

Statement of
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before the
Subcommittee on Sea Power and Force Projection
Committee on Armed Services
United States Senate

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Mr. Chairman and members of the Committee, I am pleased to be here this morning to testify on options for improving U.S. strategic mobility--that is, the ability of the United States to transport military forces across long distances.

In 1981, as part of an overall review of mobility requirements, the Department of Defense (DoD) decided it needed the capability to move 66 million ton-miles per day (MTM/D) by air in the event of future military conflicts. The Administration plans to meet that goal by adding 210 of the new C-17 aircraft to its inventory by the year 2000. The Congressional Budget Office (CBO) estimates the investment costs of this program to be \$10.2 billion over the next five years. Total costs over 30 years to buy and operate the entire airlift fleet under this plan will be \$96.7 billion (in constant 1987 budget dollars, discounted at 4 percent, over the 30-year period from 1987 through 2016).

Others have proposed meeting the 66 MTM/D goal by continuing to buy C-5 and KC-10 transport aircraft now in production instead of the new C-17. CBO finds that the cost of this alternative does not differ greatly from the C-17 option. The C-5/KC-10 approach would cost about 3 percent more over the next five years, but about 5 percent less over 30 years. There are, however, important differences between the options. The C-17 is a newly designed aircraft that offers qualitative advantages including greater maneuverability and expedited cargo handling. On the other hand, the C-5/KC-10 approach would reach the DoD goal of 66 MTM/D sooner, and there is less uncertainty about long-term costs.

Neither the C-17 nor the C-5/KC-10 approach would greatly reduce near-term costs. To do that, the Congress may have to reconsider the goal of 66 MTM/D. For example, the Congress could decide not to buy any new strategic airlift and target spending increases on sealift, which is not as quick or as versatile as airlift but is dramatically cheaper per ton carried. Such an approach could result in a reduction, relative to the Air Force plan for buying the C-17, of about \$8 billion or 77 percent in five-year investment costs and about 20 percent in discounted 30-year total costs. The options CBO examined illustrate the choices the Congress faces, but other combinations of airlift and sealift are also possible.

THE AIR FORCE PLAN

The centerpiece of the Air Force plan is the addition of 210 C-17 aircraft by the year 2000. The Congress is being asked to provide long-lead funding for the first of these aircraft in the 1987 budget. The C-17 would be a modern transport aircraft big enough to carry the largest U.S. military equipment suitable for air transport. Moreover, the C-17 has been designed to land on relatively short runways of 3,000 feet in length, thus permitting it to deliver equipment directly to airfields near the battle zone.

In addition to buying the C-17, the Air Force plan would retire--and not replace--180 of the oldest C-130 aircraft. The short-range ("intratheater") capability lost would be replaced by the direct-delivery capability of the C-17. In addition, the Air Force would retire 54 C-141

transport aircraft and transfer another 80 C-141s to the reserves, reducing their monthly flying rate in order to extend their service lives (see Table 1).

Nor are these changes the only ones taking place in the airlift program. In 1982, the Administration instituted a near-term airlift improvement program that included the purchase of 50 C-5B aircraft, 44 KC-10 transport aircraft, and other improvements that are still being completed.

Effects on Capability

When coupled with the existing fleet and the near-term improvements now being completed, the Air Force plan would provide the United States with strategic airlift capability equal to 66 MTM/D by about the year 2000. This would be a substantial increase over the 48.5 MTM/D available, if only the near-term improvement program is assumed.

In addition to providing strategic capability equal to 66 MTM/D, the Air Force argues that this option would effectively increase intratheater or short-range capability to 16,000 tons per day rather than the 9,000 tons per day available today. That improvement reflects the Air Force's assumption that the C-17 would be able to fly cargo close to enemy lines and so augment intratheater capability in addition to its prime role as a long-distance or strategic airlifter.

The C-17 would also be designed to provide a number of qualitative improvements. Specifically, the Air Force believes the C-17 would:

TABLE 1. DESCRIPTION OF OPTIONS AND THEIR CAPABILITY

Aircraft	Buy C-17	Buy C-5/KC-10	Buy Less Airlift	Emphasize Sealift Instead of Airlift
DESCRIPTION				
C-17A	210	--	--	--
C-5B	--	70	24	--
KC-10A	--	66	40	--
CRAF <u>a/</u>	10	31	31	--
C-141 Retirements	54	54	54	--
C-130A/B Retirements	180	180	180	180
C-130H Procurement	--	180	180	180
CAPABILITY				
Strategic or Intertheater (MTM/D) <u>b/</u>	66	66	56	48.5
Intratheater (T/D) <u>c/</u>	16,000 <u>d/</u>	9,000	9,000	9,000

SOURCE: Congressional Budget Office

- a. Civil Reserve Air Fleet. The Air Force plan would maintain 11.3 MTM/D in CRAF, which implies an addition of 10 wide-body, cargo-capable aircraft to the current fleet.
- b. Million ton-miles per day.
- c. Tons per day.
- d. Air Force estimate of the intratheater capability of the combined C-17/C-130 force.

- o Increase deliveries at busy airfields because its smaller size and greater maneuverability relative to the C-5 would avoid congestion;
- o Minimize ground time by the innovations designed into its cargo hold;
- o Reduce the number of required flight crew; its three-man crew is comparable to an average of 5½ for the C-141 and 6½ for the C-5;
- o Reduce maintenance manning and costs, thereby making it economical to operate in peacetime.

It is important to understand, of course, that these are design goals that are not always fully realized in practice. Most, however, are based on demonstrated technology. For instance, the engines for the C-17 are already in commercial service.

Costs

Over the next five years, CBO estimates the Air Force approach would result in investment costs of \$10.2 billion. (All five-year costs are in constant 1987 dollars of budget authority.) These added dollars would finish developing and begin buying the C-17 aircraft.

Costs over the next five years are clearly only part of the story. Purchase of the C-17 would continue through 1998. The United States would also operate the C-17 beyond the next five years, and thus an estimate of

the long-term operating costs of the C-17 and other aircraft involved in this option becomes important. To capture these effects, CBO has estimated costs to buy and operate the U.S. airlift fleet for the next 30 years. These costs were discounted at a real interest rate of 4 percent a year to reflect time preference for money now rather than later. Though these 30-year discounted costs would never appear in a budget, they are a reasonable guide to long-run costs. The 30-year costs of the Air Force plan amount to \$96.7 billion (see Table 2).

TABLE 2. COSTS OF OPTIONS (In billions of 1987 dollars)

Option	Five-Year Costs		Thirty-Year Discounted Costs <u>b/</u>
	Investment <u>a/</u>	Total	
Buy C-17	10.2	31.2	96.7
Buy C-5/KC-10	10.5	31.7	91.9
Buy less Airlift	7.6	28.9	79.2
Emphasize Sealift Instead of Airlift	2.3	24.2	76.8

SOURCE: Congressional Budget Office

- a. Includes costs to develop and buy all new systems except the remaining C-5 and KC-10 aircraft included in the near-term program.
- b. Discounted at a real rate of 4 percent a year.

THE OPTION TO BUY C-5, KC-10, AND C-130 AIRCRAFT

The Air Force plan is not the only proposal for meeting U.S. strategic airlift needs. Others have suggested that, instead of developing and buying a new aircraft, the United States should continue buying the large C-5B transport and the KC-10 aircraft--a military version of the commercial DC-10--both of which are now in production. The version of this approach that CBO analyzed assumed the purchase of 70 more C-5B aircraft and 66 more KC-10s. In addition, to ensure adequate intratheater lift capability for this approach, CBO assumed the purchase of 180 more C-130 aircraft to replace those that the Air Force intends to retire because of advanced age. (Details of the option considered by CBO are shown in Table 1.)

Like the Air Force plan, this option assumes the retirement of 54 old C-141 aircraft and the transfer of 80 others to the reserves. In contrast to the Air Force's approach, however, the rates of use and the crew size for these transferred C-141 aircraft are not assumed to be reduced to extend the C-141's service life; instead, modifications are assumed to be made to the C-141 to extend its service life. Finally, this option assumes the addition of 31 more aircraft to the Civil Reserve Air Fleet, commonly called CRAF. These airliners would remain in commercial service during peacetime, but would have special modifications. Moreover, they are in a special status designed to allow them to augment military airlifters in the event of a military conflict.

Effects on Capability

This alternative approach would, like the Air Force plan, provide 66 MTM/D of strategic lift capability. Indeed, because the C-5 and KC-10 are already in production, it would achieve this capability by 1994--six years sooner than the Air Force plan (see Figure 1). Moreover, all the aircraft to be purchased under this option have been bought and operated. Thus, there should be minimal risk of cost growth or failure to meet performance goals. While there is no evidence of significant problems with the C-17 program, it is a new aircraft and so would present more risk of failure to achieve planned performance.

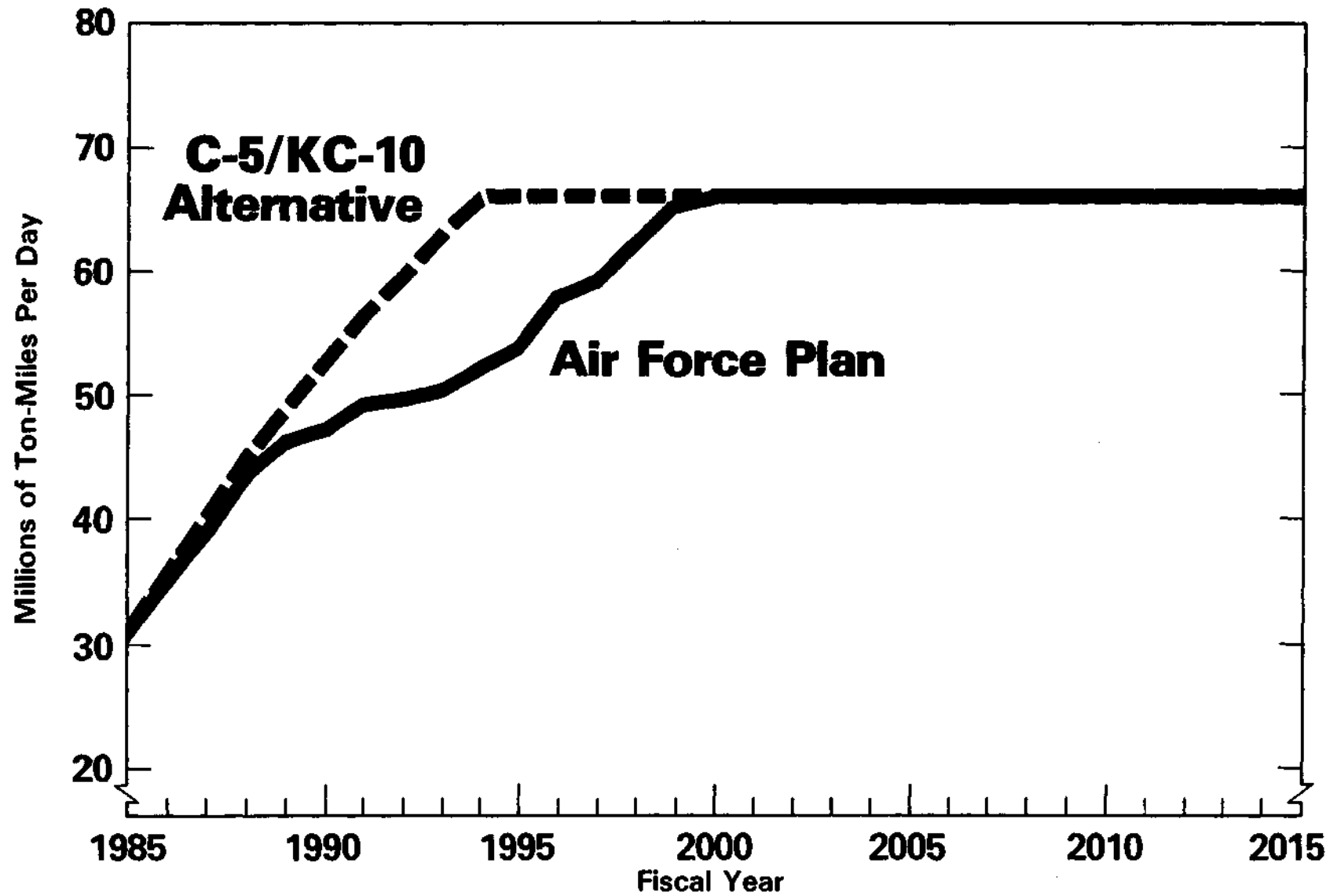
While the two options are equal in terms of 66 MTM/D, the C-17 would have a number of qualitative advantages--noted above--that the Air Force believes strongly favor the new plane. In addition, the C-5/KC-10 option might not provide identical capability at shorter or intratheater distances. This C-5/KC-10 approach would maintain intratheater lift at today's level of about 9,000 tons per day whereas the C-17 option would, according to the Air Force, raise that capability to about 16,000 tons.

Despite these important differences, the two approaches are similar in their fundamental ability to move cargo long distances. For that reason, a comparison of their costs is revealing.

Costs

Over the next five years, the C-5/KC-10 option would require \$0.3 billion more in investment than the Air Force plan, an increase of 3 percent (see

FIGURE 1. INTERTHEATER AIRLIFT COMPARISON



SOURCE: Congressional Budget Office.

Table 2). This additional investment is needed because the C-5 and KC-10 aircraft are already in production; thus, their procurement costs must be provided quickly if the production lines are to remain open and efficient. Also, in contrast to the C-17 option, this one continues the purchase of substantial numbers of C-130 aircraft, which adds \$1.4 billion to near-term costs.

Nonetheless, when examined in terms of total 30-year costs for acquisition, operation, and support, the C-5/KC-10 approach is modestly cheaper than the C-17 option, saving \$4.8 billion or 5 percent. It is less expensive in the long run because the lower costs of buying existing aircraft offset the C-17's operating economies.

CBO's analysis of the relative costs of the C-17 and the C-5/KC-10 plans differs from the analysis presented by the Air Force in its 1983 study, which found that the C-17 approach was cheaper in the long run. The Air Force compared the costs of the C-17 with an "all C-5" alternative. CBO assumes that KC-10 and CRAF aircraft--which would be cheaper to buy and operate--would be used to meet less demanding requirements for "bulk" and "oversize" equipment. Only enough C-5s are included in the CBO alternative to ensure sufficient capability for very large or "outsize" cargo. Another reason for the difference between CBO's cost results and those presented by the Air Force in 1983 is that operation and support costs for the C-5B, while still higher than those of the other aircraft, have come down since 1983. Meanwhile, estimates of those for the C-17 have increased somewhat, narrowing the differential.

Uncertainties in the Cost Analysis

These long-run cost analyses require some strong assumptions that, if not realized, could alter the results. One key assumption regards the wartime utilization rates--the number of hours per day that an aircraft can be operated in a crisis. That rate governs the number of aircraft needed to meet the 66 MTM/D goal and so affects costs dramatically. CBO used the same utilization figures for both the C-17 and the C-5 as the Air Force uses. The C-17 rate is 15.2 hours per day. That is higher than any rate ever used in wartime planning and is comparable to the best rates ever achieved for aircraft in commercial service. Should this rate be unattainable, then the cost to achieve the 66 MTM/D goal under the Air Force plan would increase. For example, if the C-17 achieved a utilization rate of only 12.5 hours per day as assumed in the DoD Sealift Study, then the Air Force would need an additional 43 C-17 aircraft to achieve its goal, thus increasing the 30-year cost of the program by \$4.7 billion. On the other hand, the 12.5 hours per day credited to the C-5 by CBO, although consistent with the rate used in previous DoD and Air Force analyses, is also somewhat higher than some think the aircraft can achieve. Thus, although the assumed rates may both be high, they may not distort relative comparisons.

There is also important disagreement about the capabilities credited to the C-17 and the C-5. The Air Force plans to use the C-17 to make direct deliveries to austere airfields near the battle zone, but does not plan to use the C-5 in the same way. The C-5, according to its manufacturer, is capable of such operations, although the Air Force has never chosen to use

it in that capacity. That raises a question: will the Air Force use the C-17 for direct delivery? If not, as many as 180 additional C-130s would have to be procured as part of the Air Force plan, increasing the 30-year cost of the program by as much as \$2.7 billion.

Nor are assumptions about capabilities the only source of uncertainty. CBO discounted costs for future years at a real rate of 4 percent per year. A higher discount rate would reduce the long-term costs of all options, especially those in which more costs are deferred. In this analysis, however, CBO found that the overall ranking of options, in terms of costs, did not change when the discount rate varied from 0 to 10 percent.

THE OPTION TO BUY LESS AIRLIFT

Both short- and long-run cost differences between the C-17 and the C-5/KC-10 approach are not large in percentage terms. If the Congress wishes to achieve large cost reductions, it will have to consider reducing the goal for strategic airlift. To illustrate the effects of such a reduction, CBO analyzed an alternative that would achieve 56 MTM/D rather than the DoD goal of 66 MTM/D.

With a lower goal, it makes less sense to produce a new aircraft like the C-17. The cost of completing development and opening a production line would have to be spread over fewer aircraft, leading to sharp growth in unit cost. Thus, CBO assumes that the reduced goal of 56 MTM/D would be met by purchasing more C-5 and KC-10 aircraft. Specifically, CBO assumed the purchase of 24 additional C-5B aircraft and 40 KC-10 aircraft.

Other changes are similar to those under the C-5/KC-10 option discussed above.

Capability would gradually improve under this approach, but would level off at 56 MTM/D in 1991 rather than rising to 66 MTM/D. This would certainly increase the risk that strategic airlift needs would go unmet. The Congressionally Mandated Mobility Study (CMMS) that established the 66 MTM/D goal identified several contingencies in which airlift needs were considerably higher than 66 MTM/D.

Costs under this approach would, however, be substantially less in the long run. Over the next 30 years, discounted costs would be \$17.5 billion less than under the Air Force plan.

Reduction in investment cost over the next five years would also be realized. This approach would save \$2.6 billion relative to the Air Force plan, or about 25 percent. Near-term costs, however, would still be substantial because, if any C-5 and KC-10 aircraft are to be bought, they must be bought soon while production lines are still open.

EMPHASIZE SEALIFT INSTEAD OF AIRLIFT

If near-term costs are to be greatly reduced, the Congress could decide not to make further improvements in U.S. airlift capabilities beyond those now planned. Instead, it could make offsetting improvements in U.S. sealift. Sealift comes in two forms: prepositioning ships, which hold military cargo at key spots overseas awaiting a crisis, and the Ready

Reserve Force. Ships in the latter are maintained in a high state of readiness for use in an emergency to transport cargo from the United States to a crisis point. The United States has been expanding its sealift forces recently. The number of Ready Reserve Force ships stands at 72 today compared with only 27 in 1982, and further sealift improvements are planned.

If the Congress decided to forgo further immediate improvements in airlift, it could use some of the savings to accelerate sealift improvements. For example, it would take the entire planned fleet of C-17s about 18 days to move a heavy mechanized Army division to Southwest Asia. That job could be done with six additional Maritime Prepositioning Ships plus a duplicate set of Army equipment to be prepositioned aboard these ships. This option would also acquire additional C-130 aircraft to provide intra-theater capability.

The effects on costs of substituting these six ships for strategic airlift would be substantial. Maritime prepositioning ships have been acquired in the past through a lease/charter arrangement. Five-year costs, covering the lease of needed prepositioning ships and the purchase of C-130 aircraft, as well as some of the mechanized division equipment, would equal \$2.3 billion, 77 percent below those of the Air Force plan. As the ships become available, equipment to be prepositioned aboard them could be taken from other uses. Eventually the prepositioned equipment would have to be replaced. But 30-year discounted costs, which include the purchase of extra

equipment, as well as full lease costs, would equal \$76.8 billion--or 21 percent below those of the Air Force plan.

Of course, substituting sealift for airlift does not provide equal capability even if the two forms can move the same number of tons in the same period of time. Ships take much longer to get initial deliveries to a destination than aircraft, which can fly high-priority cargo to a spot quickly. Also, ships cannot go where aircraft can--and this may limit U.S. options. Prepositioning ships could solve some of these problems by making equipment available immediately, but this would require that planners correctly anticipate where equipment will be needed well in advance of hostilities. Nonetheless, this option illustrates the major cost advantage of using sealift.

CONCLUSION

In sum, Mr. Chairman, CBO's analysis suggests that there are not large differences in costs between the C-17 approach and the C-5/KC-10 option: the long-run cost differences are about 5 percent. The choice between these approaches probably turns on the qualitative advantages of the C-17's new design versus the more rapid improvements in capacity offered by the C-5/KC-10 approach and the less uncertainty about long-term cost.

Neither of these airlift approaches, however, would greatly reduce spending over the next five years. These costs can only be avoided if the Congress considers--as either a temporary or permanent solution--relying less on airlift and more on sealift as a cheaper way to move U.S. military forces.