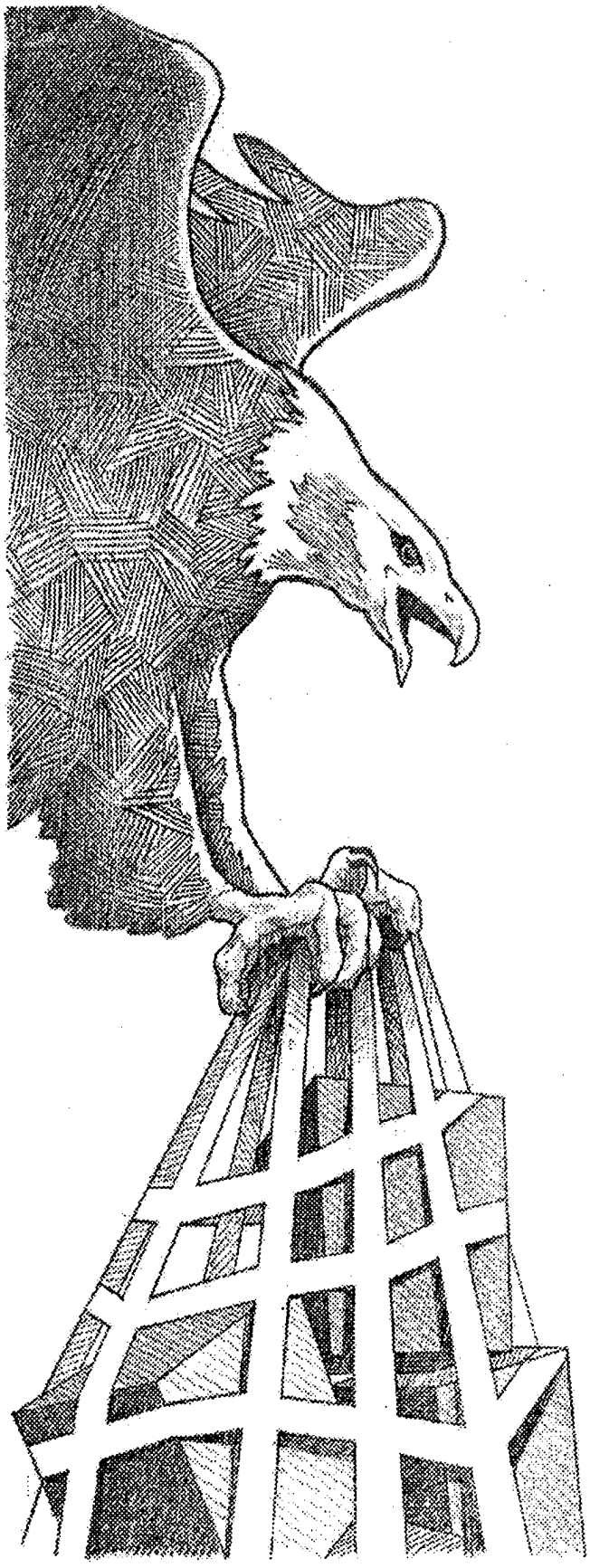

THE AIRLIFT *SYSTEM*

A PRIMER

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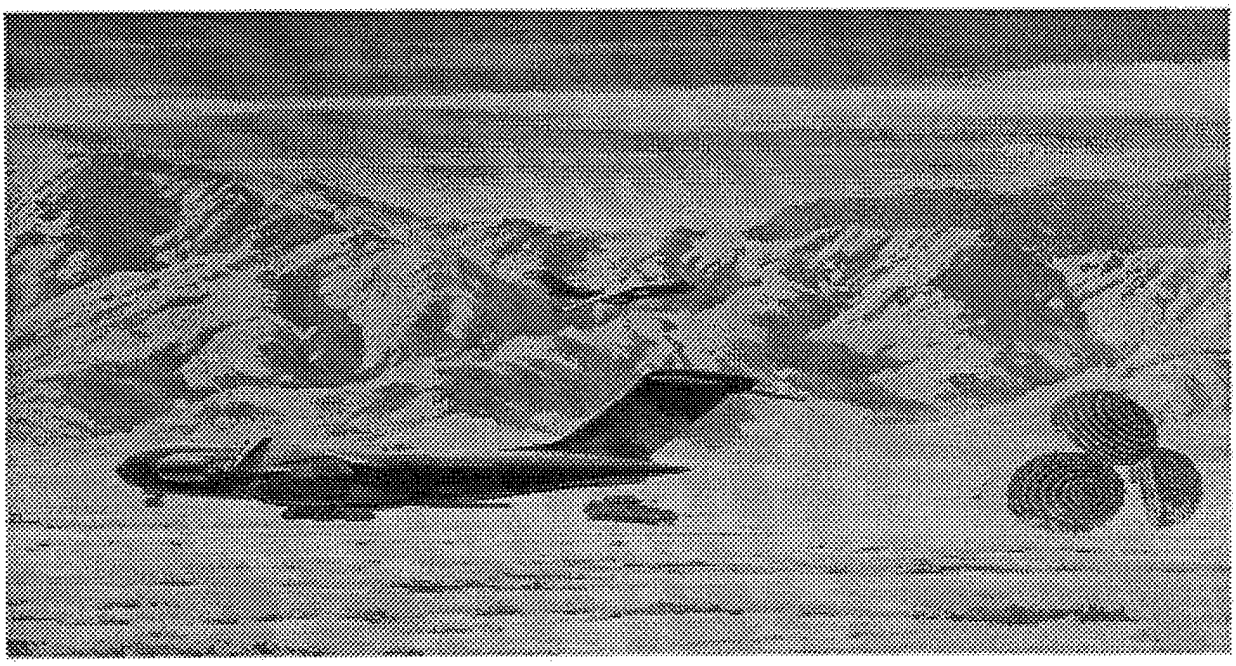
THE NATIONAL military airlift system of the United States and its associated policy-making processes are enormously complex. The components of the system include airlift forces and support units from all the military services and hundreds of aircraft and thousands of employees from numerous commercial air carriers. The formulation of airlift policy includes cooperative and adversarial interactions among these military and civilian components and other organizations such as Congress, the Department of Defense (DOD), the Department of Transportation, commercial aircraft manufacturers, the Airline Transport Association, and many other players. The balkanized complexity of airlift policy-making is evident in current efforts to keep moving forward such major airlift programs as the C-17 and proposals to bring an existing, probably civil-type "nondevelopmental airlift aircraft" (NDAA) into Air Mobility Command (AMC). Each of these efforts involves confrontation and cooperation among numerous institutions and individuals, each with a distinct perspective on the military, political, economic, and technological parameters involved. Given the multibillion-dollar costs of such programs, it is not surprising that this welter of perspectives can render the airlift policy process complex and intense—even bitter.

In dealing with these complex issues, most airlift policymakers and planners understand that they are dealing with a system of interconnected and interdependent parts. But the stakes and in-



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tensity of the policy process can obscure their systemic perspective and thereby allow decision makers to consider proposals or take actions that offer substantial advantages to one element of the airlift system, while simultaneously undermining its overall efficiency and effectiveness. The airlift policy and planning communities, therefore, need to refresh their understanding of the national military airlift system *as a system,* lest in their efforts to improve its individual components they become guilty of robbing Peter *twice,* to pay Paul only once.

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This primer offers a macrolevel vision of how the airlift system works. Its purpose is to describe key concepts and component interrelationships of the US national military airlift system to provide a baseline for assessing the systemic advantages and disadvantages of making changes to the missions or composition of those components. The core concepts and interconnections of the airlift system—mission, the focus of airlift policy, component roles, and organization—are reasonably easy to describe. Secondary issues, such as the determination of appropriate airlift technologies and the interplay of institutional self-interests in the policy process, are more complex. Consequently, determining the net benefits of any effort to improve the effectiveness of a specific airlift component is challenging but not impossible, so long as the overall connections and synergism of the airlift system are kept in mind. To the end of seeing how the interrelationships of the airlift system influence assessments of viable policy, this discussion touches on some current airlift policy issues in the course of discussing the system's foundational tenets. These issues include the role of the Civil Reserve Air Fleet (CRAF), the acquisition of commercial aircraft for the military component of the airlift system, and organizational centralization.

The Air Mobility System

The present US military airlift system is the product of at least six decades of doctrinal, operational, organizational, and technological development. Even in the early 1920s, a few individuals were thinking and sporadically writing about the military potential of air transportation. By the early 1930s, the appearance of two-engine, all-metal transport aircraft such as the Boeing 247 and Douglas DC-2 prompted a sustained discussion among senior Army Air Corps leaders about the technological, operational, and organi-

zational options of military airlift. World War II established the importance of airlift to all military services, and it encouraged a number of major US commercial carriers to expand their overseas operations and acquire long-range transport aircraft identical or at least similar to those operated by the military. For airlift policy, the first three postwar decades featured sustained efforts by a greatly expanded host of military and civilian individuals and institutions to quantify and provide forces to serve the airlift requirements of the services, to divide airlift responsibilities among the military and civilian organizations available to move them, and to properly organize military airlift forces in ways that optimized the advantages of centralized management and decentralized operational command. By the mid-1970s, these efforts had produced a close-coupled system of airlift thought and structure that remains in place today, though refined in detail and expanded in capability to move combat forces between and within combat theaters.[1] Thus, one should impose change on this system or its individual components only with clear reference to its dearly derived general wisdom.

The basic mission of US military airlift forces is straightforward: to move by air—in the words of a Military Airlift Command (MAC) slogan—"Anything-Anywhere-Anytime." To guide planning for the size and composition of national airlift forces, military planners since the mid-1940s usually have expressed baseline airlift requirements in terms of the number of Army divisions or Air Force squadrons to be moved over given distances in a given time. Gen Henry H. ("Hap") Arnold, commander of the Army Air Forces in 1945, proposed that the post–World War II military establishment include airlift forces sufficient to move an Army corps anywhere in the world in 72 hours.[2] In more realistic terms, given the capabilities of air transport aircraft at the time, the US Army entered the 1950s with a stated requirement for enough aircraft to lift the tactical elements of an airborne corps in an intratheater airborne operation and to move a single division by air anywhere in the world.[3] By 1956 the Army's requirement for "strategic" airlift had grown to include the movement of the combat elements of two infantry divisions weighing 11,000 tons each anywhere in the world in 28 days.[4] The Air Force, meanwhile, focused the force structure and training of its major, long-range airlift command—Military Air Transport Service (MATS)—on deploying Strategic Air Command (SAC) mediumbomber units to overseas bases in the event of nuclear war. MAC, which superseded MATS in 1966 as the US military's principal operator of global airlift forces, concentrated on reinforcing the North Atlantic Treaty Organization (NATO) in the event of war—a requirement that once called for the movement of 259,000 tons of personnel and materiel, including seven divisions and 23 tactical fighter wings, from the United States to Europe in 10 days.[5] Thus, the fundamental definition and structure of the military airlift mission has remained constant for 50 years, though the actual "baseline" lift requirements established to guide force-structure planning have grown steadily.

Determining the scale and composition of baseline airlift planning requirements has persistently challenged airlift policymakers and planners. The acute sensitivity of airlift operational planning to factors such as time, distance, infrastructure, and load configurations hampers the development of confident and broadly accepted estimates of the appropriate size and configuration of the airlift fleet. Even minor changes to any one of these factors in a planning scenario can drastically alter the daily capacity and routing of an airlift movement and can thus alter the characteristics and size of the aircraft fleet, support structure, and even the crew needed to support that movement.

The increasing complexity of national military strategies also complicates airlift planning. In the 1950s, MATS planners sized and equipped the long-range airlift fleet to match the distinctly quantifiable mobility requirements of SAC, in the certain knowledge that national strategy would recognize no higher-priority movement requirement in the event of nuclear war.[6] With similar certitude, MAC planners in the 1970s and 1980s focused on NATO reinforcement. But in the multipolar confusion of the post-cold-war world, planners in AMC, which superseded MAC in 1991, face competing requirements and high day-today operating levels that render strategic priorities difficult to predict and baseline airlift requirements difficult to calculate. AMC's "user list" has also increased, as command aircraft continue to support humanitarian missions, foreign military forces engaged in peacekeeping operations, and a host of other users.

The steady growth and increasing complexity of the airlift requirement infuses airlift planning with three noteworthy tensions. First, airlift planners face an ex-

pensive version of the "closet syndrome." That is, no matter how much airlift capacity they create, there is always demand for more. Although overall US long-range airlift capacity has grown more than twentyfold since the early 1950s, the relative gap between airlift requirements and capabilities seems hardly to have narrowed.

To a great extent, the steady growth in the US military's demand for airlift stems from the increasing importance of airlift to successive national military strategies. The role of MATS in support of the strategy of massive retaliation in the 1950s, for example, was to move SAC at the outbreak of a nuclear war. In 1960 this mission called for 384 sorties—a number roughly corresponding to MATS's strength in heavy cargo and cargo-convertible aircraft. [7] Under the strategy of flexible response in the 1960s, MATS's planning responsibilities included much larger and more complex requirements to move Air Force tactical units and Army ground forces in response to a variety of planning scenarios.

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Another cause of the airlift gap has been the growing inclination of each service to rely on air mobility and logistics. Since the early 1950s, the Air Force has expected to deploy its personnel and units by air, while the Army has steadily increased its dependence on air deployment since the early 1960s. Further, in contrast to the neatly calculable needs of SAC, Army airlift requirements vary greatly with changing constraints of force structure, time, and location. No wonder that Gen Curtis E.LeMay, Air Force chief of staff, complained to Congress in 1963 that the inclusion of limited war and counterinsurgency wars as airlift planning factors had created an airlift deficit, primarily because "Army airlift requirements continue to grow." [8]

The magnitude and complexity of the airlift requirement also challenge planners in their efforts to determine proper characteristics and mix of transport aircraft in the airlift fleet. Within a given airlift requirement, the characteristics of individual loads, distances flown, nature of destination airfields, and times available to complete or "close" specific movements usually vary greatly. Aircraft loads in support of a joint task force deployment might include troops, aircraft munitions, rations, bulk liquids, medical supplies, satellite downlink stations, armored fighting vehicles, artillery pieces, tents, computers, and a host of other things. Some of these loads might be destined for developed, international-class airfields, while others might be dropped or unloaded at "terminals" ranging from rough clearings to small regional airfields with relatively short runways and limited taxi and parking space. No single aircraft type can efficiently carry all these loads, over all routes, into all possible terminals. An efficient airlift fleet, therefore, must be composed of several types of aircraft.

Airlift planners have recognized the need for airlift fleets of mixed aircraft types at least since the outbreak of World War II. As a group, however, they have always found daunting the problem of determining what types of aircraft and how many of each should be included in the airlift fleet. Generally, the Air Force airlift fleet after the Korean War included a mix of small, short-range "assault transports" such as the Fairchild C-123; medium-sized "tactical transports" such as the Lockheed C-130; and larger, long-range "strategic transports" such as the Douglas C-124, Lockheed C-5 and C-141, and aircraft drawn from civilian airlines. Assault transports disappeared from the Air Force inventory by the mid-1980s, their role of forward logistics and short-range airborne and airlanded assault largely taken over by the US Army's fleet of battlefield airlift helicopters. Also, tanker-transports are now a large part of the long-range fleet, a further example of the complicated problem of force structuring faced by airlift planners.

The high costs of building and maintaining a large, multitype airlift fleet present airlift planners with the additional frustration of knowing that they have little hope of actually acquiring a fleet large and diversified enough to move all possible requirements with maximum efficiency. For a start, no airlift-planning baseline has ever stood or is likely to stand the tests of changing national strategies and growing user requirements long enough to allow the major operating commands—MATS, MAC, Tactical Air Command (TAC), and now AMC and Air Combat Command (ACC)—to tailor the airlift fleet to match it. Moreover, since the late 1950s, the high-end airlift-planning baselines always exceeded Congress's ability or even its willingness to purchase

an appropriate fleet of aircraft. Expensive transport aircraft compete for budget money with other "big-ticket" programs, such as fighters, bombers, tanks, missiles, and ships. Historically, these combat systems have had a high priority and, as a result, the military has funded major air transport programs only when the existing airlift fleet is decrepit or when a major shift in national security policy, such as the adoption of flexible response in the early 1960s, demanded improved airlift forces. [9] Even in those cases, the capabilities of the airlift fleet never equaled the air transportation demands anticipated in "worst-case" war plans or other expressions of the baseline planning requirement.

These three tensions—high demand, fleet structure, and budget—impose a pragmatic focus on the process of formulating airlift policy, although this slant is not always clearly understood or articulated by all participants. Realistically, airlift planners and decision makers are unlikely to advocate successfully the acquisition of a fleet adequate to satisfy the ever growing tonnage, cargo configuration, and time constraints of all war plans or other baseline requirements. The focus of airlift policy, therefore, is not to build an airlift fleet that can meet a specific requirement but to acquire the largest and most generally capable airlift force with the funds available. This is not to say that airlift planners should not or do not calculate ideal airlift fleets needed to satisfy likely worst-case requirements, such as massive force deployments to regional conflicts. Such calculations are essential to making and evaluating plans for the size and composition of the airlift fleet. But when airlift policymakers actually advocate specific aircraft development and acquisition programs, they typically reduce—and likely will be obliged to continue to reduce—their estimates of requirements and force structure to fit budgetary and political realities. In other words, effective airlift policy-making involves asking for what one can get instead of what one actually needs.

Numerous illustrations show how this tension between real requirements and politically viable requirements has affected the process of creating airlift policy. For example, John Shea—a senior airlift planner who served nearly 40 years in MATS and MAC—recalled that in the mid1960s he and his staff determined the initial size of the C-5A fleet off-the-cuff, settling on a six-squadron force more for reasons of supportability than for meeting specific operational requirements. He scarcely considered actual or potential requirements since he believed that, whatever they turned out to be on paper, those requirements would call for a C-5 fleet larger than the Air Force or Congress would be willing to buy. [10] Similarly, the 66 million ton-miles-per-day (MTM/D) airlift capacity target of the Congressionally Mandated Mobility Study (CMMS) of 1981, which guided MAC long-range airlift planning for a decade, represented "only about half" of what Shea considered the real requirement. MAC and DOD accepted the 66 MTM/D figure, Shea reports, because it was "a reasonable and attainable" number, in terms of the forces required to meet it. [11] The drafters of the CMMS implicitly acknowledged Shea's assessment by proposing an airlift capacity enhancement that fell short of all the regional-conflict planning requirements used in their analysis. The 1992 mobility requirements study by the Joint Chiefs of Staff (JCS) more explicitly expressed the tension between "real" requirements and costs:

> This mobility requirement is based on accepting no more than moderate risk to the attainment of US objectives. The moderate-risk capability might not be adequate to support these objectives in some worst case scenarios. The forces recommended by the Commanders of unified commands normally are based on a low-risk requirement and can require significantly more mobility assets than are on hand or programmed. In addition, the moderate-risk capability cannot handle a second, concurrent major regional contingency beginning sequentially. . . . However,the moderate-risk requirement yields a strategically prudent force that is fiscally responsible. [12]

Further, the inability of existing and programmed mobility forces to support simultaneous major regional contingencies (MRC) clearly influenced the recent shift in US national strategy to a commitment to fight "near-simultaneous" MRCs. Whatever the desirability of deploying war-winning forces to two major conflicts at the same time, national airlift (not to mention sea-lift) capabilities simply will not support such a strategy. Recognizing that good airlift policy-making is based on pragmatic realism rather than idealistic absolutism is helpful. Most importantly, recognizing that acquisition programs for US airlift forces must reflect fiscal and political realities—at least as much as they reflect stated mobility and other logistical requirements—per-

mits policymakers to own up to the strategic limitations imposed by those realities. Acknowledgment of the "delta" between requirements and reality—at least in classified channels—will, in turn, reduce the likelihood of military planners and political leaders committing to strategies and policies that existing or planned airlift forces simply cannot support. Lastly, understanding that effective airlift policy maximizes capacity for the funds available is a requisite to understanding the tenets of airlift policy.

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Tenets of Airlift Policy

By the late 1930s, when the Army Air Corps began establishing permanent airlift units, American military and civilian planners had worked out a policy approach to the problem of providing as much suitable airlift capability as possible, within the constraints imposed by the three tensions of growing requirements, expensive aircraft, and low budget priorities. In that early period, there was no comprehensive, written airlift doctrine. But in scattered writings and early policy actions, these planners implicitly revealed an approach to reconciling their conflicting goals of acquiring enough airlift forces to meet requirements without breaking the bank. Their approach was based on four tenets that remain at the heart of airlift policy, their position secured by a growing body of experience and doctrine.[13]

The central tenet of airlift policy is that *the commercial airline fleet is the heart of the national airlift fleet.* To the extent possible, commercial aircraft should move military cargo and personnel. Even in the late 1930s, airlift thinkers found the logic of this tenet compelling. Above all else, they knew that military airlift requirements far exceeded the capabilities of any airlift force that the Army and the Navy combined would likely buy. Their only choice was to consider civilian airlines a vital adjunct of the military fleet. By the time CRAF was established in 1951, airlift leaders realized that commercial carriers were *by far* the least expensive source of active airlift support for day-to-day operations and of reserve airlift capacity for wartime mobilization. Indeed, to provide for mobilization airlift beyond its day-to-day operating requirements, the Air Force in the mid-1950s only needed to install radio racks and sextant ports in four-engine commercial airliners to make them ready for transoceanic operations. The costs of these modifications were trivial compared to the costs of maintaining whole aircraft in the military fleet for the same purpose.[14] In the mid-1980s, MAC planners estimated that reserve airlift capacity was about six to eight times less costly to maintain in CRAF than in the military fleet; further, a 1990 study by the Rand Corporation assessed those costs as "a fraction" of those incurred in maintaining the same reserve capacity in the active military fleet.[15]

The wisdom of relying first on the commercial fleet for routine and wartime reserve-airlift capacity is well established in national-policy documents. In 1955 the watershed Hoover Commission report on government operations declared that the acquisition of military transport aircraft to carry peacetime and wartime loads that could be carried in commercial airliners was tantamount to "military socialism"—that is, improper government competition with private industry.[16] Utilization of the commercial fleet as the first recourse for military airlift in peace and war was also at the heart of the first presidential policy statement on the subject in 1960.[17] In his national airlift policy directive of 1987, President Ronald Reagan reiterated the coequal usefulness of the military and civilian components of the national military airlift fleet and the policy of utilizing commercial carriers to the maximum extent possible in both peace and war.[18] The logic of this reliance is simple: the commercial fleet is always available, largely without cost to the government unless the latter contracts for its services in peace or mobilizes it for war. Military planners would be remiss if they did not tap the fleet's capabilities to the maximum extent practical before spending public funds on military aircraft.

Given the availability and minimal cost of the commercial fleet, the Hoover Commission implicitly questioned the need for more than a residual military component of the long-range airlift fleet.[19] At the time, the primary mission of MATS was to move SAC support teams to overseas bases on the outbreak of a nuclear war. The personnel and equipment of those teams—composed mainly of small vehicles, parts bins, and engines—fitted into the four-engine Douglas C-54s, C-118s, and C-124s that comprised the bulk of the MATS fleet. Since these aircraft were virtual copies of—or, in the case of the C-124, shared the same de-

sign with—commercial airliners in service at the time, the Hoover Commission's question had substance, particularly in the eyes of a budget-conscious Congress and administration.[20] Operating airline-type aircraft and carrying loads that commercial carriers had declared their readiness to handle, MATS simply looked like the government's private airline.

The ability of the airlines to supplant MATS declined after the late 1950s, when Army long-range or intertheater air mobility requirements became a major airlift-planning factor. The Army's requirements increased the airlift-planning baseline by at least an order of magnitude over SAC's established needs, and they presented technological and doctrinal barriers to movement by commercial carriers. Many Army cargo loads simply did not fit or could not be loaded easily into aircraft designed for commercial operations. Commercial airliners are designed primarily to produce maximum profit on developed route systems terminating at modern airfields designed for their use. Consequently, the fuselage of a typical long-range commercial aircraft is long and narrow to maximize seating and cruising speeds. Its wings typically are mounted through the lower fuselage to improve aerodynamics and to save weight by allowing the wing support structure to carry simultaneously the weight of the aircraft, its engines, and its landing gear. One consequence of this low wing design is that it places the payload deck of the typical commercial aircraft 10 or more feet above the ground. In concert, these features make the typical commercial aircraft a profitable carrier of passengers and package cargo. But they also sharply limit the size and weight of military vehicles and materiel that a commercial design can carry, as well as its ability to operate at high capacity on the rough airfields typically found in forward battle zones.

Policy also limits the availability and utility of commercial aircraft for military airlift operations. As one important limitation, the commander in chief (CINC) of US Transportation Command can mobilize only the first "stage" or segment of CRAF on his own authority. This part represents about 10 percent of the available fleet. Mobilizations of the second and third stages of CRAF require tacit approval by the secretary of defense or the president under national security emergencies of increasing gravity. Moreover, American military airlift policymakers have been reluctant to use civilian airline crews in situations fraught with more than minimal risk of enemy attack or other operational hazards. From habit of mind and the contractual provisions of the CRAF program, policymakers generally have assumed that airlines will not accept even moderate risks to their aircraft and that civilian crews are less obligated and less likely than military crews to risk the dangers of active areas of combat. A Rand study of CRAF operations during the Gulf War gave credence to these concerns, reporting that "morale suffered [and] volunteerism fell in some [CRAF] companies" in the face of Scud missile attacks on Riyadh and Dhahran, Saudi Arabia. Asserting the importance of providing CRAF crews with adequate chemical-defense clothing and training, the Rand study pointed out that "because crews fly voluntarily, any real unease over personal safety could significantly impact crew availability."[21] In graphic terms, therefore, the theoretical upper limits of the commercial air transport industry to support military airlift requirements are demarcated by either a technological or policy "cut line," whichever is more restrictive (fig. 1).

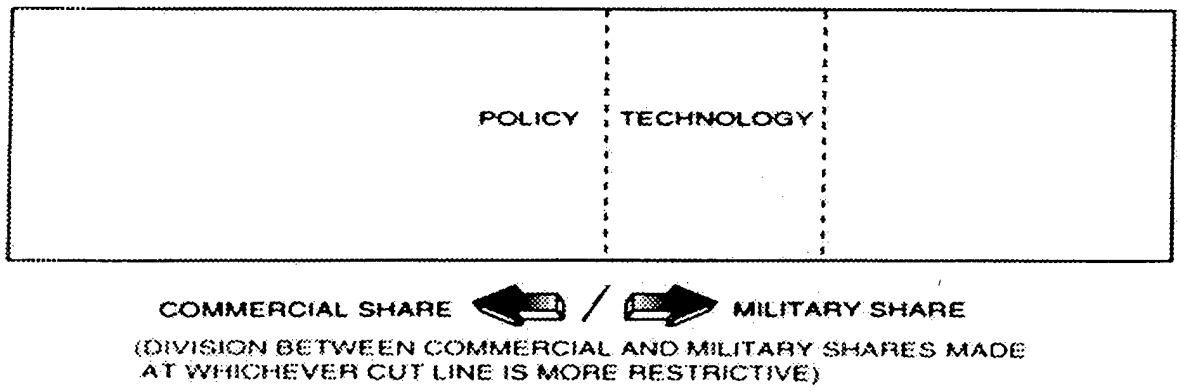

Figure 1. Notional Requirement and Commercial Cut Lines

Though notional, figure 1 suggests that policy establishes the most restrictive cut line on the US government's ability to utilize commercial aircraft for military airlift. That this situation is currently the case is implicit in proposals to equip some portion of AMC's fleet with NDAAs. If these proposals do lead eventually to the acquisition of minimally modified commercial-type aircraft for the military fleet, then clearly the military is being equipped to carry an increment of the overall airlift requirement that is "CRAF compatible." Such a violation of the spirit and logic of national policy to maximize use of the commercial fleet can make sense only in the context of a lack of confidence in the timely availability of enough appropriate airlift from CRAF. Such a lack of confidence is justified, of course, by the formal and informal limitations on CRAF mobilization. Technology cannot be the limiting factor, since materiel that will fit into a commercial-type aircraft with the AMC patch over its door will fit into a similar aircraft with a CRAF airline's logo on its tail, particularly if that aircraft was modified to NDAA standards.

Unfortunately, if the effort is to minimize the costs of the airlift program, knowing that utilization of CRAF is more restricted by policy than by technology does not open a clear path to solving the problem. Most importantly, the restrictions of CRAF mobilization are entrenched deeply in national policy and experience. Even before World War II, some military thinkers proposed militarizing the civil airlift reserve so that airline aircraft, personnel, and equipment could be mobilized directly under government control. Senior military and government leaders, including President Franklin Roosevelt, rejected this option during and after the war as unfair to the airlines and inefficient in comparison to contracting for commercial airlift service when needed. [22] Accordingly, CRAF was established in 1951 on the basis of voluntary contractual relationships between the government and participating airline companies. [23] Voluntary contracts remain the foundation of CRAF, though—in net effect—such arrangements limit the government's ability to send civilian crews and aircraft into danger.

Similarly, efforts to increase commercial industry's technological ability to carry military loads have met little success. Since the late 1940s, for example, Congress and the military failed in several attempts to finance or encourage the development of civil-military transport aircraft of equal attractiveness to commercial carriers and airlift planners. The conflicting design parameters of commercial economy and forward military operations doomed all such efforts. [24] Beginning in the mid-1970s, MAC used financial incentives to encourage CRAF carriers to install additional cargo features in their new jumbo jets. This initially promising program fizzled out in the early 1980s, though not before prompting several CRAF carriers to buy a total of 21 cargo-enhanced Boeing 747s and two Douglas DC-10s.

In combination, the cost-effectiveness of the commercial fleet and its inability to carry all military loads in all circumstances lead to the second tenet of airlift policy: *The role of the military component of the airlift fleet is to do what commercial transport aircraft or civilian aircrews cannot or will not do.* Given the high costs to the government of acquiring, maintaining, and using military airlift forces, any acquisition of such forces to do things that relatively less expensive commercial carriers could do would be fiscally irresponsible. Accordingly, by the late 1950s, Air Force leaders recognized that military airlift forces were justified only when they were needed to support "requirements which because of their nature or the nature of the mission to be supported must move in military operated aircraft." [25] Called "hard-core" missions in the late 1950s, the national airlift policy of 1987 described these missions as "requirements [which] 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." [26] Logically, such missions would include (1) critical missions in the early phase of an emergency, (2) classified or diplomatically sensitive missions, (3) tactical combat missions such as airdrops and flights into airfields in forward combat zones, (4) operations into airfields not suitable or areas too dangerous for civilian crews and aircraft, and (5) missions to carry loads that were too big or heavy for standard airliners to carry. Since such missions are features of most major war plans, they assure the existence of the military component of the national airlift fleet, though in a size and composition based on supplementing the commercial carriers—not on preempting their role in the airlift mission.

The supplemental role of the military component of the airlift fleet underpins the third tenet of airlift

policy: *The military component should be equipped with aircraft specifically designed for its role.* As rough cousins of the commercial component, the military component's aircraft should be capable of moving more troops and materiel into forward terminals, such as parachute drop zones and airfields, than could their commercial equivalents in a given period of time. Consequently, military transports come with payload decks that are relatively shorter, wider, and stronger than those in commercial transports of equivalent weight and engine power. Typically, military transports also have large cargo doors at the rear and, in some cases, at the front of their payload decks, which are usually situated at truck-bed height to further accelerate cargo operations at austere locations. Such low decks require that most modern military transports have high-wing designs. Moreover, such aircraft usually are equipped with high-flotation landing gear mounted directly on or under their fuselages for strength and enhanced ground maneuverability during operations at less-developed airfields. Taken together, these cargo and structural features enhance the ability of military transports to move a lot of "stuff" into rugged places quickly, even as their incumbent weight and aerodynamic penalties render military transports generally unprofitable in commercial operations. Thus, as frequent failures to produce civil-military transport aircraft attest, the technological requirements of the two types of operations call for distinctly different families of aircraft.

In addition to technological considerations, economic and political reasons exist for equipping the military component of the national airlift fleet only with specialized aircraft. Economically, there is little justification for equipping the military with aircraft types that commercial carriers can make available to the military under contract at less cost. Moreover, any substitution of commercial aircraft for specialized aircraft in the military component's fleet ultimately undermines the military's ability to carry loads to places where commercial carriers cannot go. In other words, equipping the military fleet with airliners undermines its unique flexibility—its reason for existing. Thus, equipping even a portion of the current military component with commercial aircraft eventually will place it in the unenviable political position of MATS in the 1950s (i.e., it will come under criticism for looking and operating like a government-owned competitor with the commercial airline industry). As was the case in the 1950s, such a perception of the military component will likely lead to strong pressure to resume its proper role of operating forward of the commercial component's doctrinal and technological cut lines. Therefore, military planners contemplating expedient purchases of commercial designs to rectify the military component's near-term shortfalls in capability should first contemplate the long-term economic and political implications of such actions.

The fourth tenet of airlift policy is that *airlift operations represent a continuum that should be under the operational and administratlve direction of a single command.* This tenet was not always obvious to senior policymakers or even to airlift practitioners. At the beginning of World War II, the military established numerous airlift organizations and placed them under the direct operational control of the specific organizations and commands using their logistic services. Almost immediately, however, some airlift thinkers recognized that these arrangements created duplications of effort, particularly in long-range operations, and that they undermined the overall flexibility and effectiveness of the national airlift effort. In 1948 Secretary of Defense James E. Forrestal took the first step toward reducing airlift duplication by consolidating the Army's Air Transport Command and most of the Navy's Naval Air Transport Service into MATS. [27] A DOD directive of 1956 assigned virtually all remaining Air Force and Navy long-range air transports to MATS, which then became DOD's single manager for airlift. [28] The operational experiences of the Vietnam War and the Israeli airlift of 1973 convinced many senior US military leaders that the remaining organizational separation of Air Force theater and long-range airlift forces was an expensive anachronism in light of their overlapping operations, aircraft fleets, and capabilities for mutual augmentation. Accordingly, Secretary of Defense James R. Schlesinger placed virtually all Air Force transport aircraft under MAC in 1974. [29]

Airlift consolidation greatly improved the economy and operational flexibility of the national airlift system. First, consolidation brought most of the Air Force's responsibilities as a military service to organize, train, and equip airlift forces under the authority of a single steward—the fourstar commander of MAC. Among his important duties, the MAC commander was empowered to consolidate and service the requirements of all airlift users, develop plans for new aircraft and force

structure, and ensure that the overall airlift program was funded cohesively and adequately. Coincident with consolidation, the secretary of defense also directed that MAC become a DOD specified command for airlift, giving the MAC commander—now a CINC—combatant authority over all Air Force airlift forces and power to apportion available intertheater airlift capacity among all users authorized by the JCS. [30] Within overseas theaters, however, airlift command arrangements remained divided. Under the terms of consolidation, MAC-assigned commanders of military airlift forces (COMALF) directed airlift units and operations in the theaters—but in accordance with the priorities and guidance of the theater CINCs. In practice, local CINCs retained what was then called operational command (i.e., ownership) of theater-assigned airlift forces and exercised their collateral operational control over those forces through their COMALFs. In other words, COMALFs worked for the commander of MAC, but—in directing the operations of theater-assigned airlift forces—their job was to satisfy the operational requirements of their CINCs. [31] This dual-hat arrangement simultaneously preserved the operational continuity of airlift operations on a global basis and the unity of operational command authority within the theaters. It was a system that worked well right through the Gulf War.

Following the successful demonstration of consolidated airlift in the Gulf War, the Air Force redivided airlift forces in mid-1992. As part of a general reorganization, Headquarters United States Air Force transferred its service responsibilities to organize, train, and equip C-130 forces based in the US to the newly formed ACC. The Air Force further transferred service responsibilities for long-range airlift forces from MAC to AMC. In a somewhat cosmetic change, the Air Force returned direct operational command of overseas C-130 forces to appropriate theater air commanders. This action rendered the COMALF arrangement obsolete though, in truth, it had little practical effect on the responsiveness of assigned theater airlift forces to local requirements.

The jury is still out on whether refractionating airlift forces—a decision that flies in the face of at least four decades of hard-earned airlift wisdom—will improve the economy and effectiveness of US military airlift forces. The transfer of command authority over theater forces to local commanders seems to have gone fairly well, possibly because it changed little of substance in the way those forces are operated and their lift capacity is apportioned. In contrast, the division of airlift responsibilities between ACC and AMC seems to have gone less well. The problems of organizing, training, and equipping airlift forces are complex, involving *comprehensive* planning and sustained advocacy of many programs if the overall airlift system is to work well in war. If airlift is an operational continuum of interconnected, mutually supporting, "multicustomer" parts—and it is—then the division of these service functions is artificial and prone to produce unnecessary redundancies between the planning, acquisition, and training programs of the two commands. To what extent these redundancies have actually appeared is not clear in the open record, but, certainly, now is the time for a detailed examination of the usefulness and efficiency of continuing this new division of airlift responsibilities.

The purpose of this primer has not been to predetermine the conclusions of such studies of airlift organization or other issues. Rather, it has sought to lay out a theoretical backdrop for such studies and for any proposal to change components of the national military airlift system. Seventy years of experience and the assiduous thought of dedicated people created the interconnected and synergistic body of organizations, equipment, policy, and doctrines that comprise the current airlift system—a system unique in its ability to sustain national strategy by moving military forces and materiel over global and regional distances by air. Differences between past and future national security environments may suggest small changes to the airlift system's components but—thus far anyway—not to its tenets or to the relationships between those components. Airlift policies that ignore or violate the "grand logic" of the national military airlift system thus jeopardize its ultimate capacity and utility.

Notes

1. The best available general history of US airlift remains Charles E. Miller's *Airlift Doctrine* (Maxwell AFB, Ala.: Research Studies Institute, 1988). For a more focused look at the workings of the post–World War II airlift policy process, see Robert C. Owen, "Creating Global Airlift in the United States Air Force 1945-1977: The Relationship of Power, Doctrine and Policy" (PhD diss., Duke University, 1992).

2. Gen Henry H. Arnold, commander, Army Air Forces,

to Lt Gen H. L. George, commander, Air Transport Command, letter, 5 December 1945.

3. Frederick C. Thayer summarized Army airlift requirements through the 1950s in his seminal *Air Transport Policy and National Security: A Political, Economic and Military Analysis* (Chapel Hill, N.C.: University of North Carolina Press, 1965), 136–42.

4. Senate Committee on Armed Services, *Study of Airpower: Hearings before the Subcommittee on the Air Force,* 84th Cong., 2d sess., April 1956, 833–49.

5. Department of Defense, "Congressionally-Mandated Mobility Study: Executive Summary" (Washington, D.C.: Department of Defense, 7 April 1981), 7.

6. In 1956 Adm Arthur W. Radford, chairman of the JCS, reported to Congress that, even in the aftermath of a general nuclear exchange and after all SAC movement requirements were met, he still anticipated no need to move large Army forces by air. See House Committee on Appropriations, Subcommittee on Department of Defense Appropriations, *Strategic Mobility,* 85th Cong., 1st sess., March 1957, 2062–70.

7. For the first time in public hearings, Lt Gen William H. Tunner, commander of MATS, pegged the SAC deployment requirement at 384 sorties. House Committee on Armed Services, *Hearings on National Military Airlift,* 86th Cong., 2d sess., March-April 1960, 4164. At that time, the MATS fleet included 123 C-118s and 299 C-124s, along with numbers of C-97 and C-121 aircraft, which were mainly operated in passenger configurations. *Anything, Anywhere, Anytime: An Illustrated History of the Military Airlift Command, 1941–1991* (Scott AFB, Ill.: MAC Office of History, May 1991), 280.

8. House Committee on Armed Services, Special Subcommittee on National Military Airlift, *Hearings before the Special Subcommittee on National Military Airlift,* 88th Cong., 1st sess., 1963, 6059–60.

9. Cases in point include the airlift buildups following the Korean War and the shift in national strategy from new look/massive retaliation to flexible response. In the latter case—and in the present cases of the C17 and NDAA programs—expansion of the fleet was also driven by the impending obsolescence of large portions of the existing airlift fleet.

10. John Shea, interview with author, 8 August 1990. Shea joined Air Transport Command in 1943 as a statistical control officer and left MAC in 1981 as the assistant deputy chief of staff for plans.

11. Ibid.

12. Department of Defense, "Mobility Requirements Study," vol. 1, "Executive Summary" (Washington, D.C.: Department of Defense, 1992), ES-4 and -5.

13. To the author's knowledge, no comprehensive treatment of US military airlift policy prior to World War II exists. The best sources dealing with specific parts of the issue are Miller; Theodore J. Crackel, "History of the Civil Reserve Air Fleet," draft; and a number of archival materials kept at the US Air Force Historical Research Agency, Maxwell AFB, Ala.

14. *Semi-Annual Report of the Secretary of the Air Force* (Washington, D.C.: Government Printing Office, 1 January 1954), 262.

15. Mary Chenoweth, *The Civil Reserve Fleet: An Example of the Use of Commercial Assets to Expand Military Capabilities during Contingencies,* Rand Note 2838-AF (Santa Monica, Calif.: Rand Corporation, June 1990), 3. The MAC estimates were rule-of-thumb numbers heard numerous times by the author while serving as a MAC aircrewman and staff officer in the field.

16. House Commission on Organization of the Executive Branch of the Government, Subcommittee on Transportation, Report on Transportation, 83d Cong., 1st sess., March 1955, 295.

17. See "Conclusions" and "Presidentially-Approved Courses of Action" in *The Role of Military Air Transport Service in Peace and War* (Washington, D.C.: Department of Defense, Assistant Secretary of Defense [Supply and Logistics], February 1960), 2-7.

18. President of the United States, *National Security Decision Directive Number 280: National Airlift Policy,* 24 June 1987, guidelines 3 and 4, 1-2.

19. *Report on Transportation,* 274, 295.

20. The C-54 was derived from the Douglas DC-4, and the C-118 from the DC-6, while the C-124 and commercial DC-7 designs shared common wings, landing gear, engines, and other components, both having been derived from a late World War II design that the Air Force bought as the C-74.

21. Mary E. Chenoweth, *The Civil Reserve Air Fleet and Operation Desert Shield/Desert Storm: Issues for the Future,* Rand Report MR-298AF (Santa Monica, Calif.: Rand Corporation, 1993), 48–50.

22. Reginald M. Cleveland, *Air Transport at War* (New York: Harper and Bros., 1956), 1.

23. "Statement of the Secretary of the Air Force, the Honorable Thomas K. Finletter," in "Report to the Airline Presidents on Civil Aviation Mobilization," 26 March 1952; see also "Department of Defense Plan for the Civil Reserve Fleet," 20 March 1952, in History, Military Air Transport Service, July-December 1952, supplemental document T-6, 67.

24. A joint civil-military transport aircraft has obvious attractions, but, so far, it has been impossible to develop. Examples of aircraft originally intended to fly as civil-military transports include the Douglas C-74, the Lockheed C-141 and C-5, and the Boeing 747. The C-5, which emphasized military cargo features, and the 747, which emphasized commercially desirable features, competed in the Air Force's CX-4 design contest in the early 1960s. The C-5 won the Air Force contract, and the 747 went on to become one of the most successful civilian aircraft in history. Like the C-74 and C-141 designs, the military features of the C-5 rendered it unsuited to commercial operations, and no commercial versions were ever produced—even for cargo operators.

25. *The Role of Military Air Transport Service,* 2.

26. *National Security Decision Directive,* 1.

27. Richard I. Wolf, *The United States Air Force Basic Documents on Roles and Missions* (Washington, D.C.: Office of Air Force History, 1987), 173–78.

28. Ibid., 305–14.

29. Owen, 392–429.

30. Wolf, 391.

31. For initial descriptions of these arrangements, see Headquarters USAF, "Conceptual Plan for Consolidation of Airlift Resources," 7 February 1975, and "Agreement between Headquarters US Air Forces Europe and Headquarters Military Airlift Command for the Operational Command, Control and Management of EUCOM Theater Airlift," 25 October 1975. These and similar documents for other theaters are included as supporting documents in official MAC histories of the period.

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