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The Air Force pilots of tomorrow may learn to fly inside the T-50A.



Lockheed Martin



By Eric Tegler Jun 21, 2016

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U.S. Air Force pilots fly the most advanced aircraft in the world. But they learn to fly on some seriously old planes.

Northrop's T-38 advanced jet trainer entered service in 1961. More than five decades later, the Air Force still operates about 400 that have been updated with heads-up (HUD) displays, GPS, and modern navigation systems. But the T-38 can't fly forever. Even now, it is no longer a practical trainer to prepare pilots for aircraft like the F-22 and F-35. According to the Air Force, 12 of 18 advanced pilot training tasks can't be completed with the T-38.

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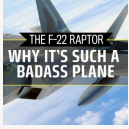
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That's why the service is on the hunt for a new trainer. It started the T-X program, and four industry teams have formed to compete for the contract. A Boeing/Saab team is putting forth an entirely new design, as is a Northrop Grumman-led group that includes BAE Systems. Raytheon and Finmeccanica are proposing an established design, the T-100, which is based on the Alenia Aermacchi M-346, an Italian trainer.



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Now Lockheed Martin and Korea Aerospace Industries (KAI) have teamed up to offer the T-50A, an airplane derived from the F-16 Fighting Falcon. The T-50A just completed its first flight test in South Korea this month.



Designed in the 1990s, the T-50 combines an airframe design similar to the F-16 with a flight control system descended directly from the Falcon. It debuted with the Republic of Korea Air Force in 2005. About 80 are currently in use training South Korean pilots.

The T-50 is smaller and lighter than the F-16 and has a different engine—General Electric's F404-102, which is derived from the F404 that powers older F/A-18 Hornets. Despite making less thrust (17,700 pounds) than the Falcon's engine, the F404 gives the T-50 performance on par with the F-16, according to Mark Ward, Lockheed Martin lead test pilot for the T-50A.



**T-50A**  
Lockheed Martin

Ward is a former Air Force F-16 tactical pilot and test pilot, later a Lockheed Martin test pilot for the F-16, and for the last five years has flown the F-35. He was also an instructor pilot in the T-38, which, he says, just can't give students the experience they need to get into new fighter aircraft. "The T-38's performance is closer to something like an F-4 Phantom in

terms of its flight control system, performance and handling. It's lacking in how it behaves compared to airplanes like the F-35 and F-22."



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Training pilots in a plane with F-16 DNA makes more sense, Ward argues. The flight control system is proven and reliable. The airframe aerodynamics are well understood. "You put those into the T-50A and you end up with an extremely reliable, high performance airplane that flies very similar in terms of control and engine response that you'd see in a fifth-generation airplane."

The T-50A that Lockheed is proposing for the Air Force shares the performance characteristics of the basic T-50: a top speed of about Mach 1.5, a 48,000-foot service ceiling, and approximately 1,150 miles of range. But Lockheed Martin adds new avionics including a HUD and a Large-Area-Avionics-Display (LAAD) very much like the one used in the F-35.

"We can program the screen any way the Air Force desires," Ward says. "One of the things we can do is essentially run a video game inside the airplane based on real-world data."



T-50A

Lockheed Martin

The LAAD can display a simulated tactical situation with accurate radar, infrared, and other target information displays—even though the T-50A doesn't have these sensors. Student pilots can then target simulated threats, dropping simulated weapons from a theoretical load of laser or GPS bombs. They can run through all the switches, buttons, and displays, getting a feel for operating a strike fighter for a fraction of the cost. Similarly, the T-50A's in-flight refueling capability (via a removable "dart pod" on the spine of the aircraft) could allow pilots to train for aerial refueling before they get into expensive single-seat F-35s and F-22s.

The Air Force plans to award a contract next year for 350 T-Xs to replace the T-38 starting in 2024. Lockheed faces some stiff competition, but as Ward says, "We believe we have a proven, reliable airplane that's ready to be used by the Air Force right now."

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