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Report to the Chairman, Legislation and  
National Security Subcommittee,  
Committee on Government Operations,  
House of Representatives

January 1984

**C-17 Aircraft Program  
Improvements in Initial  
Provisioning Process**



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**National Security and  
International Affairs Division**

B-255832

January 21, 1994

The Honorable John Conyers  
Chairman, Legislation and National  
Security Subcommittee  
Committee on Government Operations  
House of Representatives

Dear Mr. Chairman:

On June 30, 1993, we briefed your staff on our review of the Air Force's initial provisioning for C-17 spare parts. As requested, we have updated our work and are reporting on problems we identified since January 1992 in our reviews of initial provisioning of spare parts for the C-17 military transport aircraft.

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**Background**

Initial provisioning is the process for determining and acquiring the range and quantity of parts that will be needed to support and maintain a new weapon system for an initial period of operation. Initial provisioning is necessary to provide parts for maintenance until the service's experience provides historical usage data that supply managers can use to compute the required parts to buy.

The Air Force plans to use government personnel and facilities to maintain the C-17. However, until that in-house capability is established, the C-17 developmental contract requires the contractor to provide interim contractor support (ICS). That support involves providing ICS spares at all levels of maintenance for 16 C-17 aircraft until the in-house capability, currently scheduled for mid-1994, is established. Spares not used during ICS will transfer to the Air Force.

Supply managers order spare parts with the goal of achieving the right quantity and mix of inventory to support the aircraft while minimizing the cost of managing the inventory. Ordering too many, or the wrong mix of, parts increases the risk of incurring unnecessary contract cancellation costs, inventory management costs, and obsolete inventory. Likewise, premature orders, especially in a volatile, unstable program, increase the government's risk.

The C-17 program has had problems almost since the Air Force began development in 1981. The program has had difficulty in meeting the three

main criteria against which all acquisition programs are judged—cost, schedule, and performance. The volatility of the program has resulted in uncertainty in determining the mix and quantity of spare parts to order. Many of the items on order are undergoing design changes as a result of problems identified during the ongoing developmental process. These design changes can result in on-order items becoming obsolete by the time they are delivered; however, the ultimate effects are as yet unknown because delivery and price definitization will not start until mid-1994.

As of July 1993, the contractor had spent \$235 million under Air Force C-17 contracts for ICS spares. Also as of July 1993, Air Force aircraft procurement appropriations had provided another \$190.9 million for the Air Force to buy additional spare parts to follow ICS. In fiscal year 1993, the Air Force requested \$179.2 million for C-17 initial spares. In our September 18, 1992, report,<sup>1</sup> we recommended that Congress consider denying this request because the contractor and the Air Force already had sufficient C-17 spare parts to last until late 1995, and likely longer. Congress denied the Air Force's fiscal year 1993 request.

## Results in Brief

Since 1989, when it began initial provisioning for the C-17 aircraft program, the Air Force has frequently ordered spare parts prematurely. As of July 1993, the Air Force had \$111.2 million of C-17 spare parts on order. We believe the entire \$111.2 million was ordered prematurely because ICS inventories already contained sufficient spare parts to meet the Air Force's requirements.

These premature procurements were made under a Department of Defense (DOD) policy that called for maximizing procurement of support items for the provisioning period. Within the framework of this policy, premature ordering occurred because the Air Force

- used inaccurate and outdated information to determine how many spare parts to buy and when to buy them,
- bought quantities of spare parts that were higher than computed stockage levels justified, and
- failed to follow regulations that governed the initial provisioning process.

DOD has recently revised its guidance to stress the need to limit the initial procurement of spare parts, thereby minimizing cost.

<sup>1</sup>1993 Air Force Budget: Potential Reduction for C-17 Initial Spares(GAO/NSIAD-92-293, Sept. 18, 1992).

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As of July 1993, the Air Force had already canceled \$39.6 million of the \$111.2 million of C-17 parts on order. Although the prime contractor has not determined the cancellation costs for canceled actions, one subcontractor estimated cancellation costs of about \$88,000 on \$2.9 million worth of parts that were canceled.

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## Air Force Orders Based on Outdated and Inaccurate Data

The Air Force calculated its C-17 spare parts orders using an outdated program checklist and inaccurate lead times, causing at least \$32.1 million worth of premature orders. Computation of spare parts requirements using accurate program checklists and lead times would have avoided \$20.7 million and \$11.4 million in premature orders, respectively.

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## Outdated Program Data

Air Force regulations require that programming checklists—the data the Air Force use to decide how many spare parts to buy—be updated in a timely manner to assure accurate computations of the number of spares required. The Air Force did not react promptly to changes in the program. As we reported in September 1992, the Air Force did not update its programming checklist until July 1991, 15 months after the program decreased from 210 to 120 aircraft. Additionally, logistics officials continued to order spare parts using the earlier programming checklist until September 1991. Recomputations of the parts requirements based on corrected program data showed that about \$20.7 million of parts that had been ordered were ordered prematurely and could have been canceled.

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## Inaccurate Lead Times

In determining when to place a spare parts order, the Air Force considers the lead time required to order, produce, and deliver the item. We compared actual lead times used by the contractor for ordering 204 spare parts to the lead times used by the Air Force in its computations. In 116 cases, the Air Force overstated the lead times by an average of 7 months. In 27 of the 116 cases, the overstatement was at least 12 months. The overstated lead times resulted in \$11.4 million of parts being ordered earlier than necessary, thereby subjecting the government to the increased risks inherent with premature orders.

For example, the Air Force used its estimated lead time of 26 months to order four controllers for \$241,088 in September 1990 from the prime contractor. The prime contractor then ordered the controllers from a subcontractor. According to a contractor official, the actual lead time for the controllers was 14 months; therefore, the subcontractor returned the

prime contractor's solicitation without a bid because the order was premature. However, the Air Force's order with the contractor remained open. Table 1 shows additional examples of overstated lead times.

**Table 1: Examples of Lead Time Overstatements (in months)**

Item name	Lead time			Dollar value of orders
	Air Force records	Contractor records	Difference	
Inertial navigation unit	28	22	6	\$530,990
Mission computer	36	26	10	975,000
Data entry keyboard	36	28	8	560,000
Display unit	36	29	7	1,320,000
Radar data processor	46	25	21	180,000
Radio frequency switch	46	17	29	114,580

## Items Ordered With No Computed Requirements

As the Air Force began the initial provisioning process, computations made of the requirements for each item showed that many items had a fractional (less than one) or zero requirement, thereby indicating that they were not needed. However, in 227 instances Air Force logistics officials decided they should provision one or more of the parts anyway. The files did not document or provide supporting rationale for the decision to buy items with no computed requirement. Air Force officials conceded that these parts were ordered erroneously and told us they will require complete documentation in future cases where decisions are made to buy quantities above those supported by system documentation.

## Initial Provisioning Regulations Were Not Followed

During the early part of the C-17 initial provisioning program, the Air Force did not always follow guidance prescribed by Air Force Materiel Command Regulation (AFMCR) 57-27, dated July 1, 1992.<sup>2</sup> As a result, at least \$21.1 million of spare parts not expected to fail during normal use—known as insurance items—were ordered unnecessarily, and \$18.3 million of spare parts were ordered before the designs of the parts had become stable. In addition, although we were not able to quantify the amount, the quantity of some parts ordered could have been reduced had the Air Force considered ICS inventories in their requirements determinations.

<sup>2</sup>AFMCR 57-27 was AFLCR 57-27 until July 1, 1992.



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**Insurance Items  
Unnecessary**

AFMCR 57-27 prescribes that expensive insurance items should not be ordered until near the end of the weapon system production run, which in the case of the C-17 is expected to be about the year 2003. However, the Air Force ordered 108 insurance items between August 1990 and April 1992, at an estimated cost of \$21.1 million. The Air Force told us the insurance items were ordered by mistake and took action to cancel them.

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**Items Not Design-Stable**

According to AFMCR 57-27, items that do not have fully stable designs should not be acquired. Interim contractor support allows the Air Force to delay ordering spare parts until a level of design stability is reached and spare parts usage data are available for calculating requirements. According to a senior buyer for the contractor, passing flightworthiness tests is a minimum indicator of design stability. However, the Air Force placed orders for many items beginning in February 1989 that had not passed flightworthiness tests.

Overall, 99 items worth approximately \$18.3 million were ordered from 12 to 32 months before the contractor deemed the items flightworthy. For example, the Air Force ordered 14 communication control units at a total cost of \$4.8 million in April 1989. The units did not pass flightworthiness tests until March 1991, 22 months after they were ordered.

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**ICS Inventories Not  
Considered**

Air Force regulations require that all parts, including parts acquired for ICS, should be considered before additional parts are ordered during initial provisioning. The Air Force did not always consider parts already ordered for ICS when placing orders for more parts. In December 1991, an Air Force report pointed out that C-17 personnel did not offset initial provisioning requirements with contractor-acquired spares as required.

As of September 1992, the Air Force was still not considering all contractor-acquired spare parts. For example, on August 20, 1992, the Air Force ordered 23 navigation system units without considering 16 units, valued at approximately \$2 million, that the contractor ordered for interim contractor support. The order was placed because the Air Force was not aware the part number had changed; such changes occur when items are modified or redesigned by the contractor. The Air Force uses the older part numbers until a design change conference is held with the contractor. Until then, the Air Force cannot readily match the contractor's part number with its part number. The potential mismatch increases the risk of

duplicating orders. On November 18, 1993, DOD officials informed us that they have been studying the problem to develop a servicewide solution.

## DOD Has Changed Initial Provisioning Policy

During the course of our work, we briefed Air Force and DOD officials on the causes and effects of premature ordering and the need for policy changes in this area. DOD has acted to change provisioning guidance to emphasize fiscal restraint.

Until recently, DOD and Air Force initial provisioning policy emphasized expedited procurement actions to provide support early in the life cycle of the weapon system program. Within the framework of this policy, program managers stressed the need to maximize procurements based on funding availability. However, this policy fostered an environment where regulations and inventory management procedures were not followed and inaccurate data were used to compute requirements.

Since January 1992, when we began to examine the initial provisioning process for C-17 spare parts, we have briefed DOD and Air Force officials on various problems we identified. In response, DOD and the Air Force have taken a number of actions to cancel unneeded C-17 spare parts. For example, the Air Force has revised its regulations to require C-17 program managers to recompute spare parts requirements using up-to-date data.

More significantly, on January 5, 1993, DOD changed its initial provisioning policy to correct many of the problems we had identified and that its Provisioning Process Action Team has had under study. DOD has amended its initial provisioning guidance to point out that "DOD policy . . . is to limit procurement of spares and other support items, rather than maximize procurement of support items for the provisioning period based on available funding . . . Provisioning must be provided at minimal cost."

Further, the Air Force now requires the system program director to periodically assess the impact of program changes on procurements for provisioned items and make appropriate adjustments.

## Recommendations

In addition to the positive steps the Air Force has taken to address the problems we have reported, we recommend that the Secretary of the Air Force direct the Commander, Air Force Materiel Command, to ensure that weapon system managers comply with regulations for



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- ordering (1) insurance items, (2) spares prior to design stability, and (3) spares after considering all available assets;
  - using current and accurate information to determine when and how many spare parts to buy—specifically, the latest programming checklist and uninflated lead time estimates; and
  - adequately documenting justifications for decisions to purchase more items than requirement system computations support, that is, “management decision” items.

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## Scope and Methodology

We interviewed officials and reviewed relevant documentation at Air Force Headquarters, the Air Force Air Logistics Center at Kelly Air Force Base, the Air Force Materiel Command at Wright-Patterson Air Force Base, the Air Force Mobility Command at Scott Air Force Base, and the Douglas Aircraft Company's C-17 production facility at Long Beach, California. Our work was conducted between November 1992 and September 1993 in accordance with generally accepted government auditing standards. However, this report discusses problems we have identified since January 1992 in examining the Air Force's initial provisioning process for C-17 spare parts.

As requested, we did not obtain written agency comments. However, we discussed a draft of this report with responsible Air Force officials. They generally agreed with the message of our report. We have incorporated their comments where appropriate.

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As agreed with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days after its issue date. At that time, we will send copies to the Secretaries of Defense and Air Force; the Director of the Office of Management and Budget; and other interested parties. We will make copies available to others upon request.

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If you or your staff have any questions concerning this report, please contact me at (202) 512-4841. Major contributors to this report are listed in the appendix.

Sincerely yours,

A handwritten signature in cursive script that reads "Louis J. Rodrigues". The signature is written in black ink and is positioned centrally on the page.

Louis J. Rodrigues  
Director, Systems Development  
and Production



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