



Analysis of Alternatives for Recapitalizing the Air Force's KC-135 Aerial Refueling Tanker

Aerial refueling tankers play a critical role in U.S. military and national security strategy, enabling the United States to deploy air power overseas in a timely way and to operate effective homeland defense air patrols. The KC-135 fleet, which provides about 80 percent of U.S. aerial refueling capability, is nearing 50 years of age and has exhibited some technical difficulties and increased costs of operation. The total cost of both operating the KC-135s until they are retired and acquiring and operating their replacements is in the \$200 billion range over the next half century. Thus, the decisions of what replacement systems to acquire and when to recapitalize the KC-135 fleet have major implications for U.S. national security and the national budget.

In 2004, the Department of Defense (DoD) directed the Air Force to undertake an analysis of alternatives (AoA) for KC-135 recapitalization. RAND Project AIR FORCE (PAF) was chosen to lead the research effort. The AoA addressed the cost-effectiveness of a wide range of alternatives, including a large number of replacement systems and schedules. In this AoA, the most “cost-effective” alternative was the one that could meet the military aerial refueling requirement (primarily based on DoD’s 2005 Mobility Capabilities Study) at the lowest cost. The major findings of the AoA are as follows:

- **A fleet of new medium to large commercial derivatives is the most cost-effective alternative for KC-135 recapitalization.** Candidates include tankers based on the Airbus 330, the Airbus 340, the Boeing 767, the Boeing 787, the Boeing 777, and the Boeing 747. The cost-effectiveness of fleets consisting of two kinds of such aircraft was comparable to that of fleets consisting of only one kind. Smaller or larger new commercial derivatives, used commercial derivatives, new-design tankers, unmanned tankers, stealthy tankers, and commercial sources of tanking were also analyzed in the AoA and were found to be less cost-effective than the new medium to large commercial derivatives.
- **If the KC-135 fleet meets or exceeds the future aerial refueling requirement, the timing of the recapitalization does not significantly affect the present value of the combined cost of operating the KC-135s until they are retired and acquiring and operating the replacement aircraft. In this case, the decision of when to recapitalize should be based on considerations other than cost.** Arguments favoring earlier recapitalization include hedging against the technical risk associated with the aging KC-135 fleet, the existence of future budget constraints, and the additional capabilities that new tankers would offer. Arguments favoring delayed recapitalization including hedging against uncertainties that could reduce the desirability of new tankers and the existence of very near-term budget constraints.
- **If additional tankers are needed to meet the future requirement, the present value of the cost of closing the gap will be greater the more rapidly new systems are acquired.** How rapidly to close the gap is a matter of judgment for senior decisionmakers.

These findings should help decisionmakers develop an appropriate strategy for providing aerial refueling capability for decades to come. ■

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