Air Force C-17 Aircraft Procurement: Background and Issues for Congress

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Summary

Procurement of C-17 airlift aircraft began in FY1988, and a total of 213 have been procured through FY2009, including 8 that were procured in the recently enacted FY2009 supplemental appropriations act (H.R. 2346/P.L. 111-32 of June 24, 2009).

The Administration's proposed FY2010 defense budget proposes to end C-17 procurement and does not request any funding for the procurement of additional C-17s. The Administration argues that enough C-17s have now been procured to meet future operational needs. Supporters of procuring additional C-17s in FY2010 believe additional C-17s will be needed to meet future operational needs. The issue of how much airlift capability will be needed in the future is currently being examined in a congressionally mandated study being done by the Institute for Defense Analyses (IDA) and in a separate Department of Defense (DOD) study called the Mobility Capabilities and Requirements Study 2016 (MCRS-16), which is due to be completed by the end of 2009.

The primary issue for Congress in FY2010 is whether to procure additional C-17s. An additional issue is whether to pass legislation relating to the airlift aircraft force structure.

The House and Senate Armed Services Committees, in their markups of the FY2010 defense authorization bill (H.R. 2647/S. 1390), recommended no funding for the procurement of additional C-17s.

Section 134 of H.R. 2647 would require the Secretary of the Air Force, in coordination with the Director of the Air National Guard, to submit to the congressional defense committees, at least 120 days before a C-5 airlift aircraft is retired, a report on the proposed force structure and basing of C-5 and C-17 aircraft.

Section 135 of H.R. 2647 would amend 10 USC 8062(g)(1) to state that, effective October 1, 2009, the Secretary of the Air Force shall maintain a total inventory of C-5s and C-17s of not less than 316 aircraft. Assuming the retention of the current force of 111 C-5s, this provision would appear to support a C-17 force of 205 C-7s—the number procured through FY2008.

Section 121 of S. 1390 would prohibit the Secretary of the Air Force from proceeding with a decision to retire C-5As until certain conditions are met, and require the Secretary of the Air Force to submit a report to the congressional defense committees on the issue of C-5 retirement.

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The Administration's proposed FY2010 defense budget proposes to end C-17 procurement and does not request any funding for the procurement of additional C-17s.[1] The Administration argues that enough C-17s have now been procured to meet future operational needs. Supporters of procuring additional C-17s in FY2010 believe additional C-17s will be needed to meet future operational needs. The issue of how much airlift capability will be needed in the future is currently being examined in a congressionally mandated study being done by the Institute for Defense Analyses (IDA) and in a separate Department of Defense (DOD) study called the Mobility Capabilities and Requirements Study 2016 (MCRS-16), which is due to be completed by the end of 2009.

The primary issue for Congress in FY2010 is whether to procure additional C-17s. An additional issue is whether to pass legislation relating to the airlift aircraft force structure. Congress's decisions on these issues could affect DOD capabilities and funding requirements and the U.S. military aircraft industrial base.

Background

C-17 Program

C-17 in Brief

The Air Force C-17, also known as the Globemaster III or simply the Globemaster, can transport equipment, supplies, and personnel over long distances, from one theater of operations to another, and can also land on austere airfields with shorter runways. The C-17 complements the Air Force's larger C-5 Galaxy airlift aircraft in the strategic (i.e., inter-theater) airlift role, and smaller C-130 Hercules airlift aircraft in the tactical (i.e., intra-theater) airlift role. DOD states that

> The C-17 can perform the entire spectrum of airlift missions and is specifically designed to operate effectively and efficiently in both strategic and theater environments. Airlift provides essential flexibility when responding to contingencies on short notice anywhere in the world. It is a major element of America's National Military Strategy and constitutes the most responsive means of meeting U.S. mobility requirements. Specific tasks associated with the airlift mission include deployment, employment (airland and airdrop), sustaining support, retrograde, and combat redeployment. Not only can the C-17 deliver outsize cargo to austere tactical environments, but it also reduces ground time during airland operations. The C-17 will perform the airlift mission well into this century.[2]

[1] The budget submission refers to ending C-17 procurement at 205 aircraft, because the budget was submitted in May, prior to the enactment of the FY2009 supplemental appropriations act that funded eight additional C-17s.

[2] United States Air Force, *Committee Staff Procurement Backup Book, Fiscal Year (FY) 2010 Budget Estimates, Aircraft Procureent, Air Force, Volume 1*, May 2009, page 2-1 (Exhibit P-40, Budget Item Justification, C-17 [MYP], (continued...)

Comparison with C-5

The C-17, like the C-5, can carry outsized (i.e., large-dimension) cargo items, such as M-1 tanks. The C-5 can carry more cargo than the C-17 and has a longer unrefueled range than the C-17. Certain DOD cargo items are so large that they can be carried only by a C-5. The C-17, however, can deploy cargo and personnel directly into austere airfields with shorter runways.[3] The C-17 also costs less to operate per flight hour than the C-5 and has a higher mission capable rate (MCR), which is a measure of aircraft reliability. **Table 1** compares some characteristics of the C-17 and C-5.

Table 1. C-17 and C-5 Characteristics

Characteristic	C-17	C-5
Cargo	170,900 pounds	270,000 pounds
Troops	102	81
Unrefueled range	2,700 miles	6,320 miles
Minimum runway length	3,500 feet	6,000 feet
Speed	572 mph	518
Crew	3	7
Mission capable rate (2007)	86%	53%
Cost per flying hour (2007)	$11,300	$23,100

Source: Information taken from Figure 1 (page 5) of Government Accountability Office, *Defense Acquisitions[:] Timely and Accurate Estimates of Costs and Requirements Are Needed to Define Optimal Future Strategic Airlift Mix*, GAO-09-50, November 2008. GAO states that Figure 1 is based on GAO analysis of DOD data.

Program Origin and Milestones

The C-17 program began in the early 1980s.[4] Procurement of C-17s began in FY1988.[5] The first C-17 was delivered to the Air Force in June 1993. The C-17 achieved Initial Operational

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[3] In addition to being able to land on shorter runways, the C-17 is more maneuverable on the ground than the C-5, which permits a larger number of C-17s to use an airfield simultaneously for loading and offloading equipment.

[4] The source selection decision for the program was announced in August 1981. A contract for the program was awarded in July 1982. The program was given Milestone II approval, and Full Scale Engineering Development (FSED) began, in February 1985.

The C-17 program had a difficult time winning congressional support in the late 1970s, and C-17 development was delayed until initial funding was finally approved in FY1981. By 1982, DOD was concerned its airlift shortfall was too urgent to await development of a new plane and decided to purchase aircraft readily available for production. Congress approved funds in the FY1983 budget to purchase 50 additional C-5B cargo planes and 44 new KC-10 Extender aerial refueling aircraft to quickly bridge the airlift gap. Because DOD wanted to develop the C-17 and buy additional C-5s, Congress directed DOD to develop a comprehensive description of its future acquisition plans. The result was the Airlift Master Plan of September 1983, which compared several alternatives for modernizing the airlift fleet and concluded that the C-17 was the most cost-effective.

[5] The program was granted Milestone III approval, and low-rate initial production (LRIP) began, in January 1989. The first flight of a C-17 occurred in September 1991. Developmental test and evaluation began in September 1991 and was completed in December 1994; initial operational test and evaluation (IOT&E) began in December 1994 and was (continued...)

Capability (IOC), with the delivery of 12 aircraft to a C-17 squadron, in January 1995. A full-rate production contract was awarded in February 1996. The C-17 program experienced development challenges and cost growth in its earlier years that were the subject of congressional oversight at the time.

Procurement Quantities

Table 2 shows annual C-17 procurement quantities, along with changes over time in the planned total number of C-17s to be procured. C-17s were procured under overlapping multiyear procurement (MYP) arrangements in FY1997-FY2003 and FY2003-FY2007.

Table 2. C-17 Procurement Quantities

Fiscal Year	Annual quantity requested	Annual quantity procured	Cumulative quantity procured	Planned total number to be procured under that year's budget submission
1988	n/a	2	2	n/a
1989	n/a	4	6	210
1990	n/a	4	10	210
1991	n/a	0	10	210
1992	n/a	4	14	210
1993	n/a	6	20	120
1994	n/a	6	26	120
1995	n/a	6	32	40
1996	n/a	8	40	40
1997	n/a	8	48	120
1998	n/a	9	57	120
1999	13	13	70	120
2000	15	15	85	120
2001	12	12	97	134
2002	15	15	112	137
2003	12	15	127	180
2004	11	11	138	180
2005	14	15	153	180
2006	15	15	168	180
2007	12	22	190	180
2008	0	15[a]	205	190

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completed in June 1995.

Fiscal Year	Annual quantity requested	Annual quantity procured	Cumulative quantity procured	Planned total number to be procured under that year's budget submission
2009	0	8[b]	213	190
2010	0	TBD	TBD	205[c]

Source: Prepared by CRS based on DOD data. Figures for total number to be procured for FY1989-FY1998 taken from the DOD Acquisition Program Baseline (APB) report of May 8, 2009, for the C-17 program.

Notes: n/a = figures not available from online DOD budget data, and have been requested from the Air Force.

a. Procured in FY2008 supplemental appropriations act (H.R. 2642/P.L. 110-252 of June 30, 2008).

b. Procured in FY2009 supplemental appropriations act (H.R. 2346/P.L. 111-32 of June 24, 2009).

c. The FY2009 budget was submitted in May 2009, prior to the enactment of the FY2009 supplemental appropriations act (H.R. 2346/P.L. 111-32 of June 24, 2009), and consequently reflects only the 2005 aircraft procured through FY2008.

Contractors, Employment, and Production Line Shutdown

The prime contractor for the C-17 is Boeing Airlift and Tankers of Long Beach, CA. C-17s are the only aircraft made at Boeing's Long Beach production plant.[6] A May 2009 press report states that the C-17 program, including supplier firms, employs a total of about 30,000 people in 43 states.[7]

The proposed FY2010 budget states that the 205th C-17 is scheduled to be delivered to the Air Force in September 2010. C-17s in recent years have been delivered at a rate of one or (occasionally) two per month. On that basis, the 213th C-17 might be delivered in the first half of 2011. As the final C-17 moves down the production line, the parts of the production line behind that aircraft will begin to shut down. Thus, if C-17 procurement ends at 213 aircraft, parts of the C-17 production line will begin to shut down prior to the delivery of that aircraft in the first half of 2011. Earlier parts of the production line, including suppliers who provide materials or make long leadtime items for the C-17, would be among the first parts of the line to shut down.

FY2010 Procurement Funding Request

Consistent with the Administration's proposal to end C-17 procurement, the proposed FY2010 defense budget does not request funding for the procurement of additional C-17s, and instead requests funding to shut down the C-17 production line. The budget requests $88.5 million in procurement funding for the C-17 program, but the funding is for C-17 support equipment, spares, data, and training equipment.

[6] Amy Butler, "New C-17s Not Needed, DOD Analysis Shows," *Aerospace Daily & Defense Report*, May 18, 2009: 3.

[7] John M. Doyle, "Senators Push Panel For 15 More C-17 Cargo Aircraft," *Aerospace Daily & Defense Report*, May 13, 2009: 3.

C-5 Modernization Program

Decisions on how many C-17s to procure can be affected by decisions on how many C-5s are retained in the strategic airlift fleet, and by decisions on efforts to modernize C-5s.

The Air Force is implementing a two-phase program for modernizing its fleet of 111 C-5s, which includes C-5As procured between 1969 and 1974, and C-5Bs and Cs procured in the 1980s. The prime contractor for both phases of the modernization effort is Lockheed Martin of Marietta, GA. A key goal of the modernization effort is to improve the C-5 fleet's MCR.

C-5 Avionics Modernization Program (AMP)

The first phase of the modernization effort, the C-5 Avionics Modernization Program (AMP), began in 1999. The first flight of an AMP-modified C-5 occurred in December 2002. Operational test and evaluation of AMP began in September 2005 and was completed in July 2006. AMP-modified C-5s achieved initial operational capability (IOC) in February 2007.[8] Modernization of all 111 C-5s with AMP is scheduled for completion in 2015.

C-5 Reliability and Re-engining Program (RERP)

The second phase of the C-5 modernization effort, the C-5 Reliability Enhancement and Re-engining Program (RERP), began in 2000. C-5s that receive RERP modification do so after receiving AMP modification, and are redesignated C-5Ms. DOD states that:

> RERP is a comprehensive modernization effort that will improve aircraft reliability, maintainability, and availability. RERP will enable the C-5M to achieve wartime mission requirements by increasing fleet availability (mission capable rates and departure reliability), reducing Total Ownership Costs (TOC), and improving aircraft performance. This effort centers on replacing the current TF-39 engine with a more reliable, Commercial Off-the-Shelf (COTS) General Electric (GE) CF6-80C2 (F138-GE-100 military designation) turbofan engine with increased takeoff thrust, stage-3 noise compliance, and Federal Aviation Regulation pollution compliance. In addition to new engines/pylons, C-5 RERP will provide upgrades to wing attachment fittings; new thrust reversers and Auxiliary Power Units (APUs); upgrades to the electrical, hydraulic, fuel, fire suppression, landing gear, and pressurization/air conditioning systems; and airframe structural modifications. These aircraft improvements increase payload capability and access to Communication, Navigation, Surveillance/Air Traffic Management (CNS/ATM) airspace. C-5 RERP also decreases aircraft time to climb, increases engine-out climb gradient for takeoff, improves transportation system throughput, and decreases engine removals.[9]

The RERP phase was originally intended for all 111 C-5s, like the AMP phase, but cost growth in 2007 that was sufficient to trigger a Nunn-McCurdy breach led to a DOD restructuring of the RERP phase in 2008 that limited RERP modifications to 52 C-5s.[10] The first flight of a RERP-

[8] Department of Defense, *Selected Acquisition Report (SAR), C-5 AMP*, December 31, 2007, p. 6.

[9] Department of Defense, Selected Acquisition Report (SAR), C-5 RERP, June 30, 2008, pp. 3-4.

[10] DOD states:

> After notifying Congress of a Nunn-McCurdy breach on September 27, 2007, the Under Secretary of Defense for Acquisition, Technology, and Logistics (USD (AT&L)) certified a restructured C-5 Reliability Enhancement and Reengining Program (RERP) on February 14, 2008. On March 14, 2008, the USD (AT&L) conducted a successful

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modified C-5 occurred in June 2006. Test and evaluation of RERP-modified C-5s began in June 2006 and, as of June 2008, was scheduled to be completed in April 2010. Initial operational capability of RERP-modified C-5s is scheduled for June 2013.[11]

The U.S. Transportation Command testified in February 2009 that:

> the C-5's outsized and oversized cargo capability is essential to meeting our global mobility requirements. Unfortunately, low departure reliability and mission capable rates continue to plague the C-5 fleet. Modernizing all the C-5s with avionics upgrades is essential to allow access to international airspace and foreign airfields. New engines and other reliability enhancements for our C-5Bs and two C-5Cs are necessary to increase aircraft availability, reduce fuel consumption and significantly improve performance throughout their projected service life. We will modernize the C-5 fleet while closely managing the costs.[12]

The Air Force testified in May 2009 that:

> The Avionics Modernization Program (AMP) provides modern, sustainable aircraft avionics, allowing the aircraft to efficiently access international airspace. This will allow the Air Force to more efficiently conduct peacetime operations and meet closure times for our Nation's war plans. All C-5B/Cs have entered or completed AMP modification and the first C-5A completed modification on 16 Feb 2009 and is assigned to Lackland ARB, Texas. Currently, the C-5 AMP effort continues at two modification centers at Dover AFB, Delaware and Travis AFB, California and will modify all 111 C-5 aircraft by 2015.
>
> The Reliability Enhancement and Re-engining Program (RERP) builds upon the C-5 AMP modification. C-5 RERP replaces the propulsion system and improves the reliability of over 70 systems and components. Following a critical Nunn-McCurdy breach, the Defense Acquisition Executive (DAE) certified a restructured C-5 RERP modernization of the entire C-5B/C fleet. Since the certification, the program has completed a Milestone C Defense Acquisition Board as well as an Interim Program Review in January 2009, earning DAE approval to continue low rate initial production (LRIP).
>
> The restructured program successfully completed developmental test and evaluation, meeting or exceeding all of its KPPs. As part of this testing, the fully modernized aircraft, known as the C-5M, accomplished a non-stop flight from Travis AFB, California to Mildenhall AB, United Kingdom via the polar route, without aerial refueling. The flight began at a gross weight of 807,000 pounds, well above the normal maximum of 769,000 pounds, established a continuous climb to an initial altitude of 33,000 feet, carried 120,000 pounds of cargo, and flew 4,770 nautical miles in approximately 11 hours. This is a vast improvement over legacy C-5A/B fleets, which would require aerial refueling to carry the same amount of cargo over the same distance.

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> MS [Milestone] C Defense Acquisition Board (DAB) [review]. The USD (AT&L) signed the Acquisition Program Baseline (APB) reflecting the Nunn-McCurdy certification and the MS C approval on June 24, 2008.
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> (Department of Defense, Selected Acquisition Report (SAR), C-5 RERP, June 30, 2008, p. 4.)

[11] Department of Defense, Selected Acquisition Report (SAR), C-5 RERP, June 30, 2008, p. 6.

[12] Statement of General Duncan J. McNabb, USAF Commander, United States Transportation Command, Before the House Armed Services Air & Land Forces and Seapower & Expeditionary Forces Subcommittees [Hearing] On the State of the Command, February 25, 2009, p. 7.

> The Air Force delivered the first C-5M to an operational unit on 9 February 2009, piloted by General Arthur Lichte (Commander, Air Mobility Command) with former Secretary John Young (USD (AT&L)) and former Secretary Sue Payton (Assistant Secretary of the Air Force for Acquisition) as proud passengers. The production program is delivering on cost and on schedule. These efforts will fully modernize 52 C-5s that meet the warfighters' requirements.[13]

The Government Accountability Office (GAO) reported in November 2008 that:

> The Air Force has cut the number of C-5s it plans to fully modernize by more than half because of substantial cost increases in the modernization effort.... All 111 C-5s will receive the avionics upgrade, while only 52 will receive the reliability enhancement and reengining upgrade. This mix may change again, based on the results of DOD's new mobility capabilities studies, possible C-5 retirements, and a revised cost estimate for C-5 modernization....
>
> The costs to modernize C-5 aircraft have not been fully identified and are likely to increase. While the Air Force now estimates it will spend $9.1 billion to modernize C-5s, the costs may be underestimated because DOD did not apply risk or uncertainty analysis to its reliability enhancement and reengining program major cost drivers. Moreover, that particular effort is underfunded by almost $300 million and costs may escalate if the Air Force has to stretch the program schedule to stay within funding targets. At the same time, the Air Force has not fully priced or budgeted for a new C-5 upgrade program it plans to begin in fiscal year 2010 to address current avionics deficiencies and to add new capabilities. Some future costs, however, may be avoided should the Air Force justify retirement of some older C-5s and forego planned modifications.[14]

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[13] Department of the Air Force, Presentation to the House Armed Services Committee Subcommittee on Air and Land Forces, United States House of Representatives, Combined Statement of: Lieutenant General Daniel J. Darnell, Air Force Deputy Chief Of Staff For Air, Space and Information Operations, Plans And Requirements (AF/A3/5) Lieutenant General Mark D. Shackelford, Military Deputy, Office of the Assistant Secretary of the Air Force for Acquisition (SAF/AQ) Lieutenant General Raymond E. Johns, Jr., Air Force Deputy Chief of Staff for Strategic Plans And Programs (AF/A8), May 20, 2009, pp. 18-19.

[14] Government Accountability Office, *Defense Acquisitions[:] Timely and Accurate Estimates of Costs and Requirements Are Needed to Define Optimal Future Strategic Airlift Mix*, GAO-09-50, November 2008, p. 3. The report also stated on page 6 that:

> Together, [the AMP and RERP] upgrades were expected to improve the fleet's mission capable rate to at least 75 percent, thereby increasing payload capability and transportation throughput, and to reduce total ownership costs over the life cycle by about $14 billion in 2008 dollars.
>
> DOD initially expected to spend about $12 billion on the C-5 AMP and RERP efforts. However, both modernization efforts experienced cost problems. AMP development costs increased by approximately 20 percent and would have been higher had the Air Force not reduced requirements and deferred some development activities to other programs. Officials waived 14 operational requirements and deferred the correction of 250 deficiencies identified during testing, many of which will be addressed and funded in RERP or future efforts. In 2007, DOD reported that RERP average procurement unit costs grew more than 50 percent from the original baseline estimate.

The report also stated on pages 8-9 that:

> C-5 modernization cost increases caused DOD to change its approach for meeting its strategic airlift requirements. DOD had planned to meet the requirements with 112 fully modernized C-5s—i.e., those receiving both the AMP and RERP modifications—and 180 C-17 aircraft. The cost for the C-5 modernization efforts was estimated to be approximately $12 billion—about $900 million for the AMP program and $11.1 billion for the RERP program.
>
> However, just prior to the RERP production decision in February 2007, the prime contractor, Lockheed Martin, indicated that RERP costs related to labor and supplier parts had significantly increased, prompting new cost estimates. The Air Force's estimate of $17.5 billion was $4.2 billion more than Lockheed Martin's estimate of $13.3 billion at that time. The new estimate increased projected average procurement unit costs by more than 50

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Requirements for Strategic Airlift

DOD's requirements for airlift capability have evolved over the years. The discussion below summarizes developments in the situation since 2005.

Mobility Capabilities Study 2005 (MCS-05)

DOD's Mobility Requirements Study of 2005 (MCS-05) identified a requirement for between 292 and 383 strategic airlift aircraft. The bottom end of this range coincided with the Air Force's program of record at the time, which included a force of 292 aircraft—180 C-17s and 112 fully modernized C-5s.[15] MCS-05 recommended a strategic airlift force structure of 292 aircraft, which the study said would meet national military strategy requirements with "acceptable risk."[16] The 2006 Quadrennial Defense Review (QDR) subsequently stated a DOD goal of maintaining 292 strategic airlifters, including 180 C-17s and 112 fully modernized C-5s.[17]

The unclassified executive summary of MCS-05 noted that unlike past mobility studies, MCS-05 did not recommend an airlift requirement expressed in millions of ton-miles per day (MTM/D) of airlift capacity.[18]

A previous DOD study of strategic airlift requirements, called the Mobility Requirements Study 2005 (MRS-05), was completed in 2000. The study established a requirement of 54.5 MTM/D.[19] Some observers expected that MCS-05 would identify a new requirement closer to 60 MTM/D, while others speculated that MCS-05 would not increase the 54.5 MTM/D requirement because of DOD concerns about being able to afford a larger airlift fleet.[20]

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> percent compared to the original baseline and triggered a statutory requirement for review and certification of the program.
>
> Following notification to Congress of the cost increase, the Under Secretary of Defense for Acquisition, Technology and Logistics requested that the CAIG estimate the cost of various options for DOD to meet its strategic airlift mission. The CAIG analyzed 14 options covering a range of scenarios for the RERP program in three broad categories: modifying all C-5 aircraft, partially modifying the C-5 fleet, and canceling the C-5 RERP program. Each option also assumed that the department would have at least 203 C-17 aircraft, 14 more than the program planned to acquire at that time. The CAIG estimated the cost of providing the RERP modification to all 111 aircraft to be $15.4 billion, halfway between the contractor's and the Air Force's estimates. Based on this analysis, the Under Secretary of Defense for Acquisition, Technology and Logistics concluded that the cost to RERP all C-5 aircraft was unaffordable and opted to limit full modification to 52 aircraft—47 C-5 Bs, both C-5 Cs, and 3 system development and demonstration aircraft. While the Air Force is expected to spend $3.4 billion less under the restructured program, ultimately less than one-half of the 111 aircraft will be modernized and at a much higher unit cost than originally estimated....

[15] One C-5 was destroyed in a crash on April 3, 2006, leaving 111 in the inventory.

[16] "Headquarters Air Mobility Command White Paper, KC-X: The Next Mobility Platform, The Need For A Flexible Tanker," p. 4.

[17] Government Accountability Office, *Defense Acquisitions[:] Timely and Accurate Estimates of Costs and Requirements Are Needed to Define Optimal Future Strategic Airlift Mix*, GAO-09-50, November 2008, p. 1.

[18] A ton-mile is one ton of cargo transported one mile. Transporting 50 tons (112,000 pounds) of cargo over a distance of 2,000 miles equates to 100,000 ton miles.

[19] Marc Selinger, "DoD Launching New Review of Transportation Needs," *Aerospace Daily*, March 11, 2004.

[20] John Tirpak, "Air Mobility in the Doldrums," *Air Force Magazine*, vol. 88, issue 8, August 2005, available online at http://www.afa.org/magazine/aug2005/0805mobility.html.

In September 2005, the Government Accountability Office (GAO) criticized the methodology that was being used for MCS-05.[21] A more detailed GAO criticism followed in September 2006, as MCS-05 was nearing completion.[22] Other observers criticized MCS-05 for not adequately addressing DOD intra-theater airlift needs, and for focusing on near-term capabilities rather than taking a longer view.[23] The criticism regarding intra-theater airlift needs was particularly germane because the C-17 can be used in for intra-theater airlift operations.

In September 2006, it was reported that the Air Force's Air Mobility Command was again studying DOD airlift needs. Some observers might have interpreted the Air Force's initiation of another airlift study so soon after the completion of MCS-05 as tacit acknowledgment of flaws in the MCS and an attempt to ameliorate them.[24]

Congressionally Mandated Study of 2007

To provide Congress with greater clarity into airlift requirements, Section 1034 of the FY2007 Defense Authorization Act (H.R. 5122/P.L. 109-364 October 17, 2006) required DOD to submit a report to Congress defining airlift requirements in terms of million-ton-miles per day. DOD delivered the report in classified form to the congressional defense committees on February 27, 2007.

Evolution in Planned Mix of Airlift Aircraft, 2005-2008

As shown in **Table 3**, which is taken from a November 2008 GAO report, the planned mix of C-17s and C-5s evolved between 2005 and 2008 due to continued procurement of C-17s, the restructuring of the C-5 modernization program to limit the RERP phase to 52 aircraft, and the crash in 2006 of one C-5 (which reduced the C-5 inventory from 112 to 111).

Table 3. Planned Mix of Strategic Airlift Aircraft, 2005-2008

Aircraft type	December 2005	July 2007	February 2008	September 2008
C-17s	180	190	190	205
C-5s (fully modernized)	112	112	52	52
C-5s (AMP modernization only)	0	0	59	59
Estimated MTM/D	33.09	33.95	33.05	34.80

Source: Information taken from Table 2 (page 9) of Government Accountability Office, *Defense Acquisitions[:] Timely and Accurate Estimates of Costs and Requirements Are Needed to Define Optimal Future Strategic Airlift Mix*, GAO-09-50, November 2008. GAO states that Table 2 is based on GAO analysis of DOD data.

Notes: Fully modernized C-5s are those that have received both AMP and RERP.

[21] Government Accountability Office, *Defense Transportation: Opportunities Exist to Enhance the Credibility of the Current and Future Mobility Capabilities Studies*, GAO-05-659R, September, 2005.

[22] Government Accountability Office, *Defense Transportation: Study Limitations Raise Questions About the Adequacy and Completeness of the Mobility Capabilities Study and Report*, GAO-06-938, September 2006.

[23] John T. Bennett, "Influential DoD Mobility Study's Focus on Intratheater Needs Questioned," *Inside the Air Force*, April 7, 2006.

[24] Michael Fabey, "AF Formulating Mobility Plan," *Aerospace Daily*, September 28, 2006.

Congressionally Mandated IDA Study of 2009

Section 1046 of the FY2008 defense authorization act (H.R. 4986/P.L. 110-181 of January 28, 2008) requires the Secretary of Defense "to conduct a requirements-based study on alternatives for the proper size and mix of fixed-wing intratheater and intertheater airlift assets to meet the National Military Strategy for each of the following timeframes: fiscal year 2012, 2018, and 2024." The study is being conducted by the Institute for Defense Analyses (IDA), which is to submit the study to the congressional defense committees. For the full text of Section 1046, see the **Appendix**.

Mobility Capabilities and Requirements Study 2016 (MCRS-16)

The Office of the Secretary of Defense (OSD) and the U.S. Transportation Command are currently examining future requirements for airlift capability in a study called Mobility Capability and Requirements Study 2016 (MCRS-16), which is expected to be completed by the end of 2009.[25] The U.S. Transportation Command testified in February 2009 that MCRS-16 and the congressionally mandated IDA study discussed in the previous paragraph "will aid decision makers in determining the mobility requirements necessary to defend the homeland, prevail in the war on terror, conduct irregular warfare and win conventional campaigns in the 2016 timeframe."[26]

GAO reported in November 2008 that

> According to Air Force officials, [MCRS-16] will take into account a variety of changes that have occurred since the last mobility study was completed in 2005, including the following:
>
> • Addition of over 92,000 Marines and Army soldiers and their equipment that will need to be transported to locations across the United States and around the world.
>
> • Establishment of a new African Command that will require the movement of troops and equipment to a variety of locations around the second largest continent in the world.
>
> • Introduction of Mine Resistant Ambush Protected vehicles, which are being used in Iraq to provide enhanced protection for U.S. troops.
>
> • Increase in weight of the Army's Future Combat System vehicles, which makes it no longer possible to transport some vehicles with C-130 aircraft (DOD's primary tactical airlifter).

The GAO report also stated:

[25] Department of the Air Force, Presentation to the House Armed Services Committee Subcommittee on Air and Land Forces, United States House of Representatives, Combined Statement of: Lieutenant General Daniel J. Darnell, Air Force Deputy Chief Of Staff For Air, Space and Information Operations, Plans And Requirements (AF/A3/5) Lieutenant General Mark D. Shackelford, Military Deputy, Office of the Assistant Secretary of the Air Force for Acquisition (SAF/AQ) Lieutenant General Raymond E. Johns, Jr., Air Force Deputy Chief of Staff for Strategic Plans And Programs (AF/A8), May 20, 2009, p. 19.

[26] [26] Statement of General Duncan J. McNabb, USAF Commander, United States Transportation Command, Before the House Armed Services Air & Land Forces and Seapower & Expeditionary Forces Subcommittees [Hearing] On the State of the Command, February 25, 2009, p. 6.

> Some expect the [congressionally mandated IDA study and MCRS-16] will identify increased demands on airlift, particularly for the C-17 since it can perform both a strategic and tactical role. As Army equipment becomes heavier and/or bulkier, the C-17 may be the only aircraft capable of delivering major weapon systems to the front lines and to more austere bases in the theater of combat. The results of both studies, if done accurately and comprehensively, should provide the analytical foundation for the future airlift force structure.[27]

A May 2009 press report stated:

> Early indications from the Pentagon's Mobility Capabilities Requirements Study suggest no need for additional strategic airlift beyond the funded procurements of re-engined C-5s and 205 C-17s already planned, says U.S. Air Force Chief of Staff Gen. Norton Schwartz.
>
> The 2005 Mobility Capabilities Study had suggested a requirement of roughly 300 strategic airlifters, and Schwartz says he sees "no major shift in the demand signal." The 2005 study, however, was discredited in much of Washington as a budget-driven formality under former Defense Secretary Donald Rumsfeld, and a new study has been eagerly awaited.
>
> The new study is now under way, although official results are not expected until the fall. Unlike previous reviews, this study will take into account the requirements associated with increases in Army and Marine Corps end-strength, as well as the new U.S. Africa Command.
>
> Even if more strategic airlift is ultimately needed, Air Force Secretary Michael Donley says an independent study[28] presents several options before considering a buy of additional C-17s, the only aircraft made at Boeing's Long Beach, Calif., plant.
>
> These include leasing additional Civil Reserve Air Fleet capacity, as well as re-engining all 111 C-5s.[29]

Prior-Year Legislation Relating to Airlift Force Structure

Section 132 of FY2004 Defense Authorization Act

Section 132 of the FY2004 defense authorization act (H.R. 1588/P.L. 108-136 of November 24, 2003) prohibits the Secretary of the Air Force from proceeding with a decision to retire C-5As from the active inventory of the Air Force in any number that would reduce the total number of C-5As in the active inventory below 112 (effectively now 111, following the crash in 2006 of a C-5 in 2006) until the Air Force has modified a C-5A aircraft to RERP configuration and DOD's Director of Operational Test and Evaluation conducts an operational evaluation of that aircraft and provides to the Secretary of Defense and the congressional defense committees an operational assessment.

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[27] Government Accountability Office, *Defense Acquisitions[:] Timely and Accurate Estimates of Costs and Requirements Are Needed to Define Optimal Future Strategic Airlift Mix*, GAO-09-50, November 2008, p. 10.

[28] This may be a reference to the congressionally mandated IDA study.

[29] Amy Butler, "New C-17s Not Needed, DOD Analysis Shows," *Aerospace Daily & Defense Report*, May 18, 2009: 3.

Section 132 of FY2006 Defense Authorization Act

Section 132 of the FY2007 defense authorization act (H.R. 5122/P.L. 109-364 of October 17, 2006) amended 10 USC 8062 to create a new subsection (g)(1) stating that, effective October 1, 2008, the Secretary of the Air Force shall maintain a total aircraft inventory of strategic airlift aircraft of not less than 299 aircraft. The provision defines strategic airlift aircraft as those with a cargo capacity of at least 150,000 pounds and a capability to transport outsized cargo over an unrefueled range of at least 2,400 nautical miles. The aircraft types that meet this definition are the C-5 and C-17.

Issues for Congress

Introduction

The primary issue for Congress in FY2010 is whether to procure additional C-17s. An additional issue is whether to pass additional legislation relating to the airlift aircraft force structure.

The Administration argues that enough C-17s have now been procured to meet future operational needs. Supporters of procuring additional C-17s in FY2010 believe additional will be needed to meet future operational needs.

Factors to Consider

In considering whether to procure additional C-17s in FY2010, Congress may consider a number of factors, including the total requirement for airlift capability and the cost-effectiveness of C-5 modernization compared to procuring additional C-17s. Additional factors to consider are constraints on total defense spending and the potential affect that procuring additional C-17s may have on reducing funding for other defense programs.

Requirements for Airlift Capability

Observers are now awaiting the results of the two current studies on the total requirement for airlift capability—the congressionally mandated IDA study and MCRS-16. GAO reported in November 2008 that:

> We previously reported on shortcomings in the Institute for Defense Analysis' study plan that could make it difficult for decision makers to know how much strategic airlift is needed. For example, the study plan did not provide details on assumptions and the measures of effectiveness, or metrics, the command officials would be using in their evaluation. Measures of effectiveness are considered to be especially important when evaluating alternatives, such as comparing the results of two analyses that measure different airlift force mixes. We recommended in April 2008 that DOD take action to ensure that the final study plan included sufficient details to address all the elements specified in the law and needed to inform decision makers on airlift issues.[30] DOD concurred with our recommendation.

[30] The passage at this point contains a footnote citing the following GAO report: Government Accountability Office, *Defense Transportation[:] DOD Should Ensure that the Final Size and Mix of Airlift Force Study Plan Includes* (continued...)

> We also identified shortcomings in DOD's 2005 mobility capabilities study approach that, if not addressed, could be repeated again in the current study. Unlike prior studies, the 2005 study did not recommend a specific airlift requirement expressed in million ton-miles per day—a common metric integral to prior capability studies that defines and quantifies airlift requirements as a basis for computing the size and optimal mix of airlift forces. Instead, DOD officials stated that it expressed its airlift requirement in terms of specific numbers and types of aircraft needed to meet the national defense strategy to take into account real-world operating parameters that may cause aircraft payloads to vary significantly from standard planning factors. Later, in response to congressional direction, DOD translated the requirements into a million ton-mile requirement. We also found the study did not identify the operational impact of increased or decreased strategic airlift on achieving warfighting objectives that would be associated with different mixes of C-5 and C-17 aircraft. As a result, we could not determine how the study concluded that the mix of C-5s and C-17s at that time was adequate for meeting mobility requirements and for supporting strategic airlift portfolio investment decisions. In 2006, we recommended that DOD include mobility metrics, along with warfighting metrics to determine air superiority, when completing future mobility capabilities studies. DOD concurred with this recommendation.[31]
>
> Although DOD concurred with the recommendation, a Transportation Command official stated that a decision has not yet been made on what specific metrics will be used to determine the number and mix of strategic airlifters in the current mobility capabilities study. At the time of this writing, the study plan had not been finalized and it is unclear whether a million ton-miles metric will be used, though it is being considered. DOD often uses the million ton-mile metric as an easy way to compare the capacity of different fleet mixes. For example, according to a DOD official, since C-130s, C-130Js, C-17s, C-5As, C-5Bs, and C-5Ms all have different capabilities when it comes to payload and range, it is difficult to compare different mixes of them without using this metric.[32]

The report also stated:

> The C-5 and C-17 provide complementary capabilities. However, DOD continues to struggle with identifying the specific quantities and determining the optimal mix of aircraft needed. Clarity is needed before committing additional billions of dollars to C-5 modernization programs, establishing C-5 retirement schedules, and/or acquiring additional C-17 aircraft. Careful planning is also important to avoid the costs of shutting down the C-17 line prematurely and later deciding to restart the production. The new mobility studies, if done correctly, could bring clarity to strategic airlift capabilities needed to support the future force and changed threats, as well as inform future tactical airlift requirements because of the C-17's dual role. Important metrics left out of the 2005 capabilities study—such as specific ton-mile mobility requirements and relative reliability rates—are considered critical factors in quantifying and analyzing cost-effective force mixes. DOD concurred with our prior recommendation to use mobility metrics to inform future mobility capabilities studies. However, at this writing, it is unclear whether DOD will use a million ton-mile metric in its current analysis to determine the cost-effective mix of aircraft and guide important investment decisions related to the expenditure of billions of dollars. Until comprehensive

(...continued)

Sufficient Detail to Meet the Terms of the Law and Inform Decision Makers, GAO-08-704R, April 28, 2008.

[31] The passage at this point contains a footnote citing the following GAO report: Government Accountability Office, *Defense Transportation: Study Limitations Raise Questions about the Adequacy and Completeness of the Mobility Capability Study and Report*, GAO-06-938, September 2006.

[32] Government Accountability Office, *Defense Acquisitions[:] Timely and Accurate Estimates of Costs and Requirements Are Needed to Define Optimal Future Strategic Airlift Mix*, GAO-09-50, November 2008, pp. 10-11.

> requirements—supported by appropriate, quantifiable metrics—and the full costs for alternate courses of action are identified, DOD decision making on the future size and mix of strategic airlift is hampered, thus increasing the risk of incurring unnecessary costs and establishing a less than optimal mix of strategic and tactical airlift forces.[33]

Cost-Effectiveness of C-5 Modernization Compared to C-17 Procurement

Regarding the cost effectiveness of C-5 modernization compared to procuring new C-17s, GAO reported in November 2008 that:

> if the cost for C-5 modernization continues to increase, Air Force officials may have to reconsider the mix within its airlift portfolio or request additional funding. Additional investments in C-17 aircraft may become more attractive. Currently, a new C-17 would cost about $276 million compared to $132 million to fully modernize a C-5. Each new C-17 potentially adds 100 percent of its cargo capacity toward meeting the total airlift requirement. Because the C-5s are already part of the operational force, each aircraft's current capacity is already counted toward the total requirement. Consequently, according to DOD data, the C-5 modernization programs only provide a marginal increase of 14 percent in capability over nonmodernized aircraft. Using DOD's million ton-mile per day planning factors, we, working in collaboration with DOD, calculated that DOD would need to fully modernize 7 C-5s to attain the equivalent capability achieved from acquiring 1 additional C-17 and the costs would be over 3 times more (see table 3).

Table 4. [Table 3 in GAO report] Comparison of a Modernized C-5 and C-17 Equivalent Aircraft Capabilities

	Unit cost[a]	Aircraft needed to provide equivalent capabilities	Total Cost of equivalent capability
C-5 fully modernized	$ 132 million	7	$924 million
C-17 new	$276 million	1	$276 million

Source: GAO analysis of DOD data.

a. Unit costs reflect procurement costs only. Data are rounded for presentation purposes.

> The analysis does not include the life-cycle costs of adding more C-17s to DOD's airlift portfolio. However, previous DOD analysis indicated that the life-cycle costs would be approximately the same if DOD replaced 30 C-5s with 30 C-17s.
>
> The Air Force has not fully identified the funding needed to modernize the C-5 aircraft, and costs are likely to increase. The current cost estimate is $9.1 billion to AMP the entire fleet of 111 aircraft and RERP 52 aircraft. However, we believe this is understated. The current budget does not fully fund the revised RERP program and the CAIG's [the DOD Cost Analysis Improvement Group's] cost estimate does not adequately address risk and uncertainty. Further, the cost estimate does not include the costs for a new modernization upgrade program slated to begin in fiscal year 2010 that would fix AMP deficiencies and add

[33] Government Accountability Office, *Defense Acquisitions[:] Timely and Accurate Estimates of Costs and Requirements Are Needed to Define Optimal Future Strategic Airlift Mix*, GAO-09-50, November 2008, pp. 19-20.

new capabilities. Alternatively, some future modification costs may be avoided should the Air Force justify retirement of some older C-5s.

The current budget does not sufficiently fund the revised RERP program. According to the CAIG's analysis, the C-5 RERP is underfunded by about $294 million across the Future Years Defense Plan for fiscal years 2009- 2013. Approximately $250 million less is needed in fiscal years 2009 through 2011, and $544 million more is needed in fiscal years 2012 and 2013. According to program officials, the Air Force is committed to fully funding the CAIG RERP cost estimate in the fiscal year 2010 President's budget yet to be submitted. However, program officials could not identify sources for the additional funding needed in fiscal years 2012 and 2013....

While our review of the CAIG's cost-estimating methodology found it generally well documented, comprehensive, and accurate, we found some weaknesses that impair the credibility and overall reliability of the C-5 cost estimate. Specifically, the CAIG did not take risk or uncertainty into account for some major cost drivers, in particular the propulsion system and labor. Because cost estimates predict future program costs, uncertainty is always associated with them. For example, there is always a chance that the actual cost will differ from the estimate because of a lack of knowledge about the future as well as errors resulting from historical data inconsistencies, assumptions, cost-estimating equations, and factors that are typically used to develop an estimate. Quantifying that risk and uncertainty is considered to be a cost estimating best practice because it captures the cumulative effect of risks and recognizes the potential for error.

In a memo documenting its independent cost estimate, the CAIG stated that the biggest risk to the cost estimate was the purchase agreement between Lockheed Martin and General Electric for the propulsion system that is conditioned on specific annual procurement quantities. The CAIG had estimated that the Air Force could save 18 percent by meeting the quantity and schedule identified in the revised RERP. However, CAIG officials stated that if the budget is not sufficient to meet these agreed-to quantities, then anticipated price breaks would not occur, resulting in increased costs of the C-5 RERP to the government. Despite this significant risk, the CAIG did not perform a risk/uncertainty analysis to determine the extent to which costs would increase should the buy quantity be cut. CAIG officials stated that they believe propulsion system procurement risk has been mitigated because they have identified the quantities necessary to meet the conditions of the purchase agreement and the Air Force plans to fully fund to this estimate. Despite these assurances, however, we have found that DOD often changes procurement quantities and there is a risk that quantities for the C-5 RERP program may change. For example, DOD's Selected Acquisition Report summary shows that of the 56 programs currently in production, 38 (or 68 percent), have experienced a quantity change since their production decisions.

In addition, the CAIG did not quantify or address uncertainty with its $2.1 billion labor cost estimate associated with the installation of the RERP on C-5 production aircraft. The RERP program experienced a 29-month break in production between the last system development and demonstration unit and the first production unit. As such, the CAIG had to estimate inefficiencies due to loss of learning and how it would affect the costs of future production. The CAIG's assumptions differed from those used by the Air Force and Lockheed Martin, which caused the CAIG estimate to be about $200 million more than Lockheed Martin's estimate and about $400 million less than the Air Force's labor estimate. As a result of the weaknesses discussed above, the Air Force's basis for making strategic airlift portfolio investment decisions is impaired, and the RERP program is at increased risk of experiencing cost overruns.

Additional modernization efforts not yet budgeted will add to future C-5 costs. Air Force officials stated that a new C-5 upgrade program is slated to begin in fiscal year 2010. The

initial funding requirement is $65 million—$40 million in research, development, test, and evaluation funds and $25 million in procurement funds—to migrate all C-5s toward a standard software configuration, based on changes made in the AMP and RERP programs. Requirements previous waived on the AMP may also be addressed in the initial block of this program. Additional funding will be requested in 2012 and beyond to provide additional capabilities. According to a program official, the total requirements and funding needs for this modernization program have not been finalized. However, at this time it is not expected to be as costly as the C-5 AMP or RERP.

The eventual costs for modernizing C-5 aircraft hinge upon the decisions DOD officials make about the number and mix of strategic airlifters DOD needs in the future. If additional C-5 capability is needed, more C-5 aircraft may need to receive the RERP modification and costs will increase. On the other hand, if decision makers believe additional C-17 capability is needed in lieu of the C-5, the Air Force may be able to reduce the number of aircraft that need the AMP modification and additional modifications slated to begin in fiscal year 2010.[34]

Legislative Activity in 2009

FY2010 Defense Authorization Bill (H.R. 2647/S. 1390)

House

The House Armed Services Committee, in its report (H.Rept. 111-166 of June 18, 2009) on H.R. 2647, recommends no funding for the procurement of additional C-17s in FY2010, and instead recommends approving the Administration's request for $88.5 million in procurement funding for other C-17 program expenses. (Page 93)

Section 134 of H.R. 2647 would require the Secretary of the Air Force, in coordination with the Director of the Air National Guard, to submit to the congressional defense committees, at least 120 days before a C-5 is retired, a report on the proposed force structure and basing of C-5 and C-17 aircraft. The text of Section 134 is as follows:

SEC. 134. REPORTS ON STRATEGIC AIRLIFT AIRCRAFT.

At least 120 days before the date on which a C-5 aircraft is retired, the Secretary of the Air Force, in coordination with the Director of the Air National Guard, shall submit to the congressional defense committees a report on the proposed force structure and basing of strategic airlift aircraft (as defined in section 8062(g)(2) of title 10, United States Code). Each report shall include the following:

(1) A list of each aircraft in the inventory of strategic airlift aircraft, including for each such aircraft—

(A) the type;

[34] Government Accountability Office, Defense Acquisitions[:] Timely and Accurate Estimates of Costs and Requirements Are Needed to Define Optimal Future Strategic Airlift Mix, GAO-09-50, November 2008, pp. 12-16.

(B) the variant; and

(C) the military installation where such aircraft is based.

(2) A list of each strategic airlift aircraft proposed for retirement, including for each such aircraft—

(A) the type;

(B) the variant; and

(C) the military installation where such aircraft is based.

(3) A list of each unit affected by a proposed retirement listed under paragraph (2) and how such unit is affected.

(4) For each military installation listed under paragraph (2)(C), any changes to the mission of the installation as a result of a proposed retirement.

(5) Any anticipated reductions in manpower as a result of a proposed retirement listed under paragraph (2).

(6) Any anticipated increases in manpower or military construction at a military installation as a result of an increase in force structure related to a proposed retirement listed under paragraph (2).

Section 135 of H.R. 2647 would amend 10 USC 8062(g)(1)—the subsection of 10 USC 8062 that was created by Section 132 of the FY2007 defense authorization act (H.R. 5122/P.L. 109-364 of October 17, 2006)—to state that, effective October 1, 2009 (rather than October 1, 2008), the Secretary of the Air Force shall maintain a total strategic airlift aircraft (i.e., C-5 and C-17) inventory of not less than 316 (rather than 299) aircraft. Assuming the retention of the current force of 111 C-5s, this provision would appear to support a C-17 force of 205 C-7s—the number procured through FY2008.

The committee's report states:

Strategic airlift force structure

The committee notes that the current Mobility Capabilities Study 2005 (MCS–05) identified a range of 292–383 strategic airlift aircraft to meet global mobility requirements with moderate risk. In testimony before the Subcommittee on Air and Land Forces and the Subcommittee on Seapower and Expeditionary Forces on February 25, 2009, the commander of the United States Transportation Command testified that a force structure of 205 C–17s, 52 [fully modernized] C–5Ms, and 59 C–5As modified with the avionics modernization program [AMP], a total of 316 strategic airlift aircraft, meets the requirement to transport 33.95 million ton-miles per day. Additionally, the committee notes that the previous commander of the United States Transportation Command and now current Air Force Chief of Staff, in his letter to the Chairman of the Senate Committee on Armed Services on November 6, 2007, also identified 316 strategic airlift aircraft as the ''sweet spot'' to meet global mobility requirements.

The committee further notes that MCS–05 did not consider the combined Army and Marine Corps increase of 92,000 soldiers and Marines, a potential increase in strategic airlift necessary to transport the Army's future combat systems, or the prospect that future strategic

> mobility aircraft would be utilized to conduct intra-theater airlift missions to move outsized and oversized equipment as they are now being used in Operation Iraqi Freedom, and believes that the results of MCRS–16 should more accurately identify the inventory of strategic airlift aircraft necessary to meet future strategic airlift mobility requirements.
>
> Accordingly, the committee believes that the long-term strategic airlift force structure inventory required to meet global mobility requirements may be subject to future adjustment based on the results of the Mobility Capability Requirement Study 2016 (MCRS–16) scheduled for completion in December 2009, and encourages a continued dialogue between the Office of the Secretary of Defense, senior uniformed military officials, and the congressional defense committees. The committee also recommends a provision elsewhere in this title [Section 135] that would amend subsection (g)(1) of section 8062, United States Code, by striking ''299'' and inserting ''316.'' (Pages 101-102)

Senate

Division D of S. 1390 as reported by the Senate Armed Services Committee (S.Rept. 111-35 of July 2, 2009) presents the detailed line-item funding tables that in previous years have been included in the Senate Armed Services Committee's report on the defense authorization bill. Division D recommends no funding for the procurement of additional C-17s in FY2010, and instead recommends approving the Administration's request for $88.5 million in procurement funding for other C-17 program expenses. (Page 630 of the printed bill.)

Section 121 of S. 1390 would prohibit the Secretary of the Air Force from proceeding with a decision to retire C-5As until certain conditions are met, and require the Secretary of the Air Force to submit a report to the congressional defense committees on the issue of C-5 retirement. The text of Section 121 is as follows:

> SEC. 121. LIMITATION ON RETIREMENT OF C-5 AIRCRAFT.
>
> (a) Limitation- The Secretary of the Air Force may not proceed with a decision to retire C-5A aircraft from the active inventory of the Air Force in any number that would reduce the total number of such aircraft in the active inventory below 111 until—
>
> (1) the Air Force has modified a C-5A aircraft to the configuration referred to as the Reliability Enhancement and Reengining Program (RERP) configuration, as planned under the C-5 System Development and Demonstration program as of May 1, 2003; and
>
> (2) the Director of Operational Test and Evaluation of the Department of Defense—
>
> (A) conducts an operational evaluation of that aircraft, as so modified; and
>
> (B) provides to the Secretary of Defense and the congressional defense committees an operational assessment.
>
> (b) Operational Evaluation- An operational evaluation for purposes of paragraph (2)(A) of subsection (a) is an evaluation, conducted during operational testing and evaluation of the aircraft, as so modified, of the performance of the aircraft with respect to reliability, maintainability, and availability and with respect to critical operational issues.
>
> (c) Operational Assessment- An operational assessment for purposes of paragraph (2)(B) of subsection (a) is an operational assessment of the program to modify C-5A aircraft to the configuration referred to in subsection (a)(1) regarding both overall suitability and

deficiencies of the program to improve performance of the C-5A aircraft relative to requirements and specifications for reliability, maintainability, and availability of that aircraft as in effect on May 1, 2003.

(d) Additional Limitations on Retirement of Aircraft- The Secretary of the Air Force may not retire C-5 aircraft from the active inventory as of the date of this Act until the later of the following:

(1) The date that is 150 days after the date on which the Director of Operational Test and Evaluation submits the report referred to in subsection (a)(2)(B).

(2) The date that is 120 days after the date on which the Secretary submits the report required under subsection (e).

(3) The date that is 30 days after the date on which the Secretary certifies to the congressional defense committees that—

(A) the retirement of such aircraft will not increase the operational risk of meeting the National Defense Strategy; and

(B) the retirement of such aircraft will not reduce the total strategic airlift force structure below 324 strategic airlift aircraft.

(e) Report on Retirement of Aircraft- The Secretary of the Air Force shall submit to the congressional defense committees a report setting forth the following:

(1) The rationale for the retirement of existing C-5 aircraft and a cost/benefit analysis of alternative strategic airlift force structures, including the force structure that would result from the retirement of such aircraft.

(2) An assessment of the costs and benefits of applying the Reliability Enhancement and Re-engining Program (RERP) modification to the entire the C-5A aircraft fleet.

(3) An assessment of the implications for the Air Force, the Air National Guard, and the Air Force Reserve of operating a mix of C-5A aircraft and C-5M aircraft.

(4) An assessment of the costs and benefits of increasing the number of C-5 aircraft in Back-up Aircraft Inventory (BAI) status as a hedge against future requirements of such aircraft.

(5) An assessment of the costs, benefits, and implications of transferring C-5 aircraft to United States flag carriers operating in the Civil Reserve Air Fleet (CRAF) program or to coalition partners in lieu of the retirement of such aircraft.

(6) Such other matters relating to the retirement of C-5 aircraft as the Secretary considers appropriate.

(f) Maintenance of Aircraft Upon Retirement- The Secretary of the Air Force shall maintain any C-5 aircraft retired after the date of the enactment of this Act in Type 1000 storage until opportunities for the transfer of such aircraft as described in subsection (e)(5) have been fully exhausted.

FY2009 Supplemental Appropriations Act (H.R. 2346/P.L. 111-32)

House

The House Appropriations Committee, in its report (H.Rept. 111-105 of May 12, 2009) on the FY2009 supplemental appropriations bill (H.R. 2346), recommended $2.2452 billion for the procurement of eight additional C-17s. (Page 21) The report stated:

> C–17 GLOBEMASTER III
>
> The Committee recommendation includes $2,245,200,000 for the procurement of eight C–17 Globemaster III aircraft. The C–17 is the workhorse of the theater, flying fifty percent of all sorties for the United States Transportation Command over the last 24 months. These missions range from airdrops for troops in forward locations to aeromedical evacuation of servicemembers from theater back to the United States. While the aircraft is designed to fly 1,000 hours per year over 30 years, over the last ten years the C–17 fleet has averaged 1,250 hours per aircraft with some aircraft flying in excess of 2,400 hours in a single year. This heavy usage is reducing the expected service life of the aircraft. The aircraft included in the recommendation will alleviate some of these issues by introducing new aircraft into the inventory.
>
> Further, the Committee is concerned that a decision on the continuation of the C–17 program was announced prior to the completion of the Mobility Capability and Requirements Study (MCRS), which will address the needs of the Department of Defense in 2016. Since the last MCRS in 2005, several changes have occurred that would change previous requirements to include the growth of ground forces, the increased size and use of Special Operations Forces, additional use of the C–17 in an intra-theater role, and the stand up of a new combatant command—United States Africa Command. It seems more prudent to continue the C–17 program until the results of the study are announced later this year.
>
> Additionally, the Air Force is encouraged to work with Congress and the reserve component to replace aging C–5A aircraft with C–17 aircraft. While there are concerns that reserve component aircraft are not utilized at the same rate as aircraft assigned to Air Mobility Command, the Committee believes that the Air Force can develop plans to work with the reserve component to address some of these issues (i.e. active association with Guard units). (Pages 24-25)

Senate

The Senate Appropriations Committee, in its report (S.Rept. 111-20 of May 14, 2009) on the FY2009 supplemental appropriations bill (S. 1054), recommended no funding for the procurement of additional C-17s, and instead recommended rejecting a request that the Administration had made for $230.2 million in FY2009 supplemental funding to cover other C-17 program expenses. (Page 43)

Conference

The conference report (H.Rept. 111-151 of June 12, 2009) on H.R. 2346 provided $2.172 billion for the procurement of eight additional C-17s. (Page 93)

Appendix. Section 1046 of FY2008 Defense Authorization Act

The text of Section 1046 of the FY2008 defense authorization act (H.R. 4986/P.L. 110-181 of January 28, 2008) is as follows:

> SEC. 1046. STUDY ON SIZE AND MIX OF AIRLIFT FORCE.
>
> (a) Study Required- The Secretary of Defense shall conduct a requirements-based study on alternatives for the proper size and mix of fixed-wing intratheater and intertheater airlift assets to meet the National Military Strategy for each of the following timeframes: fiscal year 2012, 2018, and 2024. The study shall—
>
> (1) focus on organic and commercially programmed airlift capabilities;
>
> (2) analyze the full-spectrum lifecycle costs of the various alternatives for organic models of each of the following aircraft: C-5A/B/C/M, C-17A, KC-X, KC-10, KC-135R, C-130E/H/J, Joint Cargo Aircraft; and
>
> (3) incorporate the augmentation capability, viability, and feasibility of the Civil Reserve Air Fleet during activation stages I, II, and III.
>
> (b) Use of Ffrdc- The Secretary shall select, to carry out the study required by subsection (a), a federally funded research and development center that has experience and expertise in conducting similar studies.
>
> (c) Study Plan- The study required by subsection (a) shall be carried out under a study plan. The study plan shall be developed as follows:
>
> (1) The center selected under subsection (b) shall develop the study plan and shall, not later than 60 days after the date of enactment of this Act, submit the study plan to the congressional defense committees, the Secretary, and the Comptroller General of the United States.
>
> (2) The Comptroller General shall review the study plan to determine whether it is complete and objective, and whether it has any flaws or weaknesses in scope or methodology, and shall, not later than 30 days after receiving the study plan, submit to the Secretary and the center a report that contains the results of that review and provides any recommendations that the Comptroller General considers appropriate for improvements to the study plan.
>
> (3) The center shall modify the study plan to incorporate the recommendations under paragraph (2) and shall, not later than 45 days after receiving that report, submit to the Secretary and the congressional defense committees a report on those modifications. The report shall describe each modification and, if the modifications do not incorporate one or more of the recommendations, shall explain the reasons for not doing so.
>
> (d) Elements of Study Plan- The study plan required by subsection (c) shall address, at minimum, the following:
>
> (1) A description of lift requirements and operating profiles for airlift aircraft required to meet the National Military Strategy, including assumptions regarding the following:

(A) Current and future military combat and support missions.

(B) The planned force structure growth of the military services.

(C) Potential changes in lift requirements, including the deployment of the Future Combat Systems by the Army.

(D) New capability in airlift to be provided by the KC(X) aircraft and the expected utilization of such capability, including its use in intratheater lift.

(E) The utilization of intertheater lift aircraft in intratheater combat mission support roles.

(F) The availability and application of Civil Reserve Air Fleet assets in future military scenarios.

(G) Air mobility requirements associated with the Global Rebasing Initiative of the Department of Defense.

(H) Air mobility requirements in support of worldwide peacekeeping and humanitarian missions.

(I) Air mobility requirements in support of homeland defense and national emergencies.

(J) The viability and capability of the Civil Reserve Air Fleet to augment organic forces in both friendly and hostile environments.

(K) An assessment of the Civil Reserve Air Fleet to adequately augment the organic fleet as it relates to commercial inventory management restructuring in response to future commercial markets, streamlining of operations, efficiency measures, or downsizing of the participant.

(2) An evaluation of the state of the current airlift fleet of the Air Force, including assessments of the following:

(A) The extent to which the increased use of airlift aircraft in on-going operations is affecting the programmed service life of the aircraft of that fleet.

(B) The adequacy of the current airlift force, including whether or not a minimum of 299 strategic airlift aircraft for the Air Force is sufficient to support future expeditionary combat and non-combat missions, as well as domestic and training mission demands consistent with the requirements of meeting the National Military Strategy.

(C) The optimal mix of C-5 and C-17 aircraft for the strategic airlift fleet of the Air Force, to include the following:

(i) The cost-effectiveness of modernizing various iterations of the C-5A and C-5B/C aircraft fleet versus procuring additional C-17 aircraft.

(ii) The military capability, operational availability, usefulness, and service life of the C-5A/B/C/M aircraft and the C-17 aircraft. Such an assessment shall examine appropriate metrics, such as aircraft availability rates, departure rates, and mission capable rates, in each of the following cases:

(I) Completion of the Avionics Modernization Program and the Reliability Enhancement and Re-engining Program.

(II) Partial completion of the Avionics Modernization Program and the Reliability Enhancement and Re-engining Program, with partial completion of either such program being considered the point at which the continued execution of each program is no longer supported by the cost-effectiveness analysis.

(iii) At what specific fleet inventory for each organic aircraft, to include air refueling aircraft used in the airlift role, would it impede the ability of Civil Reserve Air Fleet participants to remain a viable augmentation option.

(D) An analysis and assessment of the lessons that may be learned from the experience of the Air Force in restarting the production line for the C-5 aircraft after having closed the line for several years, and recommendations for the actions that the Department of Defense should take to ensure that the production line for the C-17 aircraft could be restarted if necessary, including—

(i) an analysis of the methods that were used and costs that were incurred in closing and re-opening the production line for the C-5 aircraft;

(ii) an assessment of the methods and actions that should be employed and the expected costs and risks of closing and re-opening the production line for the C-17 aircraft in view of that experience.

Such analysis and assessment should deal with issues such as production work force, production facilities, tooling, industrial base suppliers, contractor logistics support versus organic maintenance, and diminished manufacturing sources.

(E) Assessing the military capability, operational availability, usefulness, service life and optimal mix of intra-theater airlift aircraft, to include—

(i) the cost-effectiveness of procuring the Joint Cargo Aircraft versus procuring additional C-130J or refurbishing C-130E/H platforms to meet intra-theater airlift requirements of the combatant commander and component commands; and

(ii) the cost-effectiveness of procuring additional C-17 aircraft versus procuring additional C-130J platforms or refurbishing C-130E/H platforms to meet intra-theater airlift requirements of the combatant commander and component commands.

(3) Each analysis required by paragraph (2) shall include—

(A) a description of the assumptions and sensitivity analysis utilized in the study regarding aircraft performances and cargo loading factors; and

(B) a comprehensive statement of the data and assumptions utilized in making the program life cycle cost estimates and a comparison of cost and risk associated with the optimally mixed fleet of airlift aircraft versus the program of record airlift aircraft fleet.

(e) Utilization of Other Studies- The study required by subsection (a) shall build upon the results of the 2005 Mobility Capabilities Studies, the on-going Intra-theater Airlift Fleet Mix Analysis, the Intra-theater Lift Capabilities Study, the Joint Future Theater Airlift Capabilities Analysis, and other appropriate studies and analyses, such as Fleet Viability Board Reports or special aircraft assessments. The study shall also include any testing data collected on modernization, recapitalization, and upgrade efforts of current organic aircraft.

(f) Collaboration With United States Transportation Command- In conducting the study required by subsection (a) and preparing the report required by subsection (c)(3), the center shall collaborate with the commander of the United States Transportation Command.

(g) Collaboration With Cost Analysis Improvement Group- In conducting the study required by subsection (a) and constructing the analysis required by subsection (a)(2), the center shall collaborate with the Cost Analysis Improvement Group of the Department of Defense.

(h) Report- Not later than January 10, 2009, the center selected under subsection (b) shall submit to the Secretary and the congressional defense committees a report on the study required by subsection (a). The report shall be submitted in unclassified form, but shall include a classified annex.

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