

KC-46A

Executive Summary

- The KC-46 program completed flight test requirements for first aircraft delivery in June 2018. The Federal Aviation Administration (FAA) awarded the aircraft's Supplemental Type Certification in early September 2018. The Military Type Certification is still pending additional test results. Both the FAA and military certifications are required before operational crews can fly the KC-46A.
- Flight testing to certify the KC-46A aerial refueling (AR) system and the first eight aircraft for receiver operations with the KC-46A began in October 2017 and will continue into FY19.
- IOT&E is likely to start in March 2019 or later. Schedule analysis identified two key milestones affecting IOT&E start and completion: (1) completion of AR certification of the initial group of 3 to 8 receivers before the beginning of IOT&E and (2) certification of all 18 receivers planned to participate in the IOT&E.
- Air refueling operators continue to inadvertently contact receiver aircraft outside the refueling receptacle with the boom nozzle. Boeing identified the root cause as reduced visual acuity in the Remote Vision System (RVS) and implemented a software-only fix. Evaluators reviewed the effectiveness of this solution, and although the software improved a few display deficiencies, it did not provide an overall adequate solution. The potential boom strikes will likely have adverse operational affects primarily on low observable receivers.

System

- The KC-46A AR aircraft is the first increment of replacement tankers (179) for the Air Force fleet of more than 400 KC-135 and KC-10 tankers.
- The KC-46A design uses a modified Boeing 767-200ER commercial airframe with numerous military and technological upgrades, such as the fly-by-wire refueling boom, the remote air refueling operator's station, 787 cockpit displays, additional fuel tanks in the body, and defensive systems.
- The KC-46A will provide both a boom and probe-drogue refueling capabilities. The KC-46A is equipped with an AR receptacle so that it can also receive fuel from other tankers, including legacy aircraft.
- The KC-46A is designed to have significant palletized cargo and aeromedical capacities; chemical, biological,



- radiological, and nuclear survivability; and the ability to host communications gateway payloads.
- Survivability enhancement features are incorporated into the KC-46A design.
 - Susceptibility is reduced with an Aircraft Survivability Equipment suite consisting of Large Aircraft Infrared Countermeasures (LAIRCM), a modified version of the ALR-69A Radar Warning Receiver (RWR), and a Tactical Situational Awareness System. The suite is intended to correlate threat information from pre-flight planning, the RWR, and other on- and off-board sources, and to prompt the crew with an automatic re-routing suggestion in the event of an unexpected threat.
 - Vulnerability is reduced by adding a fuel tank inerting system and integral armor to provide some protection to the crew and critical systems.

Mission

Commanders will use units equipped with the KC-46A to perform AR to accomplish six primary missions to include nuclear operations support, global strike support, air bridge support, aircraft deployment support, theater support, and special operations support. Secondary missions will include airlift, aeromedical evacuation, emergency AR, air sampling, and support of combat search and rescue.

Major Contractor

The Boeing Company, Commercial Aircraft in conjunction with Defense, Space & Security – Seattle, Washington

Activity

- In June 2018, the KC-46 program completed flight test requirements for the first KC-46A aircraft delivery by

finishing test events for the RVS and the F-16, C-17, and A-10 receivers, and KC-135 refueling the KC-46A as a receiver.

FY18 AIR FORCE PROGRAMS

- Flight tests completed for FAA Supplemental Type Certification in September 2018 and continue for Military Type Certification, both of which are required for operational crews to fly and employ the KC-46A.
- Flight testing to certify the KC-46A AR system and the first eight aircraft for receiver operations with the KC-46A began in October 2017 and will continue into FY19.
- The KC-46A program tested the aircraft in extreme humid, cold, and hot environments with a December 2017 deployment to Guam for humid; a January 2018 deployment to Fairbanks, Alaska, for cold; and a July 2018 deployment to Yuma, Arizona, for hot.
- Boeing completed Block 30 LAIRCM flight testing at Moses Lake, Washington, in June 2018 to confirm installed system performance.
- The KC-46A program completed one test in FY18 and has planned two more tests in FY19 to assess thermal curtains for crew survivability to nuclear threats against the KC-46A.
- Air Force analyses are ongoing for the KC-46A inherent nuclear hardness to blast, radiation, flash, thermal, and electromagnetic pulse effects and to assess the ability to launch and fly a safe distance from a simulated nuclear attack.
- The Air Force completed Joint Interoperability Testing of the KC-46A communicating over Link 16 with other material assets in April 2018.
- The Air Force completed its LFT&E Consolidated report.
- Analysis of Block 30 LAIRCM testing and nuclear survivability assessment of thermal curtains is ongoing.
- The KC-46A program completed follow-on developmental testing of an RVS software-only fix in June 2018.
- Initial centerline drogue system (CDS) testing revealed deficiencies in software and hardware that resulted in unexpected disconnects during AR operations. Boeing identified the root cause and implemented new coupler tolerances and updated control software logic.

Assessment

- IOT&E is likely to start in March 2019 at the earliest. Schedule analysis identified two key milestones affecting IOT&E start and completion: (1) completion of AR certification of the initial group of 3 to 8 receiver aircraft before the beginning of IOT&E and (2) certification of all 18 receiver aircraft planned to participate in IOT&E.
- Air refueling operators continue to inadvertently contact receiver aircraft outside the refueling receptacle with the boom nozzle. Boeing identified the root cause as reduced visual acuity in the RVS and implemented a software-only fix. Evaluators reviewed the effectiveness of this solution, and although the software improved a few display deficiencies, it did not provide an overall adequate solution. The potential boom strikes will likely have adverse operational affects primarily on low observable receivers.
- After the program incorporated modifications to the CDS, testing showed improved system performance and enabled probe-equipped receiver certification testing to continue. However, the modifications did not resolve all of the problems and therefore, additional data collection and analysis are required to determine the appropriate action for problem resolution.
- Joint Interoperability Testing was successful. The KC-46A was able to communicate via Link 16 with other military assets.

Recommendation

1. The KC-46A program should consider hardware changes for the RVS to improve system visual acuity and depth perception for the air refueling operators.