

Air Force Takes Step Toward Cleaner Fuel

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WRIGHT-PATTERSON AIR FORCE BASE, OHIO -- As the aviation community looks to a future of independence from non-renewable energy sources, the Air Force is making historic strides in alternative fuels that will bring about positive economic and environmental outcomes.

Three Air Force Materiel Command fuels experts at Wright-Patt were on hand Tuesday for a DOD Live Bloggers Roundtable to discuss the March 25 first flight of an A-10C Thunderbolt II powered on a blend of Hydro-treated Renewable Jet biofuel, or HRJ, and JP-8.

The panel included Jeff Braun, director of the USAF Alternative Fuels Certification Office, Dr. Tim Edwards, a senior chemical engineer with the Air Force Research Laboratory's Propulsion Directorate and Betty Rodriguez, chief engineer for the Alternative Fuels Certification Offices.

"Last week's flight demonstration is a small step in a much broader test effort that the Air Force has undertaken to certify a family of biomass-derived fuel," said Mr. Braun.

The Air Force burns about the annual fuel equivalent of a mid-sized commercial airline and Doctor Edwards said the service is working jointly with the Commercial Aviation Alternative Fuel Initiative or CAAFI, on biofuels development. As the largest consumer of jet fuel in the DOD, the Air Force uses 2.4 billion gallons per year. The goal is to switch half of the continental U.S. jet fuel requirement to alternative fuels by 2016.

But the fuel blend which was tested in the A-10, derived from a plant called camelina, is not the only option for HRJs. Mr. Braun said HRJ fuels can be derived from a wide number of plant oils and animal fats.

"There's any number of different feedstocks that can be used to manufacture the fuel," he said. Feedstocks may be a regional commodity. For example, algae is currently produced in Arizona and Hawaii, animal fats from a food processing plant in Louisiana and camelina crops are grown in the Montana area.

"The Air Force intends to use fuels that are cost-competitive with petroleum fuels," said Mr. Braun. "Our hope is that once we complete our testing and we demonstrate that the fuel can in fact be used not only in military applications but also in commercial applications that it would generate additional production," Mr. Braun said.

Once industry responds to commercial airline and military demand for biofuels, supply and production efficiencies will make it as affordable as petroleum-based jet fuel. As it turns out, the cost of developing biomass fuels comes from the feedstock and not necessarily the refining process.

Private industry producers are already gearing up to fulfill the expected interest in HRJ fuels.

"Tyson/Syntroleum have announced a plant down in Geismar, La. that's going to take animal fat from Tyson's operations down there and make either this type of HRJ jet fuel or a green diesel fuel," said Doctor Edwards. "There was an announcement a month or two ago about a consortium called AltAir Fuels that was going to build an HRJ plant near a refinery in Washington state."



Quality Assurance Specialist James LaFave at the Air Force Petroleum Office cleans a distillation flask after working with JP-8 fuel. A DOD Live Bloggers Roundtable held March 25 featured AFMC experts who discussed the first test flight of an A-10C Thunderbolt II powered by a blend of Hydro-treated Renewable Jet biofuel and JP-8 at Eglin AFB, Fla. (U.S. Air Force photo/Bonnie White)



One of the areas that is getting a huge amount of money is algae. Doctor Edwards said that HRJ fuels can also be made from algae oils. "Where we have gotten our hands on algae oil we've proven that those fuels are pretty much the same as the camelina fuel that we flew on last week." And it doesn't stop there. "Actually most of our work with HRJ is coming to a close," said Doctor Edwards. "We're doing a lot of work now looking beyond HRJ -- what's next, what type of processes can we bring in."

"Some of the fuels beyond HRJ, like the fuels made from forest waste or agricultural waste have a really good potential environmental cost-to-benefit ratio," said Doctor Edwards, "and some of those look like they have the potential to contribute before 2016."

Following another demonstration flight with an F-15 and static engine tests at Arnold AFB, Tenn, the plan is to conduct a full-blown certification test efforts with "Pathfinders."

"We're going to use the C-17 aircraft to represent the mobility fleet. That is tentatively scheduled to kick off in late summer out at Edwards Air Force Base," said Mr. Braun.

Later in the fall, an F-22 Raptor will serve as the pathfinder for the entire fighter fleet. Mr. Braun added that they are considering a third Pathfinder program, which would evaluate the fuel in extreme environments.

"We're trying to get the Global Hawk on board to do a certification using that platform. It's probably worst-case environment as far as temperature and altitude," said Mr. Braun. The intent is to be able to drop in a 50/50 blend of JP-8 and HRJ without any modification to systems or fuel infrastructure, Mr. Braun said.

The certification program will apply to other platforms that burn JP-8 in wartime, such as Remotely Piloted Vehicles, Humvees, even power generators. "If we're going to call it JP-8, it has to be able to perform as equal in all the platforms that have been certified to use JP-8," said Ms. Rodriguez.

It should be noted that research into alternative fuels is only one part of the Air Forces' plan to reduce dependency on oil. "There is a lot of work going on in reducing demand also, which is not our area of expertise," said Doctor Edwards "but I should mention the Air Force is probably spending more money on the reduced demand side, looking at advanced engines, things like that. So there are a lot of areas where energy is being worked very hard in the Air Force.

"We're at the cutting edge of alternative fuels," said Ms. Rodriguez. "Everybody's really pulling in to make this a success."

Source: <http://www.afmc.af.mil/news/story.asp?id=123198112>