "Pentagon Study of Civil Reserve Air Fleet Recommends Changes to Increase Flexibility," Aviation Week & Space Technology, 24 June 1991, 37.

[37] Lawrence Schwartz and others, eds., Review of DoD's Strategic Mobility Programs Civil Reserve Air Fleet (Bethesda MD: Logistics Management Institute, 1991) 14.

[38] Lloyd Mosemann, "LMI Case Study," Memorandum for Secretary McMillen, Assistant Secretary of Defense for Production and Logistics, Washington, D.C., 27 June 1991.

[39] Nels Wilt, "CRAF Lessons Learned During Operation DESERT SHIELD/STORM," Point Paper for Headquarters Air Mobility Command, Scott Air Force Base, IL, 5 November 1992.

[40] Schwartz, 18.

[41] Wilt.

[42] Patricia Gilmartin, "Airlines, Pentagon Push for Expanded War Risk Coverage," Aviation Week & Space Technology, 20 April 1992, 41.

[43] Schwartz, 31.

[44] Wilt, "Lessons Learned."

[45] Schwartz, 25.

[46] Wilt, "Lessons Learned."

[47] "Shrinking Incentives for Airlines Pose Problems for CRAF Program," Aviation Week & Space Technology, 9 September 1991, 55.

[48] Ibid., 55.

[49] Schwartz, 24-25.

[50] Ibid.

[51] James Ott, "U.S. Airlines Await Clinton Directions," Aviation Week & Space Technology, January 5, 1993, 34.

[52] Johnson, 1.

[53] Ibid., 3.

[54] Ibid., 3.

[55] Ibid., 4.

[56] Lloyd, Mosemann, "Request for Legislative Language," Memorandum for SAF/GC, Washington, D.C., 22 January 1992.

[57] Johnson, 5.

[58] Ibid., 6.

[59] Gourdin, 12.

BIBLIOGRAPHY

"Airlift--First on the Scene." Defense Transportation Journal, December 1991, 26-29.

Annual Report to the President and the Congress. By Dick Cheney, Secretary of Defense. Washington, D.C.: GPO, 1992.

Becker, James W. European Civil Air: Can NATO Count On It? Washington, D.C.: National Defense University Press, 1989.

"Desert Shield/Desert Storm: USTRANSCOM's First Great Challenge," Defense Transportation Journal, June 1991, 14-19.

Detering, Sandy. "Mobility Requirements Study." Point Paper for Headquarters Military Airlift Command, Scott Air Force Base, IL, 6 March 1992.

Fraley, Tom. "Civil Reserve Air Fleet (CRAF)." Point Paper for Headquarters Military Airlift Command, Scott Air Force Base, IL, 30 April 1992.

Gibson, Andrew E. and Jacob L. Shuford. "Desert Shield and Strategic Sealift." Naval War College Review, Spring 1991, 6-19.

Gilmartin, Patricia. "Airlines, Pentagon Push for Expanded War Risk Coverage." Aviation Week & Space Technology, 20 April 1992, 41-42.

Gourdin, Kent N. and Robert E. Trempe. "Contingency Transportation in a Changing World: Meeting the Challenge." Logistics Spectrum, Spring 1992, 9-15.

Grier, Peter. "The Ton-Mile Gap." Air Force Magazine, November 1992.

Johnson, Hansford T. Commander in Chief, United States Transportation Command. "White Paper on Incentives for Civil Reserve Air Fleet (CRAF)." Scott Air Force Base, IL, 25 August 1992.

Kennedy, Betty R., ed. Anything, Anywhere, Anytime: An Illustrated History of the Military Airlift Command, 1941-1991. Scott Air Force Base, IL: Headquarters Military Airlift Command, 1991.

Kroesen, Frederick J. Strategic Mobility Getting There is the Big Problem. Arlington, VA: Association of the United States Army, 1989.

Levine, Herbert M. "The Politics of Strategic Airlift." Ph.D. Diss., Columbia University, 1969.

Mackenzie, Richard. "More Stormy Weather for the Airlines." Air Force Magazine, March 1992, 70-73.

Mecham, Michael. "USAF Fills New Role With U.N. Relief Flights." Aviation Week & Space Technology, 23 November 1992, 104-105.

Miller, Charles E. Airlift Doctrine. Maxwell Air Force Base, AL: Air University Press, 1988.

Morrocco, John D. "Pentagon Study of Civil Reserve Air Fleet Recommends Changes to Increase Flexibility." Aviation Week & Space Technology, 24 June 1991, 37.

Mosemann, Lloyd. "LMI Case Study." Momorandum for Secretary McMillen, Asssistant Secretary of Defense for Production and Logistics, Washington, D.C., 27 June 1991.

_____. "Request for Legislative Language." Memorandum for Secretary of the Air Force General Counsel, Washington, D.C., 22 January 1992.

National Security Strategy of the United States. The White House. Washington, D.C.: GPO, 1991.

Nelms, Douglas. "Answering the Call." Air Transport World, October 1990, 68-69.

Ott, James. "U.S. Airlines Await Clinton Directions." Aviation Week & Space Technology, 25 January 1993, 34-35.

Rathbun, Robin E. "Strategic Mobility for the 1990s: The Mobility Requirements Study." Strategic Review, Summer 1992, 48-56.

Roser, Steven A. "To the Front! Taxis & Planes. A Lesson from the Past." Airlift, Fall 1984, 16-18.

Schwartz, Lawrence, Alfred H. Beyer, Frederick M. McNamee, Click D. Smith, and John A. Ciucci, eds. Review of DoD's Strategic Mobility Programs Civil Reserve Air Fleet. Bethesda, MD: Logistics Management Institute, 1991.

"Shrinking Incentives for Airlines Pose Problems for CRAF Program." Aviation Week & Space Technology, 9 September 1991, 55-58.

U.S. Congress. House of Representatives. Military Air Transportation: Hearing before the Subcommittee on Military Operations. 85th Cong., 2d Sess., 25 June 1958.

U.S. President. Executive Order No. 10219. "Defining Certain Responsibilities of Federal Agencies With Respect to Transportation and Storage." Federal Register 16. 2 March 1951. 1004-1006.

Wilt, Nels. "CRAF Lessons Learned During Operation DESERT SHIELD/STORM." Point Paper for Headquarters Air Mobility Command, Scott Air Force Base, IL, 5 November 1992.

_____. "Civil Reserve Air Fleet (CRAF) Program." Point Paper for Headquarters Air Mobility Command, Scott Air Force Base, IL, 11 January 1993.