

T-7A Advanced Pilot Training (APT)



In FY25, the Air Force and Boeing continued T-7A developmental testing (DT), monitored by DOT&E, using contractor-owned and -operated prototype aircraft and Engineering and Manufacturing Development (EMD) aircraft. DOT&E will provide an observation report based on the DT data to assess T-7A progress toward operational effectiveness, suitability, and survivability to support the Milestone C (MS C) decision scheduled for 2QFY26. The program office plans to begin IOT&E in FY27.

SYSTEM DESCRIPTION

The Advanced Pilot Training (APT) system includes the T-7A Red Hawk aircraft and Ground Based Training System (GBTS). It replaces the Air Force's fleet

of T-38C aircraft and associated simulators.

The T-7A is a two-seat trainer powered by a single afterburning turbofan engine. The aircraft uses digital avionics and fly-by-wire flight controls that emulate the characteristics of fifth-generation

fighters. GBTS devices include the aircrew ground-egress trainer, part-task trainer, and three types of simulators with varying levels of fidelity. T-7A aircraft can be networked with each other and with the simulators via a training data link.

MISSION

Air Education and Training Command (AETC) will use the APT system to train student pilots and combat systems officers for assignments in fourth- and fifth-generation fighter and bomber aircraft. Pilot training in the T-7A will include the basic and advanced fighter fundamentals taught in the T-38C and will add sustained high-g maneuvering, advanced sensor management, night-vision goggle operations, and in-flight refueling training.

PROGRAM

APT is an Acquisition Category IB program. The Air Force awarded the contract to Boeing in September 2018. DOT&E approved the Milestone B (MS B) TEMP in January 2018. After declaring a schedule breach in June 2022, the Air Force approved an updated program schedule, which moved the MS C decision threshold date from December 2023 to 2QFY26 and the full-rate production decision threshold date from September 2025 to 2QFY28.

Boeing delivered the last two EMD aircraft in 1QFY25. To compensate for delay in the MS C decision, the Air Force contracted four additional aircraft that are production-representative test vehicles (PRTV) prior to low-rate initial production. The MS C TEMP is in coordination to support a planned MS C decision in 2QFY26.

The program is scheduled to begin IOT&E in FY27 to support a full-rate production decision in FY29. AETC plans to procure 351 T-7A aircraft, 46 simulators, and

associated GBTS for deployment to its five pilot training bases: Joint Base San Antonio-Randolph, Texas; Columbus Air Force Base (AFB), Mississippi; Laughlin AFB, Texas; Vance AFB, Oklahoma; and Sheppard AFB, Texas.

The program office is working with Boeing to contract testing in the transonic and supersonic regions prior to IOT&E. While the APT contract does not require a supersonic trainer, the T-7A is capable of supersonic flight. Student pilots might exceed technical order limits of 0.95 Mach during T-7A designated missions, particularly during the advanced fighter fundamentals course. This will be mitigated by verifying the aircraft's ability to safely reach and recover from speeds exceeding the flight manual limits up to 1.05 Mach.

» MAJOR CONTRACTORS

- The Boeing Company – St. Louis, Missouri
- Saab AB – Linköping, Sweden and Lafayette, Indiana

TEST ADEQUACY

Boeing continued flight testing of two contractor-owned-and-operated prototype EMD aircraft in FY25. DOT&E has continually monitored and periodically observed DT to support an observation report to inform the MS C decision and assess progress toward operational effectiveness, suitability, and survivability.

DOT&E will not use test data from these prototype aircraft in its final evaluation of system performance after IOT&E, as the prototypes are

substantially different from the five EMD aircraft contracted. The EMD and PRTV aircraft will be used for government-led DT and operational testing. Boeing's FY25 DT continued to focus on resolving safety-of-flight issues required for airworthiness certification. These issues included the escape system, flight control software, high angle-of-attack portion of the flight envelope, propulsion, noise and vibration, and departure resistance.

Government-led DT in FY25 focused on wing flutter, flying qualities, aerodynamic structural loads, and initial mission systems test points. The program office identified a set of critical test data to assess in order to support the MS C low-rate initial production decision in 2QFY26. These data include high-angle-of-attack testing, structural design limit loads testing, and wing flutter to at least 500 knots calibrated air speed. The majority of the remaining test points in the government DT test plans, which include testing design loads, crew systems, On-Board Oxygen Generation System (OBOGS), and high-angle-of-attack testing, have the potential to drive further software and flight control changes. The program now projects that DT will be complete by 1QFY28, a delay from what was projected in the FY24 Annual Report.

In October 2024, the program conducted a final escape system study phase dynamic sled test, leading to the first escape system qualification tests in April and August 2025. In June 2025, the program completed the second cold and hot weather test event at

the McKinley Climatic Laboratory at Eglin AFB, Florida.

The Cyber Approving Official approved the T-7A Aircraft System Interim Authority to Test in March 2025. The program completed a mission-based risk assessment for cyber in June 2025, and completed a sixth adversarial cyber developmental test in the Boeing Systems Integration Laboratory in August 2025.

The Air Force Operational Test and Evaluation Center (AFOTEC) Detachment 5 provided operational feedback throughout Boeing's initial design efforts and early DT. As of FY24, AFOTEC published five periodic reports assessing progress towards operational effectiveness and suitability, with a total of 41 recommendations, 37 of which remain open. No additional periodic reports were completed in FY25. DOT&E concurs with AFOTEC's assessments and recommendations.

PERFORMANCE

» EFFECTIVENESS

Insufficient data are available at this time to provide an assessment of operational effectiveness of T-7A. The program appears to have a clear pathway to resolving known effectiveness issues, such as limited sortie duration and flight characteristics at high angles-of-attack, prior to MS C. In FY26, DOT&E will provide an observation report based on DT data to assess progress toward operational effectiveness and inform the MS C decision.

» SUITABILITY

Insufficient data are available at this time to provide an assessment of operational suitability of T-7A. The program continues to work through known suitability limitations, most notably regarding the aircraft escape system, logistics supportability issues, and Automatic Ground Collision Avoidance System (AGCAS).

As reported in the FY22 – 24 Annual Reports, the original T-7A emergency escape system did not meet minimum safety requirements for the Air Force's airworthiness certification. The current design began qualification testing with two high-speed sled tests of the canopy and ejection sequencer, and to date the Air Force has completed 17 of 22 dynamic test events. The program must successfully complete a total of five qualification sled test events under varied conditions before the escape system can be certified for airworthiness and IOT&E.

The program office also continued to make progress on the T-7A on Board Oxygen Generation System (OBOGS). The T-7A OBOGS DT will collect data over 10 ground and 100 hours of flight test events, including high and sustained-g maneuvering. DOT&E will evaluate OBOGS performance in accordance with the current military standards document (MIL-STD-3050A), which incorporates lessons learned from several fighter aircraft mishaps.

In FY26, DOT&E will provide an observation report based on DT data to assess progress toward operational suitability and inform the MS C decision.

» SURVIVABILITY

Insufficient data are available at this time to provide a survivability assessment of T-7A. In FY26, DOT&E will provide an observation report based on DT flight and cyber test data to assess progress toward operational survivability and inform the MS C decision.

RECOMMENDATIONS

As recommended in the FY24 Annual Report, the Air Force should:

1. Continue addressing AFOTEC's periodic report recommendations and make necessary design changes prior to the start of IOT&E.
2. Continue testing the emergency escape system and implement fixes as needed to meet minimum safety of flight requirements.
3. Complete the integration of the AGCAS capability to reduce safety risks.
4. Incorporate on-aircraft and data link cyber risk assessments during integrated testing and IOT&E.
5. Complete testing above Mach 0.95, prior to beginning IOT&E, for safety of flight.
6. Submit the MS C TEMP for DOT&E approval.