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Preserving the Civil Reserve Air Fleet: sustaining America's emergency lifeline

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Abstract

Purpose – The purpose of this paper is to examine an issue of critical importance to America's national security. The Civil Reserve Air Fleet (CRAF) is a public/private partnership between US air carriers and the Department of Defense (DOD) for the provision of contingency airlift services to the military in times of national need. Formed in 1951, the CRAF has only been activated twice, but it has continued to be a source of emergency air transportation should the nation require resources beyond those available from the US Air Force. Sweeping changes occurring in global trade, commercial aviation, national defense policy and foreign relations suggest that changes will be needed to maintain the CRAF as a strategic defense transportation resource.

Design/methodology/approach – This paper examines the long-standing national policy of relying on commercial interests to provide contingency transportation to the DOD in wartime. The CRAF will be singled out for closer examination in light of environmental changes occurring in the airline industry, international trade and global threats to the nation. The purpose of this analysis is to then assess the partnership's ability to remain relevant in an uncertain future.

Findings – First, commercial cargo aircraft are downsizing thereby becoming less useful to the DOD. Second, there is no new wide-body military airlifter on the horizon. Third, threats from hostile nations are becoming more indirect and subtle, requiring planners to think "outside the box" when assessing the need for strategic airlift over the next 20-50 years.

Originality/value – The CRAF has not fundamentally changed since its inception in 1951. The time has come to reexamine the partnership to ensure that it remains America's emergency lifeline.

Keywords Civil Reserve Air Fleet, Defense transportation policy, National transportation policy, Public/private partnerships, Strategic mobility

Paper type Viewpoint

Introduction

References to defense requirements occur repeatedly in federal transportation legislation. In fact, every major piece of national legislation pertaining to aviation, from the Civil Aeronautics Act of 1938, to the Federal Aviation Act of 1958 and the Airline Deregulation Act of 1978, include policy statements specifically linking the needs of national defense to the maintenance of a strong civilian air transport system. (Civil Aeronautics Act, 1938; Federal Aviation Act, 1958; Airline Deregulation Act, 1978). Integrating these resources with military requirements is accomplished through national defense planning.

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One of the most significant studies on strategic mobility was the Mobility Capability and Requirements Study-16 (MCRS-16) which was completed in 2010 (GAO-12-510T, 2012, p. 2). Briefly, the Department of Defense (DOD) officials used three different scenarios to examine a broad spectrum of military operations, each of which required the use of a certain percentage of military airlift capacity on the most demanding day of the scenario. With too few aircraft, a potential shortfall would exist thereby risking mission failure. With more aircraft than required, a potential excess could exist, with the attendant risk that mobility resources would be expended unnecessarily (GAO-12-510T, 2012, pp. 3-4). More recently, the Defense Department commenced the MCRS-18, a sweeping new assessment that will consider the precise number of air refueling tankers, cargo aircraft and supply ships needed to support the Trump Administration's National Defense Strategy. Those findings will then drive any new investment decisions in the military's fiscal year 2020, spending plan for things such as airlift aircraft needed to meet anticipated contingency requirements into the next decade (Sherman, 2018).

This paper will examine the question of whether this congressional mandate will be met in the tumultuous world of the twenty-first century. First, the author will provide general background information on America's strategic mobility system. The focus will then move to specifically consider strategic airlift capability, examining both the military and civilian contributions to the total effort. Current issues impacting this civil/military partnership will then be discussed, summary comments will be presented and conclusions will be drawn. Are national defense needs being satisfied by this continued reliance on the commercial sector? How will the Civil Reserve Air Fleet (CRAF) remain relevant into the future?

Strategic airlift

The US Air Force Air Mobility Command (AMC) is the single manager for all DOD air transport needs, which includes moving passengers and cargo for all US armed services. In a contingency situation, approximately 90 per cent of fighting personnel reach the battle area by air, while roughly 95 per cent of the cargo goes by ship (Corpus Christi, 2003). The role of airlift is first and foremost to get the initial wave of personnel and their equipment to the fight as quickly as possible and sustain them until resources begin to arrive by ship weeks or even months later. Military aircraft fulfilling that role will be discussed in the next section, followed by a similar examination of their commercial counterparts

Air mobility command assets

The Air Force uses two primary aircraft for long-distance moves. The largest airplane in the Air Force fleet is the C-5M Super Galaxy, which can carry oversized cargo incapable of being moved by other aircraft (C-5M-Super Galaxy, 2018b Fact Sheet). The C-17 Globemaster III, which is somewhat smaller than the C-5M, also provides rapid strategic delivery of troops and their equipment to main operating bases or directly to the front lines (C-17 Globemaster III, 2018 Fact Sheet). In addition, the KC-10 Extender, primarily used for inflight refueling, can also be configured to carry passengers and cargo as needed. (KC-10 Extender, 2014 Fact Sheet).

Airline assets: the Civil Reserve Air Fleet

The CRAF was established in December 1951 and resulted from DOD's realization that supplemental airlift capability would be needed to support a future major national contingency (Civil Reserve Air Fleet Allocations, 2018). The model has stood the test of time and has remained virtually unchanged since its inception. It is a voluntary program

whereby US airlines contractually commit to augment military airlift in national emergencies. To encourage carriers to participate, the government makes peacetime DOD airlift contracts (passenger and cargo) available only to the CRAF partners.

Of primary interest is the long-range international segment, which consists of passenger and cargo aircraft capable of transoceanic operations (3,500 nautical miles or greater). As shown in CRAF Carriers, as of April 2017, the following 24 carriers were enrolled in the CRAF:

International segment – long range

- ABX Air[1]
- Air Transport International[1]
- American Airlines[2]
- Atlas Air[1,2]
- Delta Airlines[2]
- Federal Express Airlines[1]
- Hawaiian Airlines[2]
- National Airlines[1,2]
- Omni Air International[2]
- Polar Air Cargo[1]
- United Airlines[2]
- United Parcel Service (UPS)[1]
- Western Global Airlines[1]

International segment – short range

- Alaska Airlines[2]
- Delta Airlines[2]
- JetBlue Airways[2]
- Lynden Air Cargo[1]
- Miami Air International[2]
- Sun Country[2]
- Northern Air Cargo[1]
- United Airlines[2]
- USA Jet[1]

National domestic services

- Allegiant[2]
- Southwest Airlines[2]
- Tatonduk[1]

Note: [1]Cargo; [2]Passenger
Source: Air Mobility Command, Civil Reserve Air Fleet Fact Sheet (2017)

This total represents 397 aircraft in the international segment (267 in the long-range and 130 in the short-range international section) and 37 planes assigned to the national domestic services segment.

Civil Reserve Air Fleet activation

There are two important requirements for airline participation in the CRAF. First, specific aircraft are identified by tail number; second, four crews must also be committed for each aircraft. As a result, the actual composition of the CRAF changes monthly, as aircraft are added to/removed from the list. When called, the company has between 24 and 72 h to make their aircraft available. The airlines continue to operate in civil status and maintain operational control of their aircraft using company resources for the duration of the mission (Ibid). The CRAF has been formally activated only twice. The first time was to support the Operations Desert Shield/Storm (from August 18, 1990, to May 24, 1991), the second during Operation Iraqi Freedom (from February 8, 2003, to June 18, 2003). (Roberts, 2003, CRS-3).

Membership incentives

A key incentive for airlines to join the CRAF (other than patriotism) is the requirement that only participating firms can bid on peacetime contracts to move passengers and freight for the DOD (Civil Reserve Air Fleet Fact Sheet, 2014). These awards are not insignificant and represent the lifeblood for some of the smaller airlines. For Fiscal Year (FY) 2018, contracts totaling more than US$2.6bn were distributed to CRAF carriers (Contract Defense, 2017). The determination of how much military business to give to the airlines can be quite contentious. The Air Force does not want to justify its own airplanes and crews sitting idle when there are DOD people and cargo that need to move, but omitting the airlines means participation in the CRAF would plummet. In other words, there is a fine line that must be walked between too much and not enough business being given to CRAF carriers. In addition to the revenue, another justification is that the companies gain valuable peacetime experience moving troops and their cargo, so they will know what to do in the event they are activated.

Issues impacting the Civil Reserve Air Fleet

Different aircraft designs. Military cargo is often large, heavy, wheeled and/or bulky, requiring aircraft that are able to support rapid on-load and off-load of these kind of items. As noted above, aircraft such as the C-5M and the C-17 are designed for this purpose with a high wing that situates the fuselage closer to the ground. In addition, equipment can be loaded from the rear and/or the nose parallel to the line of flight. Commercial freighters (except for a handful of Russian aircraft) are modified passenger aircraft having a low wing that positions the loading floor as much as 18 feet above the ground. This not only precludes drive-on/drive-off capability but also necessitates getting the cargo up to and down from the plane's floor. A comparison of civilian and military cargo planes is shown in Table I.

Different materials handling and aircraft systems. Military and commercial air cargo handling systems are of very different designs and use pallets requiring different aircraft locking systems. Simply put, civil aircraft can carry military pallets, but commercial pallets cannot move on military planes. Finally, as Banholzer points out, CRAF crews are not trained to operate in hostile environments nor do their aircraft include the capability to counter any hostile threats (Banholzer, 2006). Because the number of civilian freighters suitable for, and offered to, the CRAF is function of the demand for commercial air freight services, changes impacting that industry will be examined in the following section.

The changing face of the air cargo industry

Redefinition of a cargo airline

The CRAF is only as strong as the support it gets from US airlines, whose managers make their business decisions based on profitability not airlift capability. Cargo transport by air is

Aircraft type	Payload (tons)	Range (nmi)	Drive-on/off	Rollerized floor
C5M[1]	141	2,150a	Y	Y
C17[2]	85	2,400a	Y	Y
B747F[3]	124	4-5,000b	N	Y
B757F[4]	36	2,900-3,150c	N	Y
B777F[5]	113	4,880	N	Y
B767F[6]	58	3,255	N	Y
MD11F[7]	93-98c	3,500-4,000c	N	Y
AN124[8]	150	5,000	Y	N
AN225[9] [d]	276	2,425	Y	N

Table I.
Comparison of large military and civilian cargo aircraft

Notes: [a]Global with inflight refueling; [b]depending on the model; [c]depending on the engine type; [d]included for comparison purposes only, as there is only one
Sources: [1]C-5M-Super Galaxy (2018a), [2]C-17 Globemaster III (2018), [3]Boeing (2010), [4]757-200F (2007), [5]Clark and Kirwan (2009), [6]Boeing (2019), [7]Boeing Converted Freighter (2008), [8]Airforce-Technology (2018), and [9]The Aviation Zone (2018)

dominated by the integrated companies such as FedEx and UPS, ranked 1 and 2, respectively, both in the USA, based on tonnage moved (Focus on Air Cargo, 2017), and by a number of non-US global freight carriers (Transport Topics, 2017). Smaller American carriers (Kalitta, National Air Cargo and Atlas) may offer some scheduled services, but primarily survive on military business and charters. The two aircraft of choice for military cargo are versions of the B747 and the DC10/MD11 (AMC Form 312, 2016).

Rebounding demand for air cargo in question

Beginning in mid-2016, air shipments began to slowly increase. UPS placed a large order for Boeing's 747-8 F that ensures the assembly line will operate into the next decade, while Atlas Air began adding 747-400 freighters to support increased demand for customers, such as DHL Worldwide Express. This renewed interest in Boeing's freighter family continued through 2017 and into 2018 even as Delta and United retired the last of their passenger versions. In fact, with Boeing's new models sold out through 2021, cargo airlines are seeking used alternatives built from 1993 to 2009 (Johnsson, 2018). Similarly, interest in used MD-11s has risen as well (Putzger, 2018). Unfortunately, on July 6, 2018, US tariffs on US$34bn worth of Chinese imports took effect, immediately followed by China's retaliatory imposition of tariffs in the same amount on 545 US products to include automobiles, beef, seafood, dairy and other farm goods (Zhong, 2018). Should the USA find itself embroiled in a sustained trade war with China, this interest in expanding US fleets could disappear creating a vacuum eagerly filled by foreign airlines whose markets are unaffected by the economic conflict.

The nature of military combat equipment

Weapon systems are designed, first and foremost, to accomplish a specific mission; air transportation is, at best, a secondary concern. Most will move by water, where dimensionality and weight are not issues. However, in the mid-2000s, roadside bomb attacks targeting American and coalition troops in Iraq and Afghanistan resulted in the production of the Mine-Resistant Ambush-Protected vehicle. Because of their intended use and attendant design, they are both bulky and heavy, weighing between 17 and 24 tons [Mine Resistant Ambush Protected Vehicles (MRAP), 2019]. To get them to the Middle East as quickly as possible while simultaneously filling the sealift pipeline, the DOD contracted with

two Russian carriers to use their Antonov (AN)-124 aircraft for the initial moves. (Menchaca, 2008).

Geo-political issues

An examination of America's strategic airlift capability cannot take place without some appreciation for the global context within which it must operate. The current administration is taking a radically different view to America's place in the world than the previous one. President Obama's "pivot to Asia" has been largely abandoned in favor of an "America First" approach advocated by President Trump (Boduszyński and Le, 2017). Reapproachment with North Korea, a changing relationship with Russia, and the trade war with China are all examples of the uncertainty and upheaval such a dramatic change in America's national leadership can bring. China is following an aggressive expansionist policy not only in the South China Sea but also elsewhere through its One Belt One Road project, also known as, the New Silk Road. The initiative embraces both land and maritime routes (the "Belt" and the "Road," respectively), with the intent of using infrastructure investments to improve trade relationships in the region. In fact, China already has US$1tn of major infrastructure works underway in Africa and Central Asia (Bruce-Lockhart, 2017). However, a recent study suggests that the Chinese are using these projects to expand their military footprint, projecting power and influence around the globe from the Horn of Africa into the Middle East and South Asia (Munõoz, 2018). Another criticism is that less-developed nations may be lured into a project by the promise of economic boon, only to find out they cannot service the debt, putting them in hock to the Chinese (Su, 2017). Finally, add China's largely unchecked expansion into the South China Sea (Specia and Takkunen, 2017) to the mix, and the challenges ahead for the DOD transportation planners become clear.

Summary comments

The CRAF is like an insurance policy for the DOD and, by implication, the nation, providing coverage for a future everyone hopes will never occur. The government pays for the use of civilian aircraft during an activation, but the expense is small compared to the costs of acquiring and supporting organic aircraft, paying and training aircrews and maintaining a comparable level of standby and underutilized military airlift capability. In that regard, the CRAF has been a key element in AMC's arsenal. However, any insurance plan needs periodic review, even when no claims have been filed. Over the years, studies have been performed by various entities regarding the CRAF (Graham *et al.*, 2003; Bolkcom, 2006). Given some of the issues discussed in this paper, the time seems right to conduct such a new audit of the CRAF. Indeed, the MCRS-18 is the perfect mechanism and must include consideration of at least some of the following issues.

Issues for future consideration

Downsizing of commercial cargo aircraft

First, commercial aircraft are getting smaller. As discussed above, the B747 is slowly being phased out and has already effectively disappeared from US passenger operations. Despite a bump in short-term interest from US cargo carriers, the long-term prospects for even the freight version are slim. The reality is that large aircraft with more than two engines are becoming too expensive to operate relative to those with two engines. (Mutzabaugh, 2017). A portent of things to come can be seen in Amazon's recent decision to operate 40 B767Fs (rather than a larger aircraft) in its Amazon Air fleet by the end of 2018. These will be leased through Atlas and Air Transport Services (both CRAF carriers), but belong to Amazon

(Reed, 2017). The choice of aircraft reflects the nature of ecommerce but will be of little practical value to the CRAF.

No new wide-body military airlifter on the horizon

Second, there is no C-17 replacement planned anytime soon; a C-X development effort will not be funded until the 2030s. Thus, the US Air Force's 220 C-17s and 52 C-5Ms will comprise the entire organic strategic airlift force at least until 2040, and probably beyond (Aboulafia, 2018). Perhaps the idea of an MD-17 that could be offered to the airlines at a competitive price, or even provided through some kind of a creative lease arrangement should be revisited. Furthermore, any commercial business could make reopening the production line for military purposes more attractive as well.

Global political threats

Third, these issues must be considered within the context of a changing world order. China is aggressively moving to expand its global influence, while the threat from hostile nations like North Korea is becoming more indirect and subtler, requiring planners to think "outside the box" when assessing the need for strategic airlift over the next 20-50 years. In fact, strategic mobility is specifically identified as a key capability in the National Defense Strategy 2018 (National Defense Strategy of the United States, 2018). The reality is that China's air carriers, passenger and cargo operate under a state managed free market approach with an objective of strengthening the "Big Three" state-owned airlines (China Airlines, China Southern and China Eastern) (Wang *et al.*, 2016). Essentially, the government can direct these resources to be used for military purposes whenever deemed necessary, something that cannot be done in the USA.

Conclusions

The CRAF is a strategic partnership worth sustaining. Simply put, the nation needs the CRAF. Ironically, the widening gulf between military and airline aircraft needs may be the biggest problem, facing the future of the CRAF. AMC neither has nor desires an organic fleet sized for a worst-case scenario. Peacetime business provides a good incentive to attract civilian carriers to the program and keep them familiar with moving military cargo, assuming they have the aircraft and the interest to participate. Whether it looks the same in 20 years as it does today remains to be seen, and may be determined at least to some degree by the results of MCRS-18. Perhaps the DOD needs to increase the pool of suitable aircraft by considering previously-discarded options such as offering the CRAF membership to airlines from, for example, North Atlantic Treaty Organization (NATO) nations (Graham *et al.*, 2003, p. A-17-19). Another possibility might be to offer a lower-cost civilian version of the C-17 to "friendly" carriers willing to commit them to military service when needed. But whatever the future may hold, the congressional mandate for the nation's air transportation system is clear – it must meet the needs of both commerce and national defense. To that end, the US must have a strong strategic airlift arm, a necessity impossible to achieve without civilian partners.

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