

## Fighter Engine Bio-Fuel Testing Underway

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ARNOLD AIR FORCE BASE, TN – An F110 engine that powers the F-16 Fighting Falcon began performance testing June 18 here at Arnold Engineering Development Center using a 50/50 blend of JP-8 conventional aviation fuel and a bio-fuel derived from the oil contained in the seed of the camelina plant, commonly known as false or wild flax.

"The testing recently initiated at AEDC will be the first dedicated, uninstalled engine tests conducted by the Air Force [on Hydro-processed Renewable Jet blended fuel]," said Jeff Braun, the Air Force's Alternative Fuels Certification Office director. "These will also be the first engine tests conducted by the Air Force [on HRJ blended fuel] in a facility that can simulate altitude effects on the aircraft. The data produced will be very, very valuable in this program. In fact, we plan on using that data to justify and support upcoming flight tests of the F-22, the C-17 and then possibly even the F-15."

This test supports the bio-fuels certification effort of this field engine, said 1st Lt. Antonio Brunson, 717th Test Squadron program manager for the first phase of the test.

Testing will simulate the overall engine conditions experienced in the full flight envelope and include ignition light-off, throttle transients, augments lights and sequencing along with screech and rumble monitoring.

Military aircraft engines operate with afterburners to enhance thrust, but these can create large unsteady pressure oscillations termed "screech" and "rumble," which can damage the afterburner structure.

Lieutenant Brunson, who also was the project manager on earlier 50/50 synthetic fuel and JP-8 testing on military jet engines at AEDC, said he is excited about the test underway.

"In my opinion, this is going to be the future of the Air Force -- alternative fuels -- so being able to have a role in that early on means a lot to me," he said.

Mr. Braun agrees that alternative fuels are important to the Air Force.

"AEDC is producing the baseline data that enables us to go forward and prove that these fuels are viable fleet-wide for the Air Force," he said. "We purposefully picked the F110 and F100 because they are what we consider the most challenging and the most fleet-representative engines across the Air Force. Our strategy is to have the engines tested and certified using AEDC's facilities and then use that data to support any other actual flight testing that we conduct within the Air Force.

"AEDC has done a terrific job for us," Mr. Braun added. "I can't stress enough that the data we get from using Arnold's engine test cells just goes miles as far as providing confidence to the aircraft community. That's why



Arnold Engineering Development Center engineers recently began testing the engine for most U.S. Air Force F-16s on a 50/50 mix of standard aviation fuel and a bio-fuel derived from the camelina seed. (U.S. Air Force photo)

we work so hard at structuring these tests and maintaining our schedule. Any delays would have serious ripple effect through the entire fleet-wide certification effort."

The longer term plan depends on testing like that done at AEDC, said David Dickey, the lead systems engineer for propulsion in the Alternative Fuels Certification Office at Wright Patterson AFB, Ohio, and the AFCCO program manager for AEDC's current synthetic fuels testing.

"The goal is to complete certification of the Air Force fleet for unrestricted use of the HRJ blend by the end of 2012," he said. "It is expected that the F-16, along with the rest of the Air Force fleet, will be certified on the basis of the verification and validation provided by all of the data generated from the HRJ certification analysis and test program. Once certified, all aircraft, including the F-16, will be able to use the HRJ blended fuel for unrestricted operations."

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