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## CLOSING THE MILITARY AIRLIFT GAP

### INTRODUCTION

Should a crisis develop in Europe or the Mideast, it would take the U.S. 483 C-5 and 1,558 C-141B cargo plane loads to rush the 24th Mechanized Infantry Division--with its 16,800 troops, 290 tanks, 430 armored fighting vehicles, 124 helicopters, 780 combat support vehicles, 3,580 trucks and other equipment--from its base in Fort Stewart, Georgia, to the trouble spot within the prescribed ten days. To support Europe alone, the U.S. would have to transport six such Army divisions, 60 tactical fighter squadrons, and one Marine Amphibious Brigade to Western Europe.

In the event of such demands, the U.S. does not have enough cargo planes to speed its forces to distant battlefields. This strategic airlift gap is one of the American arsenal's most serious weaknesses. That the U.S. needs more airlift capability is widely accepted. At issue, however, is whether the Air Force's \$39.8 billion Airlift Master Plan is the best way to close the gap. By designating a new generation of cargo airplane, the McDonnell Douglas C-17, as the Plan's centerpiece, the Pentagon may be making a serious and costly error.

The Air Force Plan suffers from two fundamental flaws: 1) it underutilizes aircraft already in the airlift fleet as well as such proposed planes as the Lockheed C-5B, which could be produced sooner and at a significantly lower acquisition cost than the C-17's \$180 million each; 2) it rests on questionable operational and planning assumptions, such as using the C-17 for both tactical and strategic airlift missions.

Careful analysis by experts of U.S. airlift needs and of the C-17 program reveals that a new cargo plane is not needed to close the gap. As such, the Air Force should cancel the C-17, now in a

full-scale engineering phase of development, and instead, build more C-5B cargo and KC-10 cargo tanker aircraft. Better use, moreover, should be made of the existing fleet of C-130 "Hercules" and C-141B "Starlifter" strategic aircraft. Not only could this save about \$20 billion, but the U.S. would have the needed planes available much sooner.

## STRATEGIC AIRLIFT AND U.S. MOBILITY REQUIREMENTS

Strategic airlift is used primarily for the rapid deployment of forces, military equipment, and supplies to combat zones in the early stages of wars. Without the prepositioned military equipment that exists, for example, in Europe and Korea, most U.S. military contingencies in the Third World would require rapid air transport of men and materiel to the combat zone. Transport by sea is indispensable for sustaining combat an average 30 days or longer, but it is often too slow to reach the combat zone for violent regional conflicts decided very quickly.

The standard categories of airlift military cargoes are: 1) bulk, such as fuel, ammunition, and other cargo that when loaded on pallets can be carried by most airlifters; 2) oversize, such as trucks and towed artillery pieces that fit into all military cargo planes (C-5, C-141, C-130, and KC-10) and some specially designed civilian aircraft; and 3) outsize, such as main battle tanks, helicopters, and other extremely large items that can be placed only in the huge C-5 or the proposed C-17 cargo planes.

The principal aircraft in the Air Force's airlift fleet are its 70 C-5 "Galaxy" and 234 C-141 "Starlifter" strategic airlifters, 16 KC-10 dual-capable cargo/tanker aircraft, and 512 C-130 "Hercules" tactical airlifters. The C-5A jet and its newer modified version, the C-5B, carry outsize cargo such as tanks and helicopters over intercontinental distances. The C-141, the workhorse strategic airlifter of the Military Airlift Command, carries a substantial volume of cargo over unlimited ranges with in-flight refueling. The prop-jet C-130, on the other hand, is the mainstay of the tactical airlift fleet, operating within combat theaters and carrying troops and cargo 100 to 2,000 miles. When modified, it can refuel helicopters and fighter planes, perform as an aerial gunship, airborne command post, or airmobile communication center. The KC-10 is essentially the three-engine McDonnell Douglas DC-10 long-range aircraft capable of carrying cargo and refueling other aircraft.<sup>1</sup>

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1. Information provided by U.S. Air Force, Military Airlift Command.

## SHORTFALLS IN STRATEGIC AIRLIFT

In the late 1970s, the possibility that the U.S. would have to defend its interests in the Persian Gulf renewed interest in strategic mobility. A congressional request that the Pentagon review strategic mobility requirements led to the Congressionally Mandated Mobility Study (CMMS).<sup>2</sup> In 1981, the study concluded that the U.S. was woefully short of cargo planes, ships, and military equipment prepositioned abroad. The study recommended that the U.S. be able to airlift 66 million-ton-miles-per-day (MTM/D) to meet its global commitments. Currently, the U.S. has a 43 MTM/D capability.<sup>3</sup>

Even this vastly underestimates U.S. requirements. In 1980, the Joint Chiefs of Staff concluded that a 150 MTM/D airlift capability would be desirable just for reinforcing U.S. troops in Europe.

Simultaneous wars in Europe and the Persian Gulf, or Europe and Korea, are thus far beyond U.S. airlift capabilities. Even the CMMS goal of 66 MTM/D, which will not be met until the late 1990s, is the absolute minimum of what is required.<sup>4</sup>

## THE AIR FORCE AIRLIFT MASTER PLAN

Even before the CMMS was completed, the Air Force developed plans for a totally new long-range or strategic cargo plane to supplement the 1960s vintage C-5 and replace C-141s and C-130s. The capabilities of the C-X, as the design model was called, were determined before the CMMS was completed.<sup>5</sup> The Air Force Airlift Master Plan required a plane to have both intercontinental range and the "mission

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2. Final Report, Congressionally Mandated Mobility Study, Department of Defense, May 1981.

3. U.S. Air Force Airlift Master Plan (Washington, D.C.: U.S. Air Force, 1983), p. III-5. The million-ton-miles-per-day (MTM/D) standard measure of capability combines the amount of cargo moved (tons), the distance to be moved (miles), and the time within which the movement is to be completed (days). A follow-on study, Saber Challenge Lift, recommended that at least half of the recommended 20 MTM/D additional airlift capability be for outsize cargo such as tanks and helicopters. The study recommended, moreover, that fast sealift capabilities be improved, ibid.

4. Airlift Master Plan, p. III-5.

5. U.S. General Accounting Office, "The Department of Defense Should Resolve Certain Issues concerning the C-X Aircraft before Requesting Proposals from Industry for Its Full-Scale Engineering Development (PSAD-81-B), Washington, D.C., October 10, 1980.

flexibility" to land at small, hard-to-land-on airfields in or near combat zones. Proposed airlift characteristics included short landing and departure approaches for tactical operations and the capability to convert back and forth between cargo, troop, and aeromedical evacuation configurations. The new plane should be capable of aerial refueling and of carrying such outsize cargo as tanks and helicopters. The C-X, therefore, was to be a hybrid cargo lifter. Its mission was to be a cross between intercontinental and intratheater tasks traditionally accomplished by two different airplanes.

In 1983 the Air Force concluded that the C-17 would meet these requirements. The following year, in the Airlift Master Plan, and the Airlift Total Force Plan, the Air Force decided to:<sup>6</sup>

- 1) Build a strategic airlift force to meet the Congressionally Mandated Mobility Study goal of 66 million-ton-miles-per-day airlift capability.
- 2) Double tactical airlift capability.
- 3) Buy 210 C-17s, using 30 for training and backup.
- 4) Retire 180 C-130 "Hercules" short-range tactical airlifters.
- 5) Retire 54 C-141 "Starlifter" long-range cargo planes and transfer the remaining 180 Starlifters to the reserves where their use rate and wartime capability will be lower.
- 6) Use C-17 short-range or "intratheater" shuttles to replace the retired C-130 planes and to augment tactical airlift capability by almost 80 percent.

Before the Air Force issued the Airlift Master Plan, the Department of Defense already had decided to increase airlift capability in the near term. Its plan of January 1982 called for buying an additional 50 C-5Bs, 44 KC-10 fuel tanker aircraft, and 19 converted Boeing 747s for troop transport.<sup>7</sup> The principal reason that these aircraft were bought was that they would be available significantly earlier than the C-17.

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6. See Airlift Master Plan, pp. V-8-9.

7. The C-5B is a modified version of the C-5A. Modifications include a new engine (the General Electric TF-39-1C), new wings, modernized avionics, and a fuselage structure constructed from an aluminum alloy less conducive to corrosion.

**U.S. CARGO AIRLIFT CAPABILITY**

<u>Aircraft</u>	<u>Number Operational</u>	<u>Air Force Plans to Meet Airlift Goals</u>
C-5	70	Purchase 50 C-5Bs
C-141	234	Retire 54. Move 180 to reserves at one-half current operating rate
C-130	512	Retire 180
C-17	--	Purchase 210
KC-10	16*	Purchase 44**
CRAF Wide Body Cargo***	39	Modify 19 747s

\*16 KC-10s assigned to Strategic Air Command.

\*\*44 additional KC-10s to be added to Strategic Air Command fleet but dedicated to airlift use.

\*\*\*Civilian Reserve Air Fleet for transporting cargo on modified passenger planes in times of national emergency.

Source: Military Airlift Command, United States Air Force.

The Air Force claims that the C-17 program is the most economical option it examined. Assistant Secretary of the Air Force Tom Cooper states: "The acquisition of 210 C-17s would cost \$16 billion less and require nearly 15,000 fewer personnel to operate when compared to alternatives based on the C-5 that provide equivalent capability."<sup>8</sup> The savings will come from the lower manpower and operational costs of the C-17. Savings will also accrue from the retirement of 180 C-130s and from transferring 180 C-141Bs into the reserves at a lower operating level, which will cut down on active duty manpower and operational costs.

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8. Hearings, Subcommittee on Sea Power and Force Projection, U.S. Senate, March 7, 1985.

## PROBLEMS WITH THE AIRLIFT MASTER PLAN

The Air Force should be applauded for trying to come to terms with the perennial problem of airlift shortfalls. But its way of going about it raises serious questions. Among them:

1) Is a new generation strategic airlifter necessary? Under Air Force plans, the C-5 air cargo plane will remain in service along with the C-17 well beyond the year 2000. Is there really a need for a new strategic airlifter if the current model, the C-5B, has enough productive years left to be retained in the inventory for that long a period?

2) The dual-capability dilemma: A key element of the Air Force plan is the capability of the C-17 to deliver troops, supplies, and military equipment not only over vast distances but directly to combat forces at the forward edge of the battlefield. This will be essential mainly because the Air Force plan would retire 180 C-130 Hercules from the fleet of 512 tactical airlift aircraft. The C-17 is supposed to fly tactical air sorties between strategic airlift missions.

In a major war, however, it is questionable whether the new and expensive C-17 will be available for tactical combat support roles. Presumably, it will be flying intercontinental sorties across the Pacific or North Atlantic. Even if the plane were available, some experts see problems with a hybrid design that equips the C-17 for both strategic and tactical airlift missions.

3) Battlefield vulnerabilities: Is it realistic to expect the Air Force to risk the C-17, which may cost \$180 million or more each, on "austere" airfields in or near combat zones? Former Air Force Secretary Vernon Orr apparently does not think so. As he said in 1982, "...my worry...is that with a very large expensive plane like the C-17 and a limited number of them, the forward commander may not want to order them up to the edge of the battle area."<sup>9</sup>

This problem of the vulnerability of a large, expensive, and valuable strategic carrier plagued the 1983 U.S. military operation in Grenada. Explaining why air cargo sorties were backed up, Colonel Dave Starling, now a commander of the Army's 18th Airborne Corps Support Command, said: "Initially there was concern that the [cargo] aircraft was susceptible to gunfire and, if one got hit, we'd have really been up a creek."<sup>10</sup> "Aircraft were stacked up to the ionosphere,"

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9. Military Technology, Interview, August 1982, p. 87.

10. Military Logistics Forum, July/August 1985, p. 23.

another commander said, who added that lift operations might have been terminated had the enemy had longer range anti-aircraft guns.<sup>11</sup>

4) Cost: The estimated acquisition cost for the Airlift Master Plan is \$39.8 billion, of which \$37.2 billion is for the C-17. In its own terms, the C-17's price may be reasonable for the research, development, and production of a plane using the latest aviation technology. But whether this plane is reasonable for the allotted task is another matter. To be sure, the Air Force claims that its plan will be \$16 billion less than alternatives based on the C-5. Yet by some calculations, adding 101 C-5Bs to the fleet to meet the Pentagon's goal of 66 MTM/D airlift capability would cost at most \$16.8 billion.<sup>12</sup> And this is at an inflated "then-year" dollar cost computed to reflect price hikes during the aircraft's production life. Yet this is still far below the then-year \$37.2 billion acquisition cost for the C-17. Anticipated economies in producing a plane that has been in production for some time, moreover, could reduce the total acquisition cost of 101 C-5Bs to \$14 billion.

Greater savings will come from not retiring the C-141s and C-130s as required by the Air Force Plan. While it is true that the C-141s will have to be replaced some day, their service life can be extended to help meet strategic airlift requirements at a lower cost until 1998. In this time, the Air Force can develop and deploy a follow-on tactical airlifter to replace the C-130. By extending the service life of the "work horse" C-141B at a cost of about \$300 million, the Air Force could keep 180 of these aircraft in active status, and not, as is currently planned, transfer them to the reserves.<sup>13</sup> Cost there may be considerably lower, but readiness is also.

The savings from building more C-5Bs instead of C-17s will enable the Air Force to keep the C-130 in operation. The 180 of these aircraft currently marked for retirement could be kept in service until a new short-range tactical airlifter is developed and produced. Keeping the C-130 in the air would safeguard the Air Force's tactical

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11. Ibid.

12. This figure is based on a Lockheed fixed unit price proposal of around \$100 million a copy (in 1984 dollars), which includes Air Force add-on costs. The total then-year cost is derived from a Selective Acquisition Report estimate of \$8.4 billion for 50 C-5Bs in then-year dollars. This puts the unit cost of a C-5B at \$168 million for a program funded over the FY 1983-FY 1987 period. Adjusting for lower expected inflation results in an estimated then-year cost of \$155 million a copy for the C-5B, which compares favorably with \$180 million a unit for the C-17. Selective Acquisition Report, Department of Defense, September 30, 1985.

13. Information provided by Lockheed Corporation. It includes cost of extending service life of C-141 from 45,000 hours to 60,000 hours.

airlift mission. It would ensure that there are enough short-range airlifters to perform the many tactical airlift missions for which an expensive and essential strategic airlift cargo plane like the C-17 may either be unavailable or overqualified.

Many experts argue, in fact, that a new tactical airlifter to replace the C-130 is needed far more than a new long-range air cargo plane like the C-17. Said Lt. General William Richardson, former Army Deputy Chief of Staff for Operations and Plans: "The C-17 is not the 'solution'--there will always be a need for a smaller, STOL (short take-off and landing) aircraft that is technologically superior to the C-130."<sup>14</sup>

It is true that the C-17, with a minimum crew size of three and low maintenance personnel requirements, will demand less manpower than the C-5B, which has a minimum crew size of seven or eight. Decreasing manpower adds to savings. The Air Force claims that the C-17 option will require 15,000 fewer personnel than the C-5 option. This accounts for some of the alleged savings of the C-17 approach.

But the major portion of the Air Force projections for C-17 savings comes not from C-17 operating and manpower economies but from the cut in maintenance, operations, and manpower costs if the C-141s and C-130s are retired. It makes little economic sense, however, to purchase a new type of aircraft to replace old ones when much of the existing fleet is still capable of longer service at a relatively low cost.

#### THE C-5 VS. THE C-17: TECHNICAL ISSUES

There are a number of technical issues involving the relative merits of the C-17 or C-5 option. Among them:

1) Design and Operational Concepts: Some critics of the C-17 argue that the design and operational concepts for the C-17 and C-5 are remarkably similar. The C-17 probably has a capability advantage at the tactical airlift end of the mission spectrum, while the C-5 has the advantage at the strategic end.<sup>15</sup>

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14. "Army Operations Chief Says He's Tired of USAF's C-17," Defense Week, February 14, 1983, p. 3.

15. For a more complete comparison, see Jeffrey Record, U.S. Strategic Airlift: Requirements and Capabilities (Cambridge, Massachusetts and Washington, D.C.: Institute of Foreign Policy Analysis, 1985), Appendix B.



2) Availability of Airfields: The C-5B requires runways 4,000 feet long and 150 feet wide for landing.<sup>16</sup> But Lockheed Corporation, the manufacturer of the C-5B, claims that recent tests of the wing-modified C-5A demonstrate the ability of the C-5A and C-5B to land on runways only 3,000 feet in length.<sup>17</sup> The design requirement for the C-17, on the other hand, is the capability to land on runways 90 feet wide and as short as 3,000 feet.<sup>18</sup> Even if the C-5B still needs 4,000 feet to land, operationally it barely will be at a disadvantage compared to the C-17. The reason: only a tiny fraction of airfields in Europe, Northeast Asia (Korea and Japan), and Southwest Asia are between 3,000 and 4,000 feet long and thus can accommodate the C-17 but not the C-5.<sup>19</sup> In Central America, however, three-quarters of all airfields are shorter than 3,000 feet and thus can handle neither the C-17 nor the C-5B. This is the case in many other Third World countries.<sup>20</sup>

3) Airfield Congestion and Obstacles: A major Air Force argument for the C-17 is that because it is smaller than C-5B, it is less likely to cause congestion at airfields during operations. This is undoubtedly true. Yet because the larger C-5B delivers more cargo than the C-17 (261,000 lbs. vs. 172,200 lbs.), fewer C-5Bs than C-17s will be needed to deliver the same load, thus decreasing congestion. Backups are cut even further by the C-5s because their front and rear loading doors allow them to move in and out of the airports quickly.

It is argued that trees, fences, and other obstacles at the periphery of some narrow airfields in Europe can hinder C-5B access because of its broad wingspan (228 feet compared to 165 feet for the C-17 and 195 feet for a Boeing 747 commercial jet). Trees and fences, however, can be removed quickly. Preparing European airfields, and when necessary, non-European allied airfields, for better use by the C-5B is no major undertaking.

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16. Ibid., p. 44. Information also provided by U.S. Air Force, Military Airlift Command, Scott Air Force Base.

17. Record, op. cit., p. 29. Lockheed Corporation claims that the C-5 can operate on dirt runways as well.

18. Air Force, Military Airlift Command.

19. Record, op. cit., pp. 29-30.

20. As for the C-5B's wider runway requirement, it would be more cost effective to widen runways by pouring more concrete or laying metal planks to handle the C-5B's 150 feet runway width requirement than to buy the C-17.

## RECOMMENDATIONS AND PROPOSALS

The Gramm-Rudman-Hollings budget balancing bill is going to force careful examination of all federal spending. The Air Force thus needs an airlift-enhancement program that can be sold to Congress as cost effective. If the program cannot be sold, the entire effort to narrow and close the airlift gap could be jeopardized. All airlift-enhancement proposals should be constructed to get the most military capability for the money spent. The guiding principle should be to establish the strategic and military operational priorities for the program, and then to find the most economical way to meet these priorities.

To do so, the Air Force should:

1) Retain the Congressionally Mandated Mobility Study goal of 66 million-ton-miles-per day of airlift requirements. There is a broad consensus behind this number. More capability may be needed in the future, but the 66 MTM/D goal appears adequate for the purposes of an affordable airlift program.

2) Cancel the C-17 program, build more C-5Bs and KC-10s, and retire no C-130s.

3) Retire and transfer no C-141s. Keep all 234 of them in the active force by modifying them to extend their service life. The entire C-141B fleet of 271 airplanes can be extended 15 years for about \$300 million.

4) Consider developing a new short-range "tactical" airlifter to replace the C-130. The Air Force will know more about this need after the completion sometime this fall of the Pentagon's Worldwide Intratheater Mobility Study (WIMS), which will include an analysis of future U.S. tactical airlift requirements.<sup>21</sup> Because the U.S. needs a robust tactical airlift capability, the current force of over 512 C-130s should be kept in place until a follow-on tactical airlift is deployed to take its place. To do so, a service life extension program will be required for the C-130.

For the United States, whose military obligations are spread across thousands of miles, the ability to fly troops, supplies, and military equipment over great distances is absolutely indispensable to its global strategy. The U.S. now suffers from an airlift gap--and it

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21. The fact that no current or planned strategic airlifter can operate on three-quarters of the airfields in Central America is a powerful argument in favor of developing a new tactical airlifter which can.

must be closed. Yet the Air Force's proposed new generation cargo plane, the C-17, and the Airlift Master Plan are not the way to proceed. The Administration should buy more C-5Bs instead of C-17s, while moving rapidly to begin the development of a new generation short-range tactical airlifter.

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