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UNITED STATES GENERAL ACCOUNTING OFFICE
WASHINGTON, D.C. 20548

PROCUREMENT AND SYSTEMS
ACQUISITION DIVISION

B-200357

SEPTEMBER 23, 1980

The Honorable Harold Brown
The Secretary of Defense



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Attention: Assistant for Audit Reports

Dear Mr. Secretary:

Subject: The Department of Defense Should Resolve
Major Issues Regarding Reengining the
KC-135 Aircraft Before Continuing the
Program] PSAD-80-80)

Our review of the Air Force's KC-135 tanker aircraft reengining modification program shows that there are major issues regarding the program's pace, cost effectiveness, need, and affordability that should be resolved by the Department of Defense before any additional funds are committed to this multibillion dollar program. Although the program is in the early stages of full-scale development and meets all the criteria of a major system acquisition, it has not been designated a major system and subjected to review by the Defense Systems Acquisition Review Council (DSARC).

The purpose of our work was to determine program status and identify unresolved pertinent issues. We reviewed program documents, contracts, correspondence, and other pertinent records and information. We discussed the program with officials within the Office of the Secretary of Defense (OSD); Headquarters, United States Air Force, Strategic Air Command; Air Force Systems Command; and Air Force Logistics Command (AFLC).

BACKGROUND

Numerous studies have been made over the years to evaluate methods for modernizing the Air Force's KC-135 tanker aircraft, including various new engine configurations to replace the aircraft's aging J57-P-59W engines. In December

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1977 the Air Force awarded a contract to The Boeing Company to prepare detailed technical and cost proposals for a KC-135 reengining program covering three different engines which had been identified in previous studies. In January 1980 the Air Force selected the CFM International CFM-56 engine from among the three competing engines for the reengining modification program. The CFM-56 was jointly developed by General Electric and Snecma of France and was certified by the Federal Aviation Administration in November 1979. Its first commercial application will be on a reengining program for the DC-8.

The reengining modification is a complex effort involving extensive development and testing that will reportedly provide several benefits. These include increasing the KC-135's survivability, safety, fuel efficiency, and fuel off-load capability. ^{1/} The reengined KC-135 will also be quieter and produce fewer pollutants. (The primary reason for reengining the KC-135, however, is the need for additional aerial tanker off-load capability. A mission element need statement for the program has been submitted by the Air Force to OSD, but it has not yet been approved.

In late October 1980 the Air Force plans to award contracts totaling about \$140 million for the initial effort to modify the first KC-135 aircraft with new engines and to complete the research and development work. The Air Force estimates that it would cost about \$25 million (then-year dollars) to reengine each aircraft under the initial follow-on production program. The Air Force's objective has been to fund the program during fiscal years 1982-86.

MAJOR ISSUES

There are several issues concerning the KC-135 reengining program which should be addressed before additional funds are committed to the program. These include questions concerning the program's pace, cost effectiveness, need, and affordability.

^{1/}The amount of fuel which can be transferred to a receiver aircraft.

Will the pace of the program
correct existing problems?

Air Force plans, as of August 1980, were to initially reengine 131, or about 20 percent of its KC-135A/Q tanker fleet by fiscal year 1989. This would result in additional tanker off-load capability equal to the equivalent of about 65 additional unreengineed KC-135As, or about a 10-percent increase in capability. If the program was to continue at this pace, it would be about the year 2000 before the total fleet of 642 could be reengineed. The Air Force's plans were based on obtaining initial production funds for nine aircraft in fiscal year 1982, which we understand has been disapproved by OSD. Based on the relatively slow pace of the program, we seriously question whether it will correct existing problems with the aging J57-P-59W engine or increase tanker capability in a timely manner.

Has the most cost-effective
solution to the problem been
selected?

The original service life of the J57-P-59W engine was to have been 4,000 hours, but this has been exceeded, on the average, by over 2,500 hours. The J57-P-59W engine is becoming increasingly difficult and costly to maintain because of its prolonged operation and repeated repairs. The Strategic Air Command and AFLC believe it is vital that the J57, including the J57-P-59W, and the TF 33 engines on the C/KC-135 and B-52 aircraft fleets be rehabilitated to restore their durability and reliability and to prevent a reduction in mission capability. AFLC has established a program called Pacer Grade which would rehabilitate these engines through (1) improved rework and inspection procedures and (2) the time-phased replacement of hardware items that are experiencing frequent and extensive repairs.

AFLC estimates the total Pacer Grade program would cost about \$2.6 billion (then-year dollars), which includes about \$1.2 billion to rehabilitate all J57-P-59W engines on the entire KC-135 fleet. (As noted on p. 5, the cost to reengine the entire fleet could cost as much as \$16 billion.) The Pacer Grade program is expected to increase the service life of the existing engines to about the year 2000 and increase their reliability; durability; and, to a very limited extent, fuel efficiency. Although the Air

Force has not funded the program to date, AFLC plans, as of August 1980, would, if approved, result in funding the program over a 6-year period, with all J57-P-59W engines being rehabilitated by fiscal year 1989. Air Force officials said this program is required to keep the J57-P-59W engines in service in the near future and will be necessary regardless of the relatively long term reengining program. The reengining program is expected to reduce the number of J57-P-59W engines under Pacer Grade, but the actual reduction will depend on how rapidly the reengining program progresses. Although Pacer Grade will not increase tanker off-load capability, we believe it is a relatively low cost alternative that should be considered in reviewing the reengining program.

Have tanker requirements been properly assessed?

We believe the recently expressed congressional intent to deploy a replacement manned bomber for the B-52 by 1987 is a factor that should be considered in assessing tanker requirements in the mid to late 1980s. The Air Force has indicated that a primary factor in the need for additional tanker off-load capability is the fact that bombers now require more refueling support than in the past. This results from changes in mission profiles and tactics as well as range degradations caused by modifications, such as the increased drag caused by adding the Air Launched Cruise Missile. A more fuel efficient bomber could significantly affect tanker requirements and the potential need for the KC-135 reengining program as a means to increase tanker off-load capabilities.

The Air Force has prepared a tanker mix paper, dated August 1980, that discusses its tanker requirements as well as potential mixes of reengined KC-135s and new KC-10s that can meet these requirements. The Air Force is not clear as to what the ultimate use of the paper will be. We noted that it does not consider Pacer Grade or the issue of a new manned bomber. Also, it does not indicate how many KC-135s are planned to be reengined.

Is the program affordable?

Although the Air Force has not established firm quantities for the total program, the Strategic Air Command indicates a potential need to reengine the

entire KC-135A/Q fleet of 642 tanker aircraft. In June 1980 Air Force Headquarters officials said that a minimum of 300 aircraft would need to be reengined. Based on a unit cost of about \$25 million per aircraft, it could cost approximately \$16 billion to reengine 642 aircraft and approximately \$7.5 billion to reengine 300. Program office officials believe the \$25.0 million unit cost could be reduced to as low as \$17.5 million per aircraft if an optimum modification rate of six aircraft per month were approved. Based on a unit cost of \$17.5 million, it would cost about \$11.2 billion to reengine 642 aircraft, while the cost for 300 aircraft would be about \$5.2 billion. In view of other long range, high cost programs currently in process, there is a question as to the affordability of the program.

CONCLUSIONS AND
RECOMMENDATIONS

As noted in several of our previous reports, we strongly support the DSARC process for analyzing a system's need, cost effectiveness, risk areas, affordability, and other factors at key decision points during the acquisition process. We believe that because of the questions raised in this report, a DSARC review of the KC-135 reengining program should be conducted. Such a review is particularly critical at this time because of the Air Force's plans to award contracts in late October 1980 totaling about \$140 million for the initial effort to modify the first KC-135 aircraft and to complete research and development. Further, while a mission element needs statement has been prepared for the program, it has not yet been approved by OSD.

To avoid the possibility of continuing to develop a system which may not be needed, affordable, or the most cost-effective alternative, we recommend that you direct DSARC to review this program to answer these basic questions concerning the program. Other issues may also come to light which warrant DSARC consideration. We further recommend that you direct the Air Force to withhold its planned October 1980 contract awards until DSARC has completed its review.

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We are sending copies of this letter to the Director, Office of Management and Budget, and the Secretary of the Air Force. We are also sending copies to the chairmen of the Senate and House Committees on Armed Services and

B-200357

Appropriations, the House Committee on Government Operations, and the Senate Committee on Governmental Affairs.

As you know, section 236 of the Legislative Reorganization Act of 1970 requires the head of a Federal agency to submit a written statement of the actions taken on our recommendations to the House Committee on Government Operations and the Senate Committee on Governmental Affairs not later than 60 days after the date of the report and to the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report. We would appreciate receiving a copy of your statement when it is provided to the congressional committees.

Sincerely yours,



W. H. Sheley, Jr.
Acting Director