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NASA and Partners Testing Coal and Gas F-T Synthetic Jet Fuels at 100% and 50% Blend

The National Aeronautic and Space Administration (NASA) and 11 other research groups, including researchers from the US Department of Defense (DoD), Federal Aviation Administration (FAA), and the Environmental Protection Agency (EPA), are testing two synthetic jet fuels derived from gasified coal and natural gas using the Fischer-Tropsch process (Jet CTL and GTL).

The tests for the Alternative Aviation Fuel Experiment (AAFEX) are being run through 3 Feb at NASA's Dryden Flight Research Center in California, and are measuring the performance and emissions of the two fuels.

A DC-8 based at Dryden in Edwards, Calif., is the test vehicle because its engine operations are well-documented and well-understood. The airplane remains on the ground for the tests. Researchers are testing 100% synthetic fuels and 50-50 blends of synthetics and regular jet fuel. Almost all previous testing has considered only blends. Researchers are looking primarily at engine performance and aircraft emissions.

We're starting to look at just what comes out of the tailpipe of a commercial aircraft [that is burning alternative fuels]. — Bruce Anderson, NASA Langley Research Center and project scientist for AAFEX

It is thought that synthetic fuels create fewer particles and other harmful emissions than standard jet fuel. If this is found to be true, use of synthetic fuels could improve the air quality around airports.

The tests are using sampling probes placed downstream from the DC-8's right inboard engine. Researchers examine the plume chemistry and particle evolution to compare it to that of standard jet fuel.

Some companies have tried out synthetic fuels in proprietary tests. Unlike those, the results of these NASA tests will be in the public domain because researchers are obtaining them with a NASA plane.

We're still very much in the early research stage. [But] we know in the future these fuels are going to become important to aviation. Petroleum is dwindling and you're going to need to make fuel out of coal, natural gas and biomass. — Dan Bulzan, NASA Glenn Research Center and AAFEX project manager

The AAFEX tests are funded and managed by NASA's Fundamental Aeronautics Program, which is part of the agency's Aeronautics Research Mission Directorate in Washington, DC. The participating research groups include three other government agencies, five companies and three universities.



Sampling tubing and instrumentation control cables laid out on the pavement beside NASA's DC-8 flying laboratory in between synthetic fuels emission and engine performance tests at the Dryden Aircraft Operations Facility in Palmdale, Calif. Credit: Tom Tschida, NASA.