

# Lockheed Martin Completes First Phase Of Flight Testing Of The F-16 Conformal Fuel Tanks

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Lockheed Martin Aeronautics Company recently completed the first phase of flight testing of its new conformal fuel tanks (CFTs) for its F-16 multirole fighter.

Flight testing with aerodynamic shapes was conducted on an F-16C at Eglin Air Force Base, Fla., from March through August. A total of 24 test flights and 65 flight test hours were accomplished, and testing involved loads, flutter, and stability and control.

"Lockheed Martin has made a substantial investment in CFTs for our advanced F-16 versions," said Donald W. Jones, vice president of F-16 Programs. "We have done this in response to international market demands for more range and payload. CFTs have become a very popular option in recent orders and new business pursuits."

Lockheed Martin began F-16 flight demonstration of an initial CFT shape in 1994 to investigate performance and handling quality characteristics. Subsequent wind tunnel testing led to the current external lines, which were initially validated in flight testing of high angle-of-attack handling characteristics at Edwards AFB, Calif., last year.

"The flying qualities of the F-16 with CFTs are essentially unchanged when compared to a non-CFT equipped airplane," said Stephen W. Barter, chief F-16 test pilot and company CFT project pilot. "For most combat flight conditions, it's as if the CFTs are not even there. The surest way for me to tell if CFTs are installed is to look over my shoulder."

"The CFTs have very little adverse affect on the F-16's renowned performance," said Maj. Timothy S. McDonald, U.S. Air Force project pilot for CFT testing at Eglin. "The aircraft retains its full 9-g capability and flight envelope with the CFTs installed. The drag impact is very small -- less than one percent in combat configuration at cruise conditions."

Barter and McDonald will be presenting results of the CFT flight testing at the annual Society of Experimental Test Pilots symposium in September in Los Angeles.

A shipset of two CFTs provide a total of 440 U.S. gal, or approximately 3,000 lbs of additional fuel for the F-16. The extra fuel can significantly extend mission range, time on station or time engaged in combat. This range/persistence enhancement is very valuable for countries that do not have tankers for aerial refueling. For countries that do have tankers, CFTs can reduce the tanker offload demand and extend the fighter's penetration distance.

CFTs also increase the F-16's payload flexibility. For medium range air- to-surface missions, CFTs can eliminate the need for wing tanks. This allows doubling the F-16's primary weapon capacity and flying with two, rather than one, types of large weapons in a balanced configuration.

F-16 CFTs are located on the upper fuselage surface, which significantly reduces stores recertification requirements and the associated costs. The upper surface arrangement allows the CFTs to be relatively light weight because nothing is suspended from them. The CFTs do not interfere with daily inspections and servicing and can be removed or installed in about two hours.

"The F-16 CFT testing at the Air Armament Center at Eglin was a unique arrangement," said Rich Beausoleil, lead USAF test engineer for the project at Eglin. "Most of what we do here is weapons development and testing for stores certification for the U.S. Air Force. But in this case, we were the contractor to Lockheed Martin for a system that is designed for foreign F-16 sales. We had an excellent working relationship with our industry teammates on this project."

"We were very pleased with the results of the flight testing of our production design," said Thomas H. Clark, F-16 CFT program manager at LM Aero. "We have validated our design, analysis, and wind

tunnel testing. The CFTs are meeting or exceeding our every expectation.

"The expertise of the Eglin test center staff was indispensable and the teamwork has been extraordinary. The quality of the Air Force test facilities and services at Eglin are top notch, and we intend to use them again in the next phase of CFT flight testing."

The test aircraft has been returned to Fort Worth and has been fitted with the first functional set of CFTs. Ground systems testing of fuel transfer will begin this month, and functional flight testing is scheduled to begin in late October. Flight testing will be conducted at both Fort Worth and Eglin.

The F-16, the world's most sought-after fighter, is the choice of 23 countries, counting recent announcements by Chile and Oman. More than 4,000 aircraft have been delivered; hundreds more will be delivered to Egypt, the United States, Israel, Greece, the United Arab Emirates, Korea and Singapore; and production is expected to continue beyond 2010. Major upgrades for all F-16 versions are being incorporated to keep the fleet modern and fully supportable over the aircraft's long service life.

Lockheed Martin Aeronautics Company is a leader in the design, development, systems integration, production and support of advanced military aircraft and related technologies. Its customers include the military services of the United States and allied countries throughout the world. Products include the F-22, F-16, F-117, C-5, C-27J, C-130, P-3 and U-2. The company leads a team competing for the development and production of the Joint Strike Fighter.

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