

# KC-46A Pegasus



The KC-46A has not completed IOT&E. The Air Force Operational Test and Evaluation Center (AFOTEC) has collected all achievable IOT&E aerial refueling (AR) and secondary mission data on the current configuration of KC-46A until the program office updates the refueling boom and Remote Vision System (RVS). In FY24, AFOTEC completed operational testing of the Wing Aerial Refueling Pods (WARPs) and cooperative cyber testing of avionics systems. The Air Force continues to work with Boeing to develop critical upgrades to the refueling boom and RVS, to support starting integrated testing in late FY25.

## SYSTEM DESCRIPTION

The KC-46A tanker aircraft is a modified Boeing 767-200ER commercial airframe with military and technological upgrades. KC-46A upgrades include: a fly-by-wire refueling boom, centerline and WARP hose-drogue baskets, a dual-remote Air Refueling Operator Station enabled by an exterior RVS, additional fuel tanks in the body, a boom refueling receiver receptacle above the cockpit, a Boeing 787 digital cockpit update, Large Aircraft Infrared Countermeasures, a modified ALR-69A radar warning receiver, and Tactical Situational Awareness System that integrates input from the Radio Frequency Self Defense System (RFSDS). The KC-46A cargo bay is designed to accommodate palletized cargo; aeromedical evacuation equipment; and roll-on command, control, and communications gateway payloads.

## MISSION

Commanders will use units equipped with the KC-46A to:

- Perform AR in support of six primary missions of nuclear operations support, global strike support, air bridge support, aircraft deployment support, theater support, and special operations support.
- Accomplish the secondary missions of airlift, aeromedical evacuation, emergency AR, air sampling, and support of combat search and rescue.

## PROGRAM

The KC-46A Pegasus is an Acquisition Category IC program intended to be the first increment of 183 replacement tankers for the fleet of more than 400 KC-135 and KC-10 tankers. DOT&E approved the Milestone C TEMP update in 2016 and the IOT&E test plan in April 2019. In a May 2020 memorandum, DOT&E communicated to the Assistant Secretary of the Air Force for Acquisition, Technology, and Logistics that DOT&E will not submit an IOT&E report on KC-46A until operational testing of a production-representative RVS is complete. The Air Force expects a corrected RVS (version 2.0) will be ready for operational testing in late FY25. Air Mobility Command has approved the KC-46A as a deployable asset to support U.S. Transportation Command taskings with limitations.

### » MAJOR CONTRACTOR

- Boeing Commercial Airplanes in conjunction with Boeing Defense, Space & Security – Seattle, Washington

## TEST ADEQUACY

In April 2024, AFOTEC successfully completed all 18 IOT&E flight test points associated with the WARP system (WARPS). AFOTEC has now collected 85 percent of the planned IOT&E flight test data, but cannot complete the remaining IOT&E events until the program office implements the

final boom and RVS upgrades. The test community expects to begin developmental flight testing of the boom redesign and RVS (version 2.0) in FY25. Operational testing will be fully integrated with this effort and all remaining IOT&E test events will be completed in conjunction with developmental test objectives. DOT&E will complete its assessment and publish an IOT&E report after integrated flight testing is complete for the boom redesign and RVS (version 2.0).

KC-46A IOT&E has been ongoing since May 2019. AFOTEC has continued to collect data, in accordance with the DOT&E-approved test plan, to support assessments for sortie generation, AR, airlift, aeromedical evacuation, survivability through threat-avoidance, and sustained operations under adversarial cybersecurity conditions. Since 2019, DOT&E has been periodically observing and continually monitoring all IOT&E testing.

In June 2024, two aircrews from the 22nd Air Refueling Wing completed the first KC-46A nonstop circumnavigation flight with a 45-hour refueling mission starting and finishing at McConnell AFB, Wichita, Kansas. As part of the Maximum Endurance Operation for KC-46A, the crew refueled B-2 bombers, C-17 airlift, F-15E, and other KC-46A aircraft over the 45-hour mission.

The KC-46A Joint Reliability and Maintainability Evaluation Team has adjudicated and analyzed over 90,000 flight hours of maintenance data. AFOTEC has

collected 15 times its originally required operational suitability flight test data and no longer tracks detailed suitability data; the program office and developmental test organization continue to collect and analyze fleet suitability metrics. AFOTEC will conduct separate suitability test data analysis during operational test of upgrades to the refueling boom and RVS.

AFOTEC completed its final phase of cooperative vulnerability and penetration assessment cyber testing in December 2023 and plans to complete cyber testing with two adversarial assessments in 1QFY25.

## PERFORMANCE

### » EFFECTIVENESS

The KC-46A is capable of refueling 26 of 27 candidate receiver aircraft types with some restrictions that limit the availability in certain environmental conditions and aircraft configurations. The 26th candidate receiver will resume testing after the boom upgrades are complete.

Operational testing of the WARPS identified potential concerns while using the system in icing conditions. The Air Force has an interim plan to use the system if icing conditions exist and is pursuing a long-term solution.

Furthermore, when WARPS are installed, there is an aircraft and weight balance consideration affecting operations when refueling both boom and drogue

receiver aircraft. This is expected to be resolved in a future weight and balance tool software upgrade.

The program office is continuing to remediate all previously reported Category 1 deficiencies. The program still has three outstanding Category 1 deficiencies related to the existing refueling boom and RVS that will be resolved with the boom telescope redesign and the RVS 2.0 upgrade. The Category 1 deficiencies are associated with the fuel manifold system, cracks and leaks in the refueling receptacle drain line, and cracks in the auxiliary power unit drain mast, which have not been resolved, but engineering redesigns of the receptacles are in progress.

The KC-46A is experiencing systemic failures of bleed air ducts, driving significant parts demand, additional maintenance, and resulting in damage to the aircraft. The deficiency was first identified in November 2023, and initially adjudicated as a Category 2. However, the number of aircraft affected, and the number of repeat failures, drove the program office to upgrade the deficiency to Category 1. This upgrade is appropriate due to no known acceptable workarounds in terms of supply support, repair support, and the significant additional burden on maintenance. Boeing and the Air Force are currently modeling and flight testing temporary procedures to alleviate the issue as they validate the temporary workarounds and future design modifications. This deficiency is not considered a safety of flight issue.

In FY24, the KC-46A Program Office obtained new receiver certifications for the following aircraft: E-6, F-15EX, F-16 Aggressors, and F-16 Thunderbirds. The KC-46A Program Office continues to work with the Air Force, as well as foreign partners, to obtain air refueling receiver certifications for additional aircraft. The program office is also waiting for a refueling boom upgrade to complete receiver certification on the A-10.

### » SUITABILITY

The KC-46A is not meeting many of its suitability metrics. The operational availability ( $\geq 80$  percent threshold) and mission capable rate ( $\geq 90$  percent threshold) slightly decreased throughout FY24, well below their threshold requirements. Moreover, when accounting for partially mission capable aircraft that are unable to perform their primary AR mission (e.g., due to a broken boom), the effective mission capable rate falls an additional 24 percent on average. The program continues to suffer from prolonged maintenance repair times due to supply issues with parts needed for repair.

In March 2024, the KC-46A program experienced a two-month delay in delivering new aircraft due to the discovery of broken part associated with the boom. Inspections of aircraft off the production line found a broken gimbal nut lockwire, a part important for the directional movement of the refueling boom. Aircraft acceptance

was temporarily delayed while inspection of all aircraft took place to ensure safety of flight. The program still achieved the planned delivery of 17 aircraft in FY24.

## » **SURVIVABILITY**

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The KC-46A program office continues to develop RFSDS system software upgrades to improve survivability. The developmental testing of software version 6.0 will begin in 4QFY24. Flight testing of RFSDS (version 6.0) is scheduled for 1QFY25. Software updates to RFSDS are slated to improve the clarity of information presented to aircrew to support threat avoidance capabilities. Further testing is required to determine if version 6.0 upgrades are sufficient to support increased survivability of KC-46A in a contested environment.

## **RECOMMENDATIONS**

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The Air Force should:

1. As recommended in the FY23 Annual Report, continue to pursue design changes necessary to close the remaining Category 1 deficiencies.
2. Develop and implement a strategy to address high drivers of availability and mission capable rate shortfalls.
3. Collect additional operational test data on the RFSDS during developmental testing of software updates and share with DOT&E to use for IOT&E reporting.