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**Air Transportation: Elements of a Changing
Environment and What It Means to the
Civil Reserve Air Fleet**

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I. INTRODUCTION

“Transportation is a critical element in the mosaic of logistics. It is unique because it depends on a close partnership with the commercial transportation industry.”

*A Mosaic of Support to the Warfighter
Deputy Under Secretary of Defense (Logistics)
Department of Defense (1997)*

The commercial air carrier industry is vitally important to the nation’s rapid mobilization capability. In times of war or national emergency, when the Civil Reserve Air Fleet or CRAF is fully activated, participating air carriers contribute over 50 percent of the nation’s airlift capacity. In peacetime too, the CRAF carriers are employed by the military to provide airlift services moving military passengers, equipment and supplies. Commercial augmentation is becoming increasingly more important as the nation remains engaged in many parts of the world and the military airlift fleet becomes smaller. The changes occurring within the air transportation industry are troubling and may limit CRAF’s ability to mobilize in the future.

Three underlying changes are occurring in the air transportation environment which when taken together will limit Department of Defense (DOD) flexibility to activate CRAF. These changes are:

- Greater use of “just-in-time” inventory methods creating higher potential for economic disruption to the commercial sector
- Continued consolidation as a result of deregulation of the U.S. airlines
- Greater outsourcing of DOD distribution functions

While these factors make activation of the CRAF more difficult, the following developments increase the possibility that CRAF may be needed more in the future.

These include:

- Reduced military organic capability due to the retirement of the C-141
- Commercial demand for air transportation services crowding out the government customer
- A lower threshold for CRAF activation created by the precedent of activating the CRAF for the Gulf War

These six factors are interacting to create an environment where CRAF will be needed more in the future, yet less available. Most of the change on the commercial side is due to the growing use of air transportation as a primary transportation mode for the shipment of goods and services. The marketplace is becoming increasingly globalized and demanding greater air transportation services to fulfill global market competitive strategies.

Through an examination of the load factors of the air carriers we can determine if the capacity of the commercial cargo system is maintaining pace with the demand for air cargo transportation. Section four provides an examination of the fleet and illustrates that load factors are on the rise. With load factors on the rise can and will the commercial sector still be capable of fulfilling the military's growing need for commercial augmentation? If not, DOD will need to activate CRAF to obtain the necessary airlift or pay a premium to attract the air carriers away from the commercial sector. However, if CRAF is used, what is the impact on DOD's distribution channels?

The military logistics environment is changing. DOD logistics is in a period of transition shifting from a strategy of “just-in-case” to more “just-in-time” and as a result is reducing inventory. Much of this strategy is dependent upon rapid delivery of essential parts and supplies by using air transportation to reduce delivery time. To leverage CRAF participation, DOD is linking the opportunity for this new government transportation business to CRAF members. With less inventory and more of it moving by CRAF carriers does this practice expose the DOD supply channels to critical failure in the event CRAF must be activated? This author believes it does.

Unfortunately because of the air carriers’ proprietary operating data and the complexity of DOD’s distribution channels this researcher was unable to obtain the necessary information to fully understand this evolving relationship between CRAF and DOD’s supply channels. This paper, however, exposes the reader to the key factors that are changing the CRAF environment and provides direction for further study by DOD to better understand the risks to the nation’s warfighting capability.

Therefore, the paper begins by reviewing CRAF and how it works. This includes a short review of CRAF’s performance during its first and only activation for the Gulf War. The examination then looks at those changes occurring within DOD and the commercial sector which are creating demand for air transportation services. A statistical examination of the air cargo growth and the system capacity to absorb that growth follows.

II. THE CIVIL RESERVE AIR FLEET (CRAF)

“USTRANSCOM could never meet its wartime requirements without its absolutely unique partnership with civilian industry. In fact, the backbone of our Nation’s lift capacity lies in its commercial fleets.”

*General Walt Kross, USAF
Commander-in Chief
US Transportation Command*

The Formation of CRAF

With the Korean War raging, Congress in 1950 passed the Defense Production Act giving the President a wide range of authority to mobilize the nation for war. From experience in World War II and the Berlin Airlift, President Truman knew he would need to move the commercial air carriers to military duty. Doing so would not be an easy process. Removing aircraft from commercial operations created hardships on the civilian community while raising economic risks for the air carriers. Nationalizing the airlines was too drastic and would put the military in charge of the U.S. airline industry. A better process was needed.

Using authority granted under the Defense Production Act, President Truman in 1951 issued Executive Order 10219.¹ The order called for the Department of Commerce to “analyze the requirements of civil air transportation and of the Department of Defense for aircraft of the types used by the civil carriers,” and “to initiate such actions,” “plans and programs,” “to meet the needs of the armed forces

¹ Ronald N. Priddy, “A History of The Civil Reserve Air Fleet In Operations DESERT SHIELD, DESERT STORM, and DESERT SORTIE,” Arthur D. Little Cambridge, MA, 1993, p. 15.

and to maintain essential civil routes and services.”² The President’s approach recognized the military need for access to the commercial airlines’ assets while limiting the disruption of essential air service to the civil sector.

On the basis of Executive Order 10219 the CRAF was formed in 1952. The purpose of CRAF was to expedite the availability of the civil air carriers to support the military and avoid the mobilization problems of World War II.³ By encouraging their voluntary efforts in the CRAF, the U.S. government could avoid the need to nationalize the civil carriers in time of war or emergency when additional airlift was required.⁴ The CRAF system was to provide for the orderly transfer of commercial aircraft to military service in an emergency while still providing an appropriate level of air service to the civil sector. Out of the CRAF program grew a partnership concept between the military and commercial air carriers to meet the nation’s airlift needs. This partnership has remained in place ever since.

National Airlift Policy

In 1987 President Reagan reiterated the partnership between the commercial air carriers and the military airlift system in National Security Directive 280, otherwise known as the National Airlift Policy. The National Airlift Policy calls for the military to rely upon the “commercial air carrier industry to provide the airlift

² *Ibid.*, p. 15.

³ Cheryl A. Heimerman, Major USAF, “CRAF: Will it be There in the Future?”, Research Paper presented to the Naval War College, Newport, R.I., 22 Feb 1993, p. 5.

⁴ *Ibid.*, p. 5.

capability required beyond that available in the organic military airlift fleet.”⁵ Even today the military depends upon CRAF to provide over 50 percent of our emergency airlift capacity. Under current deployment planning, when fully activated, CRAF will airlift 90 percent of the passengers and 40 percent of the cargo to the area of operations.⁶ Not all of this capability is immediately available. The CRAF is structured to provide a graduated response depending upon the level of the national emergency. Such was the case during the Gulf War.

CRAF Since the Gulf War

When military resources were unable to meet the growing requirements for Operation DESERT SHIELD, General H.T. Johnson, Commander-in-Chief of MAC (CINCMAC)⁷, activated stage I of the CRAF on 17 August 1990. He believed that CRAF worked very well and “to AMC’s credit, many airline representatives shared the view that the CRAF worked better than anticipated for a program never before activated.”⁸ However, the activation did create economic hardships on some of the air carriers exposed to lost market share as they transferred their aircraft from commercial activities to military deployment missions.⁹ As a result, the partnership

⁵ “National Airlift Policy”: National Security Directive, 280, 24 June 1987.

⁶ Roger K. Coffey, “The Civil Reserve Air Fleet: Trends and Selected Issues”: Logistics Management Institute Study, May 1996, p 1-1.

⁷ The Military Airlift Command is became the Air Mobility Command on June 1, 1992.

⁸ Dr James K. Mathews, “General Hansford T. Johnson, Commander in Chief US Transportation Command and Commander, Air Mobility Command, An Oral History,” Office of the Historian, Headquarters Air Mobility Command, Scott AFB, IL, p. 25.

Mary E. Chenoweth, “The Civil Reserve Air Fleet and Operation Desert Shield/Desert Storm: Issues for the Future, Rand, 1993, p. 69.

⁹ Priddy, “A History of the Civil Reserve Air Fleet,” p. 242.

between the air carriers and DOD became strained. Two major passenger carriers, American and United dropped out of the program, and others lowered the level of their participation to lower their risk of activation.

As a result of the first-time activation of CRAF in 1990, the air carriers realized that “participation in the program is no longer risk free.”¹⁰ The political and operational threshold for CRAF activation has been significantly lowered. Civil air carriers in the future will “weigh their willingness to commit their assets to military use during an activation against the potential benefits of participating in the program at all other times.”¹¹ Changes to the CRAF program would be required to encourage air carriers to continue to volunteer their aircraft.

Based on lessons learned from the first activation of the CRAF for the Gulf War, improvements were made in the “Aviation Insurance Provisions of what was formerly Title XIII, now 49 U.S.C., Chapter 443 (Federal Aviation Act).”¹² This change lowered the air carriers’ asset risk and ensured that the loss of an aircraft would not unduly burden the carriers financially.

New incentives were added to the CRAF program as well in order to provide an alternative recruitment tool from peacetime business. These incentives allow CRAF participants to operate from military airfields and to designate military airfields as a

¹⁰ Chenoweth “The Civil Reserve Air Fleet and Operation Desert Shield/Desert p. 69.

¹¹ *Ibid*, p. 69.

¹² “The Civil Reserve Air Fleet,” *Briefing*, Headquarters, Air Mobility Command, Scott AFB, IL, Aug 96.

weather alternate landing site. These added incentives save the air carrier operating costs thereby encouraging participation in the CRAF.¹³

Operational offsets were also added. For example, an air carrier now receives reimbursement for an activated aircraft at a rate of ten hours of flying whether the aircraft flies or not. During the Gulf War activated aircraft often sat idle while waiting for mission tasking from AMC. This was an undue economic hardship on the carrier because the aircraft was not available for commercial operations. For small unscheduled operators, this practice can severely limit cash flow. Reimbursement for this idle time helps alleviate this burden.

CRAF's Peacetime Role

In peacetime CRAF air carriers also play a significant role. Again, the National Airlift Policy calls for the DOD to source from participating air carriers that airlift required beyond that necessary to "maintain operational readiness of the organic military airlift" fleet.¹⁴ Air carriers traditionally take this to mean that the military should move all its peacetime cargo in the civil sector while reserving the military organic fleet for specific military cargoes.

The military, on the other hand, have maintained a policy that it must fly the military organic fleet at a minimum level to maintain crew proficiency and ensure that the airlift system remains capable and ready. Therefore, the movement of cargo on military airplanes is a byproduct of military training. However, in recent years

¹³ Ibid

¹⁴ "National Airlift Policy": National Security Directive, 280, 24 June 1987

due to the high demand for airlift created by U.S. engagements around the globe, military airlift aircraft have often flown more than their annual scheduled flying hour program.

By using the commercial sector on a day-to-day basis, the commercial air carriers participating in the CRAF can relieve some of the burden on the organic military airlift fleet. Using CRAF participating carriers on a daily basis also exercises the commercial aircraft in the military airlift system and acquaints airlift personnel with commercial aircraft operations. Receiving a portion of DOD's airlift business also provides an economic incentive to air carriers to participate in the CRAF. Incentives will be discussed in more detail later, but first we need to look at how the CRAF is structured to understand the air carriers commitment to CRAF.

Organization of the CRAF

There are three stages in CRAF, each stage provides an increased level of airlift capability.¹⁵ Stage I is designed to respond to a minor regional crisis. Stage II is established for major regional conflicts such as the Gulf War, and Stage III provides for a full national mobilization. The available aircraft committed to each stage are used only to the extent necessary to meet the additional airlift required. The Commander-in-Chief of US Transportation Command can activate each stage with approval from the Secretary of Defense.¹⁶ Carriers must respond within 24 hours for a

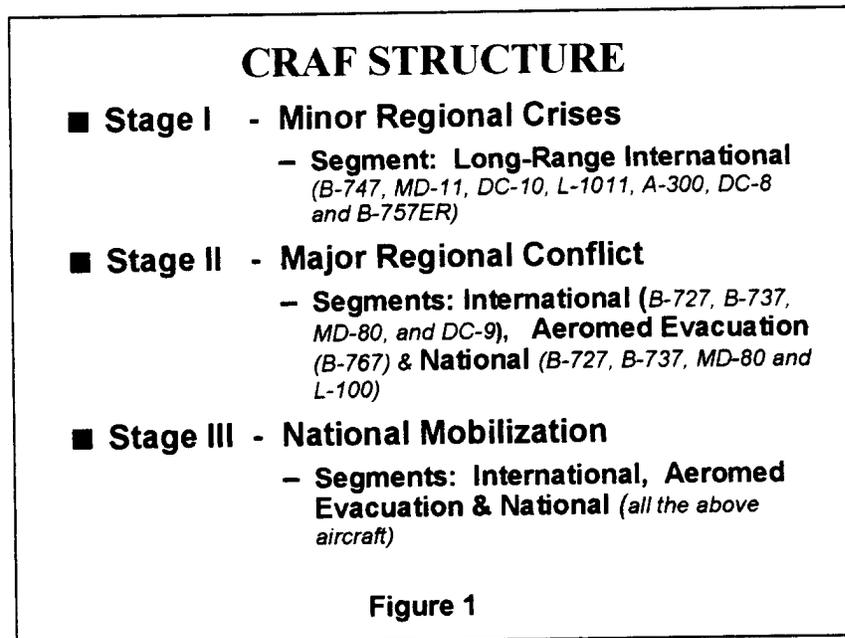
¹⁵"The Civil Reserve Air Fleet," Briefing, Headquarters, Air Mobility Command, Scott AFB, IL, Aug 96.

¹⁶ Ibid

Stage I or II activation, and 48 hours for Stage III and for Aeromedical Evacuation aircraft.¹⁷ While activated, the air carriers continue to operate and maintain the aircraft while AMC provides mission tasking through the Tanker Airlift Control Center at Scott Air Force

Base.¹⁸

In addition to these stages, the CRAF is divided into three segments, international: long-range and short-range; national segment: domestic and Alaskan; and lastly, aeromedical evacuation.¹⁹



Each segment is categorized by the types of aircraft which are matched by capability and to the specific mission needs. Figure 1 shows each stage with their corresponding segments and the typical aircraft in each segment.

The long-range international segment is composed of cargo and passenger aircraft. It is the largest section of the CRAF. Stage I is made up exclusively from the long-range international segment and is designed to “backfill” or provide airlift services during times when the organic military airlift fleet cannot meet both

¹⁷ Ibid

¹⁸ _____ “Civil Reserve Air Fleet,” Air Mobility Command Homepage. The Tanker Airlift Control Center (TACC) provides worldwide command and control of AMC assigned forces.

¹⁹ Ibid

deployment and normal mission requirements simultaneously.²⁰ Aircraft found in this segment include the B-747, MD-11, DC-10, L-1011, A-300, DC-8 and B-757ER.

The short range international segment supports “short haul operations from the CONUS to the Caribbean, Central America, Greenland, and Iceland.”²¹ In this section we find B-727, B-737, MD-80, and DC-9 type aircraft.²²

The national segment/domestic supports movement requirements within the CONUS while the national segment/Alaskan takes care of unique needs in that theater. In this segment we normally find B-727, B-737, MD-80 and L-100 aircraft.²³

The last, and newest segment, supports aeromedical evacuation of patients from a theater of operation back to the CONUS and the forward movement of medical personnel and supplies to the theater. B-767 aircraft are modified with specifically designed litter kits to carry 87 stretchers and 20-40 ambulatory patients.²⁴

CRAF is Voluntary

The CRAF is strictly voluntary--no law requires participation. The success of the program simply lies in the cooperative and contractual arrangement between the government and private carriers. To encourage participation, the airlines are awarded part of the government’s peacetime business based upon the individual carrier’s commitment of aircraft to the CRAF.²⁵

²⁰ Coffey, “The Civil Reserve Air Fleet: Trends and Selected Issues.” p. A-2.

²¹ Ibid, p. A-1.

²² “The Civil Reserve Air Fleet,” Briefing.

²³ Ibid

²⁴ Ibid

²⁵ “The Civil Reserve Air Fleet,” Briefing.

The DOD does not pay for the ownership, operation, or maintenance of CRAF aircraft while inactive. This arrangement is what makes CRAF a cost-effective means to obtain emergency augmentation airlift and provides an equitable way to allocate military peacetime business to the commercial airlines.

The amount of business offered by DOD to CRAF carriers is substantial. Figure 2 shows the level of international peacetime business since 1989 broken out by fixed and expansion buys.²⁶ Figure 2 also shows that the peacetime business base is growing. In 1996 the value of Air Mobility Command peacetime business was over \$600 million.²⁷ In 1997 AMC

anticipates purchasing over \$700M of charter airlift services from the commercial airlines participating in CRAF.²⁸

In recent years other elements of government transportation business have been linked to CRAF

participation as additional leverage to promote airlines to participate in CRAF. The two most significant actions have been the addition of the General Service

International Buys FY89 - FY 97 (Excluding DS/DS)

Fixed Buy Up 161% & Total Buy Up 31% Since FY93

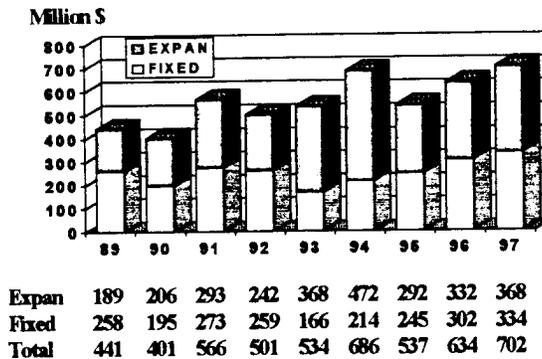


Figure 2

²⁶ The fixed buy is a known or guaranteed level of peacetime business to be bid out to the civil carriers. The expansion buy is airlift business anticipated but may or may not be bid out to the commercial sector depending upon the level of airlift tasking.

²⁷ Ibid

²⁸ Lt Col Wes Rohth, USAF, CRAF Analysis Officer, Headquarters Air Mobility Command, Scott AFB, IL, Telephone Interview, 7 Oct 1997.

Administration's (GSA) small package contract and the city pairs business. In the small package contract, one carrier (currently Federal Express) provides a low fixed rate for any government shipper for packages under 150 pounds within the Continental United States. A similar program is currently being developed for overseas shipments.

Linking the GSA city pairs business to CRAF participation provided a significant boost to the CRAF program. Under this arrangement, government travelers must travel on CRAF participating air carriers. With the city pairs business in CRAF the value of the peacetime business is now about \$1.3 billion per year.²⁹ More importantly, this additional business encouraged two of the large passenger carriers to reenter the CRAF after leaving due to problems associated with being activated for the Gulf War.³⁰ Attracting and keeping the air carriers in the CRAF can often be a difficult challenge as we will learn in the next section.

Participating in CRAF

Airlines are not a homogenous group. For some smaller carriers the government airlift business is a vital part of their business strategy and therefore is important to the profitable operation of their airline. Each air carrier has individual interests in the program and is predominantly driven by the size and the type of the carrier's operations. Incentives which are attractive to one group of air carriers are not necessarily attractive to another.

²⁹ Coffey, p. 3-18

³⁰ Coffey, p. 2-4

Accommodating the many individual carrier interests is a difficult challenge for AMC. For this reason, the Commander, Air Mobility Command meets twice yearly with senior leadership of many of the airlines to discuss topics of mutual interest to the air carriers and the military. Additionally, AMC maintains an office devoted to working CRAF issues and each air carrier designates a mobilization representative to coordinate with the AMC CRAF office. Through the mobilization representatives, open communications are maintained to work through individual air carriers's concerns and issues.

Each carrier has unique requirements and an operating style based upon the aircraft in its fleet, whether or not it is a scheduled or nonscheduled carrier, and the market(s) the operator serves. "Some airlines commit all their assets to the CRAF, while others will commit much less."³¹ In this regard "activation of the various stages will affect each airline differently." The impact of an activation on each individual carrier will depend upon the length of activation, unused capacity, and level of commercial commitments. Each carrier, must balance the risk of being in CRAF with the risk of not being in CRAF.

AMC policy tries to entice CRAF participation by "as many of the long-range international U.S. aircraft as possible" because they can contribute the most to the deployment of personnel and equipment from the U.S. to overseas locations.³² At the

³¹ Lt Col Richard Mullery, USAF, "The Economic and Political Impacts of Activating the Civil Reserve Air Fleet (CRAF)", Research paper submitted to the Industrial College of the Armred Forces, Ft. McNair, Washington, DC, 1991, p. 18.

³² Chenoweth, "The Civil Reserve Air Fleet and Operation Desert Shield/Desert," p. 9.

same time AMC, for “the ultimate health of the airline,” desires carriers in the CRAF which are not wholly dependent upon the government for their business.³³

In many of the smaller charter carriers (non-scheduled operators) this objective presents a challenge. AMC peacetime business is often last minute while commercial operations normally are booked far further in advance. In order to obtain government business, air carriers must be able to respond to a solicitation on short notice. The small operator must be positioned to shift aircraft assets from commercial to military operations and back again without undue economic costs.

For the air carriers, it is a simple opportunity cost problem. The air carrier’s aircraft can only perform one mission at a time. Once committed to a commercial shipper in advance, seldom is the carrier going to cancel or delay the commercial shipper to accommodate AMC.

The business cycle also plays an important role. In times of excess carrier capacity, aircraft are idle and the carrier can more easily respond to short notice AMC solicitations service. However, when commercial activity is up and capacity is in short supply, like at Christmas, the commercial operator is less able to respond to AMC solicitations.

Historically, AMC can depend upon 50 percent of the capability in CRAF stage I to respond to AMC daily solicitations or about 20 aircraft per day.³⁴ The carriers supporting AMC day-to-day are the small unscheduled operators. The large,

³³ *Ibid*, p. 9.

³⁴ Colonel Michael Pikula, USAF, Chief, Office of Contract Airlift, Headquarters Air Mobility Command, Scott AFB, IL, Telephone interview, 2 Dec 96

scheduled operators do not respond due to already high fleet commitments.

Maintaining equity among the various carriers is not easy and requires active management by AMC. To provide some level of fairness, AMC uses a point system based upon mobilization value.

Mobilization Value (MV)

Computation of MV allows AMC to determine a carrier's fair share of AMC peacetime business.³⁵ MV is derived by comparing a carrier's committed aircraft against a base aircraft or wide body equivalent (WBE). The WBE standard aircraft is the B-747-100. Each aircraft committed to the CRAF is normalized against the B-747-100 characteristics of speed, payload, and utilization rate.³⁶ The carriers then receive mobilization value (MV) points based upon their commitment of WBEs to the CRAF.³⁷

Other factors come into play for awarding Mobilization Value points besides the amount and kind of aircraft committed. Because AMC seeks wide-body aircraft with long-range capability, a 20 percent bonus is awarded to MD-11 and B-747 aircraft. Air carriers committing B-767 aircraft to the Aeromedical Evaluation segment receive a 100 percent MV bonus. Additionally, aircraft in Stage I receive double MV value in

³⁵ "The Civil Reserve Air Fleet," Briefing.

³⁶ The utilization rate or UTE reflects the hours the aircraft is available to move cargo or passengers. The computation is 10 hours divided by 2, times 94 percent

³⁷ Air Mobility Command (AMC) is a component command of US Transportation Command (USTRANSCOM) USTRANSCOM is the single manager for defense transportation while AMC is the single manager of Airlift. The MV is a comparison tool developed to compensate for different types of aircraft. Each aircraft type is assigned a MV value determined by the passenger or ton-mile capability of the aircraft. The base aircraft used for comparison is a Boeing 747-100. Then Each carrier is awarded a set amount of peacetime business based upon their total MV.

compensation for their greater risk of activation. Apportionment of peacetime business is based upon a carrier's MV points.

In theory, a higher MV rating should bring a larger share of peacetime military business for the CRAF participant. Mission needs, the individual carriers' availability, and the aircraft type; however, can affect the amount of business a carrier receives or desires.³⁸ To allow carriers to optimize their MV portion of the peacetime business, AMC allowed the carriers to pool their assets into joint venture arrangements.³⁹

Due to the joint venture sharing arrangements, carriers can now trade MV points.⁴⁰ In effect carriers can sell off or trade excess MV points that they do not need or cannot use. The amount of business an individual carrier receives as a member of the joint venture is determined by the venture itself, AMC simply treats the Joint Venture as a separate entity. By having a market value, MV points can influence the level of participation by a carrier in the CRAF. By adjusting participation in the CRAF, a carrier can maximize its MV and use the excess to gain a business advantage.

If we review the carriers in the CRAF and their participation levels, the previous discussion can be better understood. Appendix A lists 1997 CRAF air carriers and the percentage of their long-range international type aircraft in the CRAF.

³⁸ Ibid.

³⁹ Chenoweth, p. 5.

⁴⁰ The advent of teaming or joint ventures has allowed some major carriers to still receive peacetime business without directly participating in CRAF. For a detailed discussion on the impact and trends of MV teaming see "The Civil Reserve Air Fleet, Trends and Selected Issues, Coffey, Robert K and Frola, Ronald F., Logistics Management Institute, May 1996.

While some of these carriers are not well known others are household names; e.g. Federal Express and United Parcel Service. Federal Express Corporation has committed 100 percent of its wide body aircraft in the CRAF while UPS provides only the minimum. Each operator is pursuing a different strategy in regards to CRAF. UPS is limiting its risk to a CRAF activation while FEDEX is highly exposed. But is it?

The next chapter examines the changing shape of the air cargo market and DOD's growing dependence upon the CRAF cargo operators as the DOD shifts to a "just-in-time" logistics strategy.

III. THE GROWING ROLE FOR AIR CARGO

“The development of global systems for producing and distributing goods and an attendant increase in the use of “just-in-time” inventory systems, which reduce the need to warehouse spare parts and finished products, have contributed, in part to the growth of international air cargo services.”

International Aviation, DOT's Efforts to Promote U.S. Air Cargo Carriers' Interests, p. 13

“Two ongoing structural changes in the way business could operate were the major weapons in the battle against rising inventory costs: the information revolution and transportation deregulation.”

Anderson/Quinn, “The Role of Transportation in Long Supply Line Just-In-Time Logistics Channels,” Journal of Business Logistics, p. 70

To understand the changing environment affecting CRAF, we have to look at changes in the overall commercial air carrier industry. When CRAF was formed in 1952, the air carriers operated in highly regulated, stable environment. The transportation of manufactured goods by air was reserved solely for high valued products and mail. At that time, information technology consisted of a stubby pencil and a grease board!

Today the airline industry is deregulated. Air carriers have had to shed excess capacity to better compete. At the same time, air transportation of many products is becoming an essential competitive strategy among firms as they strive to lower inventory costs and compete on a global scale. The aggregate affect of these changes has been to create an environment with a small margin to

accommodate a CRAF activation. This reduced margin is shown through statistical analysis in chapter five.

Airline Deregulation

The Civil Aeronautics Act of 1938, which established the Civil Aeronautics Board (CAB) and its successor, the Federal Aviation Act enacted in 1958, “controlled air fares and routes with a heavy hand for some 40 years.”¹ The major features of airline regulation were:²

- Assure the sound development of an air transportation system
- Control of market entry by requiring new airlines to obtain a government certificate of public convenience and necessity to operate
- Control of cargo rates and passenger fares
- Control of intercarrier relations such as mergers and agreements

Additionally, the CAB used its regulatory powers to enact policies to “meet the air transportation needs of domestic commerce, the Postal Service and national defense.”³ Therefore, inefficiencies in the air carrier system were acceptable if they served a national need.

However, the nature of the regulated air route system was seen by many economists as inflationary and inefficient.⁴ As a result, “by the early 1970s”

¹ ____ “Transportation 1996”: Appendix A, An Overview of the US Airline Industry, p. 234.

² *Ibid*, p. 235.

³ George Williams, The Airline Industry and the Impact of Deregulation, Ashgate Publishing, Brookfield, VT, 1993, p.6

⁴ *Ibid*, p. 8.

legislative pressure mounted favoring “dismantling of as many economic controls as possible, allowing market forces free rein.”⁵

In 1978 Congress enacted the Airline Deregulation Act. Under this legislation, businesses that met fitness requirements were free to enter and exit domestic air transport markets at will and set fares in response to market demand.⁶ Few in the industry anticipated the tremendous change deregulation brought.⁷

Finding a successful business strategy in the deregulated market was not easy for the air carriers who had been accustomed to the highly protected markets under the CAB. With carriers free to set fares, the air carriers were forced to achieve operating efficiencies that under CAB’s regulated environment were not possible. However, “it rapidly became apparent that to compete against lower cost and more efficiently organized new entrants necessitated a very different plan” from the old regulated environment.⁸

One approach taken by the air carriers was to develop marketing programs to maintain passenger loyalty.⁹ The major carriers¹⁰ expanded services, such as

⁵ *Ibid*, p. 8.

⁶ _____ “Transportation 1996” Appendix A, An Overview of the US Airline Industry p. 235.

⁷ Williams, p. 49.

⁸ *Ibid*, p. 18.

⁹ _____ “Transportation 1996”: Appendix A, An Overview of the US Airline Industry, p. 235.

¹⁰ Airlines are categorized into three categories: Majors (revenues over \$1 billion), Nationals (revenues over \$100 million to \$1 billion), and Large Regions (revenues \$20 million to \$100 million) These types of carriers account for 95.4 percent of passenger revenues and 99.4 percent of all enplanements. Source: Bureau of Transportation Statistics, Office of Airline Information data, 1995.

“computer reservation systems, frequent flyer programs, and code sharing with commuter airlines to feed the parent system.”¹¹

A second strategy focused on building market share through mergers and acquisitions. By acquiring another airline, air carriers could infiltrate into “established markets and eliminate a competitor.”¹² In the late 1980s a series of mergers and acquisitions provided a period of industry consolidation--Eastern, Braniff, Pan American, and Midway disappeared while others merged into their acquirer’s operations.¹³

The most visible airline efficiency was the rapid adoption of “hub-and-spoke” route systems. With hub-and-spoke systems, the carriers intended to “raise the cost of market entry for new and smaller airlines” as a way to protect their routes vulnerable to competition in the deregulated environment.¹⁴ The hub-and-spoke route system “provided the most efficient way of overcoming the production indivisibility inherent in the use of large aircraft” thus lowering the cost of operations for the air carriers.¹⁵

The large air carriers, prior to deregulation, populated their aircraft fleets with wide-body aircraft. These aircraft were suitable for the city-to-city or linear routes, prevalent prior to deregulation, when any loss could be recaptured through the CAB’s rate setting system. As a result the adoption of the hub-and-spoke

¹¹ _____”Transportation 1996”: p. 236.

¹² Williams, p. 171.

¹³ Steven A. Morrison & Clifford Winston, The Evolution of the Airline Industry. The Brookings Institute, Washington, DC, 1995, p. 4.

¹⁴ _____”Transportation 1996”: p. 236.

¹⁵ Williams, p. 18.

system, many of the larger air carriers found their aircraft unsuitable and too costly to operate. Flight frequency through the hubs did not provide the necessary passengers per aircraft or density to make it profitable to operate wide-body aircraft. Smaller aircraft were better suited to the hub-and-spoke route system to maintain efficient load factors and control operating costs. The transition of passenger carriers to smaller aircraft has in turn provided opportunities for the all cargo carriers by reducing the excess cargo hold space available in wide-body aircraft.

The All Cargo Operators

U.S. passenger airlines have historically viewed cargo services as a by-product of their passenger services.¹⁶ Prior to deregulation, the wide-body aircraft in the passenger fleet were well suited for carrying cargo in the under belly of the aircraft.¹⁷ With the air carriers switching to smaller aircraft, passenger carriers are not well suited today for the dual operation of carrying passengers and cargo. This has provided an opportune market for the "all cargo carriers" to take a greater foothold.¹⁸ The passenger carriers lost their capability to efficiently move cargo as they converted their fleet to be better suited for hub-and-spoke operations.

¹⁶ "International Aviation, DOT's efforts to Promote U.S. Air Cargo Carriers' Interest, GAO Report to Congress, October 1996, p. 16

¹⁷ William A. Kutzke, "Cargo Market Share Impact of Desert Storm on U.S. Schedule Airlines": Report before the Military Airlift Committee, 2 Nov 92, p. 5 and Colonel Glynn W. Cavin, Jr. "The economic Health of the Airline Industry and Its Impact on National Security," Research Project submitted to the Industrial College of the Armed Forces, 1993, p. 4.

¹⁸ "1996/1997 World Air Cargo Forecast," Boeing Commercial Airplane Marketing Group, Seattle, WA, Oct 1996, p. 15.

Today there are three types of air cargo carriers: 1) integrated all-cargo (like Federal Express) offering express door-to-door delivery; 2) scheduled and charter all-cargo carriers that operate cargo-only aircraft providing service from airport to airport; and 3) passenger/cargo carriers that carry cargo on passenger aircraft on a space available basis offering primarily airport to airport service.¹⁹ As of November 1995, there were 22 all cargo carriers in the U.S. Of these 22 all cargo carriers, seven carriers makeup the bulk of the all cargo carriers. These are:²⁰

<u>Majors</u>	<u>Nationals</u>	<u>Large Regional</u>
Federal Express	DHL Airways	Challenge Air Cargo
United Parcel Service	Emery Worldwide	Northern Air Cargo
		Polar Air Cargo

The single largest freight carrier is Federal Express.²¹

Changing Cargo Environment

Historically, transportation cost has been a high percentage of the total cost of any product. In most cases shipping by air can be as much as seven to eight times higher than by surface modes of ocean, rail, or truck.²² Therefore shippers normally reserve the use of air transportation for items with the following characteristics:

- High value-to-weight ratio
- Fragile
- Physically or economically perishable
- Subject to unpredictable demand patterns

¹⁹ "International Aviation, DOT's efforts to Promote U.S. Air Cargo Carriers' Interest," p. 14.

²⁰ ____ "Transportation 1996": Appendix A, An Overview of the US Airline Industry, p. 233.

²¹ Perry A. Trunick, "Air Cargo Needs Positive Action, Transportation and Distribution, Sep 94, Vol. 35, Issue 9, p. 58.

²² Toby B. Gooley, "Air Freight Hits the Rails": Logistics Management, Mar 1996, pp. 111A-113A.

However, today these traditional norms are changing. The movement of goods by air is playing a greater role in the competitive strategy of firms.²³ Producers have found that the higher cost of shipping by air is offset by the savings from reduced inventory. “Strategic inventory management” is creating an environment where more low-valued goods are being shipped at a greater rate by air.²⁴ “Justification of air transport is not so much the value of the item itself, but the value to the receiver in having it exactly when needed.”²⁵ This is especially apparent in the growing international market.

International Trade

Many new products and services have been introduced in recent years and are marketed and distributed to customers all over the globe. “Manufacturers are developing facilities and selecting suppliers in locations that minimize overall production costs.”²⁶ To service the needs of the global market, shippers are turning in greater numbers to air transportation.

Although it accounts for a relatively small volume of global cargo movement, air transportation is important in global logistics. During the period 1990 to 1995, “airfreight traffic between the U.S. and foreign countries grew by 50 percent.”²⁷ In 1994 U.S. airlines flew more scheduled international freight ton-miles than the

²³ “International Aviation, DOT’s efforts to Promote U.S. Air Cargo Carriers’ Interest,” p. 13.

²⁴ “Better for Less”: Air Transport World, April 1995, Vol 32, Issue 4, p. 27.

²⁵ Ibid

²⁶ “International Aviation, DOT’s efforts to Promote U.S. Air Cargo Carriers’ Interest,” p. 15

²⁷ Ibid, p. 14.

airlines of any other country and of that nearly 60 percent of it was transported by the all cargo carriers.²⁸ In 1995 the “value of U.S. airborne trade reached \$355 billion, accounting for 31 percent of U.S. exports and 23 percent of imports.”²⁹

Overall, in the commercial sector, the expansion by business operations in the use of “just-in-time” inventory methods is creating a greater “need for speed.” The demand for speed is being met with air transportation; primarily by airlines who are “providing more than transportation...they are providing related services: warehousing, project assembly, order processing, and customer service.”³⁰ A “soup-to-nuts” logistics approach where businesses are outsourcing their entire supply chain to integrated air carriers is creating a “partnership in logistics to improve their entrepreneurship and cut significant costs from their cost stream.”³¹

In many business sectors “analysts consider the efficiency of such supply chains to be an increasingly important competitive advantage.”³² By not “financing buildings for warehousing and distribution purposes,” companies can “redeploy capital” to “focus on their core competency,” thus improving their overall competitiveness.³³

²⁸ *Ibid*, p. 15.

²⁹ *Ibid*, p. 12.

³⁰ “1996/1997 World Air Cargo Forecast,” Boeing Commercial Airplane Group, p. 15.

³¹ Helen Richardson, “How much Should you Outsource?": *Contract Logistics*, Sep 94, p. 61.

³² Douglas W. Nelms, “At the Crossroads”: *Air Transport World*, Jan 1997, p. 57.

³³ Richardson, p. 61.

What it means for CRAF

The growing strategic relationship between air cargo carriers and the commercial markets provides both encouragement and a challenge to AMC. On the one hand, AMC desires an economically strong air cargo industry with depth in capacity from which it can obtain augmentation airlift in an emergency. On the other hand, the dependence of the commercial markets on time critical delivery of products makes it economically, and therefore, politically harder for AMC to remove from commercial service the capacity committed to the CRAF. The impact of a full CRAF activation would substantially reduce the airlift capacity of a primary cargo handler, such as Federal Express, which makes up 48 percent of the long-range capability in CRAF. In reality then, even if Stage III of CRAF was activated, AMC would not be able to access the full capability of 26 MTM/D.³⁴ AMC would have to accommodate the needs of the commercial sector which is now more dependent upon the all cargo carriers, such as Federal Express.

The next section discusses the changes within DOD which will limit the AMC's ability to call up CRAF.

³⁴ A million ton miles is the airlift required to move one ton one million miles. This is a simplistic measure but one that allows for a quick comparison between aircraft and fleet compositions. It is often depicted as MTM/D. MTM/D ignores the wide range of potential contingencies and the differences between different kinds of cargoes.

IV. THE MILITARY SECTOR

"We fully support the Chairman's goal of full spectrum dominance and bring significant capabilities to the emerging operational concepts of dominant maneuver and focused logistics."

*General Walt Kross, USAF
Commander-in-Chief, US Transportation Command
Statement before the Senate Armed Services Committee
13 March 1997*

Focused Logistics and CRAF

The U.S. military, to save support costs, is adopting the business sector's logistics strategy in what is called "focused logistics."¹ The DOD goal is to reduce logistics support costs by removing layered inventory, making greater use of "just-in-time" inventory methods and outsourcing portions of the supply channel functions. To achieve these objectives, the DOD is depending upon "rapid transportation" and "total asset visibility."² By adopting a lean logistics strategy, the Defense Logistics Agency (DLA) plans to reduce inventories to \$48 billion by 2003 or about half the 1989 value while improving customer service.³

Additionally, the DOD is outsourcing more and more support functions to commercial providers in the same "soup-to-nuts" approach as the commercial sector. This strategy allows the commercial vendors to determine the transportation mode, carrier, and schedule.⁴ DLA is implementing programs such as "prime vendor" and "direct vendor delivery" to improve service to the military customer. With these

¹ "Logistics, A Mosaic of Support to the Warfighter": Deputy Under Secretary of Defense (Logistics), 1997, p. 10.

² Paul G. Kaminski, "Lean Logistics: Better Faster, Cheaper": Defense Issues, Volume 11, No 99, p. 2.

³ Ibid., p. 31.

⁴ "Around the clock, Around the World," Defense Logistics Agency, A Mission Briefing, 7 Nov 1996.

initiatives the “suppliers deliver products directly to their customers and bypass DOD’s warehousing and distribution centers.”⁵ In one instance, a major CRAF provider is operating a government owned warehouse in Memphis for Defense Logistics Agency providing 24 hour CONUS (48 hour Overseas) delivery of high dollar or readiness items weighing less than 5 pounds. In one night 1,000 DOD packages were delivered from this facility.⁶ This same CRAF carrier operates the GSA Small Package Contract. The Small Package Contract allows any government shipper access to express and two day delivery at pre-negotiated rates. On average this system is moving 170,000 DOD packages per month through the carrier’s route system.⁷

What is emerging from DOD’s strategy is a logistics system which is growing increasingly more dependent upon the civil air carriers for successful movement of essential and non-essential products, spare parts, and supplies. This shift in strategy by itself is not detrimental to good military operations. However, how this system will operate in times of emergency or war is yet to be tested.

For instance, the same air carriers operating the peacetime distribution functions will also be called upon to support the CRAF in times of emergency or mobilization. We, as military planners, have to stop and ask ourselves are we double counting the commercial air carriers? Can we depend upon the air cargo carriers to turn their aircraft over to CRAF while still operating their commercial routes and

⁵ “Logistics, A Mosaic...”, p. 25.

⁶ “Around the Clock, Around the World”: Defense Logistics Agency, A Mission Briefing , 7 Nov 1996.

⁷ Compiled from data provided by Terence J. Dolce, Government Sales Manager, Federal Express Corporation, Greenbelt, MD, in letter 18 Dec 1996.

maintaining their high level of service to their commercial and military customers. To understand the risk of removing aircraft from the commercial fleet, DOD needs to evaluate the impact upon the air carriers and their ability to continue operations after each stage of CRAF activation. Also, the impact of activation upon the DOD logistics distribution channels must be evaluated.

During research for this paper, no office within the DOD, TRANSCOM or at DLA could provide overall insight to the amount of essential parts, supplies or equipment being transported by the commercial air carriers. Glimpses are available into various channels from the services, DLA, and the Joint Staff. However, the aggregate impact of CRAF activation on these distribution channels is little known. A May 1996 CRAF study by the Logistics Management Institute stated: "There is no consensus on the overall effect any level of CRAF activation would have on the domestic economy" except to say "activating CRAF can withdraw from commercial service a substantial portion of the U.S. airline industry's long-range international capability."⁸

Understanding the deepening dependency between the commercial air carriers and DOD's logistics needs is critical as DOD reduces inventories providing little margin for error. What are the effects of CRAF activation on DOD and on the international economy when both are increasingly more reliant on express air cargo delivery? The effects are unknown and for this reason DOD should study immediately the movement of DOD goods through the commercial sector to better understand the

⁸ Coffey, p. 3-18.

impact at each stage caused by a CRAF activation. This examination is doubly important when considering AMC will have fewer aircraft in the future to meet the continuing transportation demands of the nation.

Airlift Modernization (Fewer Tails—Less Flexibility)

Air Mobility Command (AMC) is rapidly drawing down and retiring its core airlifter, the C-141 Starlifter. Fatigued from many years of demanding use moving personnel and equipment all around the globe, the C-141 is scheduled to be removed from the active duty fleet by 2003 and the unit-equipped Guard and Reserve by 2006. At the beginning of FY97, AMC possessed 161 C-141s down from 254 during the Gulf War era.⁹

The new core airlifter is the C-17 Globemaster III. This aircraft incorporates military features conducive to performing a wide variety of airlift missions to fulfill global force projection needs. However, this aircraft is not entering the active force as rapidly as the C-141 is being retired, nor is the C-17 replacing the C-141 on a one-for-one basis. A total 120 C-17 aircraft are being purchased to replace 254 C-141s. AMC airlift planners indicated the smaller organic airlift fleet will reduce the number of missions AMC can support by a third.¹⁰ If the future demand for airlift services by the DOD and other U.S. agencies continues, the future strategic airlift fleet of C-17, C-5 and KC-10 aircraft will have to maintain a high operations tempo (OPTEMPO) in

⁹ "Air Mobility Master Plan (AMMP-97)", Plans and Program, Headquarters Air Mobility Command, Scott AFB, IL, 11 Oct 96.

¹⁰ Ibid.

order keep up with the nation's demands for global transportation. This potential situation can have detrimental effects on aircrew morale, aircraft and support personnel. AMC has two options -- not support valid airlift missions or call upon the commercial sector to provide additional airlift.

To reduce the impact on its organic airlift fleet, AMC is shifting the workload to the civil carriers. In discussion with airlift schedulers at AMC, they indicated General Kross, Commander, US Transportation Command has directed routine channel routes be operated by the civil carriers.¹¹ In this way, AMC can reserve its reduced fleet of strategic airlift assets to support the unique military missions and ensure aircraft are available to meet training, exercise, and non-routine movements.

As mentioned in section 2, AMC can depend upon 50 percent of the Stage I capacity to volunteer their aircraft to meet the day-to-day needs of CRAF. Can AMC encourage greater volunteerism by the civil carriers to fulfill the demand for peacetime commercial augmentation? Not while commercial capacity is dedicated to commercial customers. The carrier will prefer to accommodate the commercial shipper because of substitutability. The commercial shipper can always go to another carrier to move its package or product. With on-time delivery taking on a greater competitive role, shippers want reliable, on-time service from the air carriers. Thus to assure continued market share the carrier must provide reliable service to its customers or loose business to a competitor. Therefore the CRAF carrier will favor the commercial customer over the military one. The fact that commercial transportation of goods by

¹¹ Michael Pikula, Colonel, USAF, Telephone interview, Chief, Office of Contract Air, Headquarters, Air Mobility Command, Scott AFB, IL, 2 Dec 96.

air is increasing can in effect crowd out the military shipper and limit volunteerism by the CRAF carriers. If volunteerism cannot meet the demand for military lift it will become necessary to activate Stage I and even possibly Stage II of the CRAF. These activations may become more routine as the number of aircraft in the military organic fleet is reduced. Activation may become more routine, especially, during periods of high commercial demand such as during the Christmas Holidays.

In the next section we look at the commercial capacity and quantify (although limited) the impact of CRAF activation upon the commercial sector.

V. A LOOK AT THE FLEET

Thus far this paper has described the growing use of air transportation to support the use of just-in-time inventory methods in the commercial market place and how DOD's adoption of just-in-time logistics strategy may adversely affect the logistics transportation infrastructure in the event of a CRAF activation. We now look at the impact of CRAF activation on the commercial fleet.

How can we evaluate the impact of a CRAF activation on the commercial sector? One way is to aggregate the available cargo ton miles provided by the commercial air carrier system then reduce the available ton miles offered by the CRAF participants to obtain an approximation of the lost commercial capacity. Then the capacity of the carriers in the CRAF can be aggregated and evaluated based upon the amount of their capacity in the CRAF.

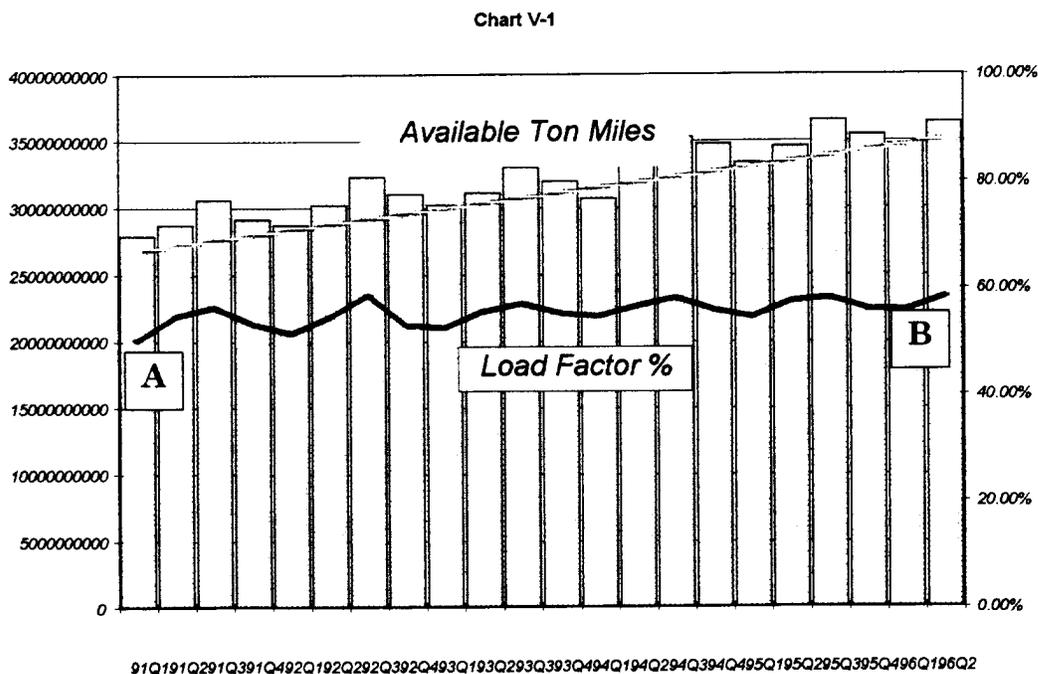
To obtain the necessary data on capacity of the air carriers, two main sources were used: the Department of Transportation T-100 data and AMC's form 312. A brief explanation of each follows.

The Department of Transportation (DOT) in January 1990 instituted the T-100 program which provides monthly traffic reports on the domestic and international operations of U.S. airlines. The large certificated carriers submit monthly traffic data on Form 41 to the DOT's Office of Airline Information (OAI), part of the Research and Special Program Administration (RSPA). The Bureau of

Transportation Statistics (BTS) analyzes the data and provides various statistical reports to the public and interested private and public agencies.¹

For this study, the internet site was used to extract system traffic data relating to the available ton miles, freight ton miles, and revenue ton miles for the certificated carriers. For a listing of those carriers see appendix B-1. To extract traffic data for the CRAF cargo carriers, the original Form 41 data was obtained from the files at the Office of Airline Information (OAI). For the listing of the CRAF carriers used to compile the traffic data for this study see appendix B-2.

Chart V-1 shows the total system available ton miles by quarter from the



second quarter 1992 through the second quarter 1996. As indicated by the bar graph on chart V-1, the total available ton miles has increased by some 28% for the

¹ BTS reports and supporting data may be accessed through their internet site, <http://www.bts.gov>.

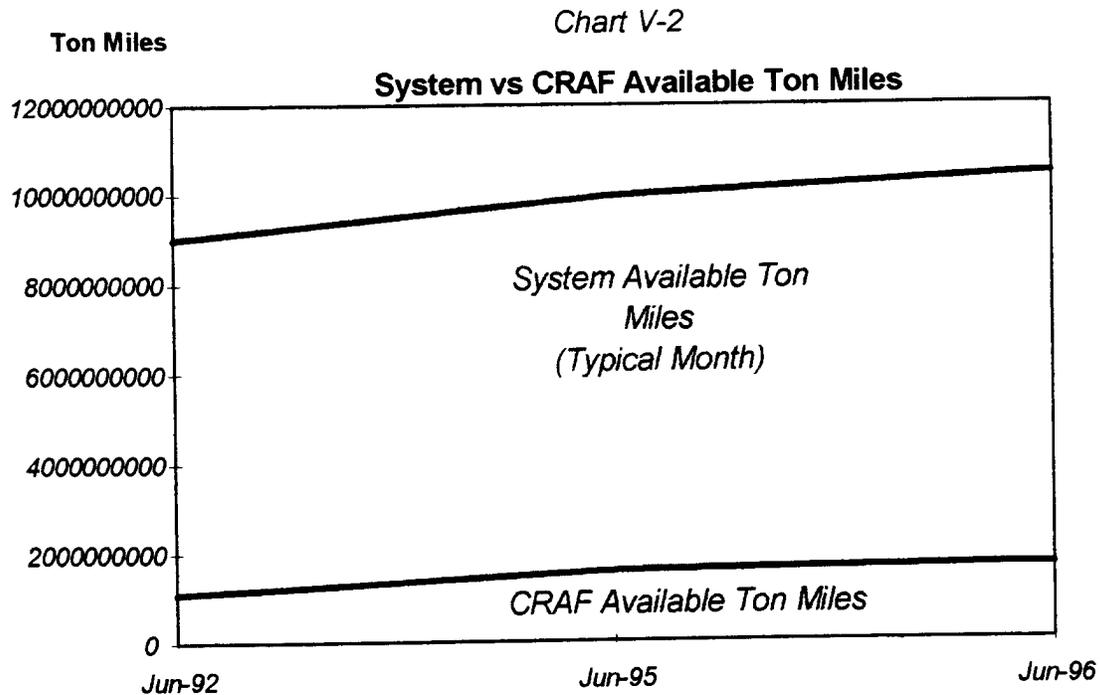
period. This trend is substantiated by the Boeing Company's, World Cargo Forecast which also projects capacity growth to continue at 6.0 percent per year.² Capacity may be growing, but what portion of the expanding fleet is already accounted for? For that we can measure the load factors.

The line AB on chart V-1 represents the load factor measured as a percentage of the available ton miles.³ The Load factors for the period shown represent about a 6 percent growth (52%-58%). So, while the overall capacity has grown, the unused portion of that capacity has declined. From the air carriers' perspective this represents more efficient use of their aircraft. To AMC it means there is less idle capacity available to support military missions. Should load factors continue to rise, AMC may find itself in a highly competitive market pitted against commercial shippers for airlift capacity.

Chart V-2 (on the next page) shows system capacity contrasted against the air carriers in the CRAF. The periods shown are for June 1992, 1995 and 1996. These dates were chosen because of the availability of the data. The specific numbers are not as important as the relationship. However, this chart provides a close approximation of the lift capacity removed from the commercial market in the event of a full CRAF activation.

² "1996/1997 World Air Cargo Forecast," Boeing Commercial Airplane Group, Seattle, WA, October 1996, p. 19.

³ The load factor is obtain by dividing revenue ton miles by available ton miles.



From this chart we can see the amount of available ton miles is small relative to the overall system. However, taking the analysis down one more step provides more revealing data.

Headquarters AMC's office of Civil Reserve Air Fleet (HQ AMC/DOF) is the policy arm for CRAF matters. Monthly this office tracks each CRAF participant's aircraft committed to the CRAF by stage and by segment. This information is compiled and reported on AMC Form 312.

In the fiscal year 1997 CRAF contract there are 674 aircraft committed to CRAF--the highest level of commitment ever.⁴ The following table is compiled from AMC form 312 and breakouts by stage and segment the aircraft in the CRAF.

⁴ General Walt Kross, USAF, Commander in Chief, US Transportation Command, "Statement Before the Senate Armed Services Committee, 13 Mar 1987, p. 7.

Segment	Stage I Pax/Cargo	Stage II Pax/Cargo	Stage III Pax/Cargo
Domestic	0/0	0/0	49/0
Alaskan	0/0	4/2	4/2
Short-Range International	0/0	16/12	81/12
Long-Range International	43/41	119/95	277/216
Sub Total	43/41	139/109	411/230
Aeromedical Evacuation (pax only)	0	25	33
Total (pax/cargo/Aeromed)	84	273	674
B-747-100 Equivalents			
Long-range International	30.0/30.17	87.15/75.13	186.14/156.6
MTM/D in Cargo Capacity ⁵	5.14	12.8	26.7

The 216 cargo long-range international aircraft in Stage III represent 156.6 WBE or 26.6 million ton miles per day (MTM/D) of airlift capability. The amount of MTM/D can be compared against the total capacity represented by the CRAF carriers to calculate an approximate percentage of capacity that would be removed from commercial service in the event of a Stage I, II or III activation. A summary of those calculations follows.

Adding up the available ton mile capacity of all the CRAF cargo participants equals 56.3 MTM/D.⁶ The commitment to CRAF of 26.7 MTM/D represents 47.5 percent of the CRAF carriers capacity at the Stage III level of activation. For Stage I CRAF represents 9.1 percent and for Stage II, 22.8 percent of the total 56.3 available ton mile capacity of the CRAF air carriers.

⁵ AMC calculates the MTM/D per CRAF aircraft WBE at .1705. To compute the MTM/D the following formula was used .1705 X 30.17 WBE for stage I and .1705 X 75.13 WBE for stage II. This equals 5.14 MTM/D and 22.8 MTM/D respectively.

⁶ Computed by aggregating the available ton miles for all the CRAF cargo carriers then dividing by 30 to an average available ton miles per day. (1,687,198,080/30= 56,239,936).

From this we can conclude that under stage I activation, little impact will be felt in the commercial sector based upon the relatively low percent capacity removed from the CRAF carriers' capacity. Stage II begins to create some hardship on the carriers and will most likely affect some service depending on the duration of the activation. Stage III will create an adverse affect on the market with nearly half of the capacity of the air carriers in the CRAF removed from commercial service.

However, we cannot stop there. Referring to Appendix A, a troubling number quickly presents itself. We see Federal Express provides 48.68 WBEs to the CRAF which represents 32 percent of WBE committed to the CRAF. In aircraft this is 59 wide-body type aircraft or 45 percent of all the wide-body aircraft in CRAF Stage III. In Stages I and II, Federal Express committed 3 aircraft or 20 percent and 18 aircraft or 31 percent of the wide-body aircraft to CRAF respectively. It is clearly apparent from these numbers that CRAF cargo capability is heavily dependent upon a single carrier, Federal Express, for the majority of its wartime capability.

A second troubling factor is that in 1995 the express carriers, such as Federal Express and UPS commanded nearly 60 percent of the North American air freight market. The affect of removing 100 percent of Federal Express's wide body aircraft from commercial operations would create a high level of disruption to that vital transportation mode (Chart V-1). When we add to the situation described the growing dependence of DOD's distribution operations as a result of outsourcing

more of the transportation function to civil carriers, like Federal Express; then DOD is creating an "Achilles' heal" in our logistics infrastructure.

During telephone interviews with airlift planners at AMC they believe the growth in the air cargo market will provide ample capacity to support DOD without adversely affecting commercial service. Talking with management at Federal Express, the company is adding some 40 to 50 wide body aircraft to its fleet over the next five years.⁷ UPS also plans to purchase new Boeing 767 freighters. The Boeing Company's 1996/1997 World Cargo Forecast predicts the commercial domestic large freighter fleet will grow from 210 to 319 aircraft by 2006.⁸

These numbers indicate a positive trend for the commercial freighter fleet. However, we are reminded that this growth is supported by the growing demand in the commercial market. We saw from chart V-1 that load factors are going up not down. Commercial capacity is not being added as a buffer to support DOD emergency airlift needs. The relative issue still remains, how much capacity can we remove before it adversely affects the economy and or DOD logistics distribution functions. With the military adopting a just-in-time strategy the nation can ill afford to impair its transportation capability as inventories are reduced. We must understand what is moving in and through the commercial system to know where there are weak links.

⁷ Mr Gary Molinary, Telephone interview, Managing Director, Charter Programs, Federal Express Corporation, 28 Oct 96.

⁸ World Air Cargo Forecast, p. 19

Single researchers can only examine relatively little in a system as large as DOD logistics. Therefore to fully grapple with the emerging issues created by the changes identified in this paper a full scale study and exercise of the system is appropriate.

In 1978 the command post exercise Nifty Nugget exposed many gaps in US mobilization planning. Nifty Nugget simulated a fast breaking attack by the Warsaw Pack on NATO.⁹ It was the first government wide mobilization effort since World War II. The exercise was a successful failure -- it succeeded in demonstrating the failure of an inadequate mobilization system. The shortfalls identified by Nifty Nugget provided the genesis to the acquisition and structural changes which helped make the mobilization for the Gulf War a success. However, in light of the changing environment identified in this study, DOD needs to do another Nifty Nugget exercise to test DOD's assumptions against the real world. In this way DOD can identify the weak links in our mobilization and distribution systems before they are tested in a real emergency when it is too late fix it.

⁹ James K. Matthews, and Cora Holt, "So Many, So Much, So Far, So Fast": US Transportation Command, Scott AFB, IL, March 1991, p. 1.

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**FY97 CARGO CRAF CARRIERS' WBE
AND
PERCENT OF FLEET IN CRAF**

<u>CARRIER</u>	<u>WBE¹</u>	<u>PERCENT²</u>
Air Transport International/Burlington Air	7.48	100
American International	15.11	98
Atlas Air	9.85	50
DHL Airways	0.45	20
Evergreen International Airlines	12.43	100
Emery Worldwide Airlines	13.84	100
Federal Express	48.68	100
Fine Airlines	2.81	100
Northwest Airlines ³	9.26	100
Polar Air Cargo	14.36	100
Rich International Airways	0.57	100
Southern Air Transport	5.23	100
Tower Air	1.87	100
Trans Continental Airlines	1.54	100
UPS Airlines	5.79	15
World Airways	6.75	100
Zantop International Airlines	0.41	33

Source: HQ AMC/DOF

Notes:

1. The B747-100 is the standard used to compute Wide-body Equivalent (WBE). Each aircraft committed to the CRAF is normalized against the B-747-100 characteristics of speed, payload, and utilization rate. From this comparison a computed WBE value is obtained.
2. To participate in CRAF an air carrier must commit a minimum of 15 percent of its long-range international capability to the CRAF
3. Northwest Airlines is the only U.S. air carrier to operate both a passenger and cargo fleet of aircraft. Other U.S. passenger carriers carry cargo in the lower hold of their aircraft on a space available basis

AIR CARRIERS (SYSTEM)

Majors

America West
American
Continental
Delta
Federal Express
Northwest
Southwest
Trans World
United
United Parcel
US Air

Nationals

Air Wisconsin
Air Wisconsin
Alaska
Aloha
American
International
American Trans
Air
Arrow Air
Atlantic Southeast
Business Express
Carnival
Continental
Express
DHL
Emery
Evergreen
Express One
Hawaiian
Horizon Air
Kiwi
Markair
Midwest Express
Morris
Private Jet
Reno Air, Inc.
Simmons
Southern Air
Sun Country
Tower
Trans States
USAir Shuttle
Westair
World

Large Regionals

Air South, Inc.
Amerijet
Air Transport
Atlas Air
Challenge Air
Cargo
Empire
Executive Airlines
Fine
Florida West
Frontier
Kitty Hawk
MGM Grand
Miami Air
North American
Northern Air
Polar Air Cargo
Reeve
Rich
Spirit Air
USAfrica
UFS, Inc.
Valujet
Worldwide
Zamtop

Medium Regionals

Aerial
Airmark
Airtrain
AV Atlantic
Capitol Air
Casino Express
Eagle Airlines
Grand
Great American
International
Cargo Xpress
Midway
Millon
Nations Air
Patriot
Ryan Intl.
Sierra Pacific
Sportsflight
Trans American
Trans Continental
Trans Air Link
Ultrair
USA Jet
Vanguard
Viscount

CARGO AIR CARRIERS CRAF USED FOR FLEET ANALYSIS

CARRIER

Air Transport International/Burlington Air

American International

Atlas Air

DHL Airways

Evergreen International Airlines

Emery Worldwide Airlines

Federal Express

Fine Airlines

Polar Air Cargo

Rich International Airways

Southern Air Transport

Tower Air

Trans Continental Airlines

UPS Airlines

World Airways

Zantop International Airlines

Note: Northwest available ton miles was not included in the aggregate for the CRAF carriers.. The T-100 data was not clear what portion of the Northwest's cargo fleet contributed to their listed available ton miles.