

## **EADS Sets First Public Algae-Biofuel Flight At ILA Berlin**

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BERLIN — EADS will make the world's first public flight of an aircraft with an engine powered solely by third-generation algae-derived biofuel here at ILA.

A Diamond DA42 with Austro Engine AE300 diesel powerplants has been flying for a couple of weeks with one engine using 100% biofuel, while the other burns regular kerosene jet fuel. The aircraft is operated jointly by EADS Innovation Works and Diamond Aircraft.

"All other demonstrations with third-generation biofuel have been done with blends," EADS research and technology chief Jean Botti told Aviation Week's Show News. "This is the first time anyone has done it with 100% biofuel."

Bench tests with algae biofuel in the AE300 engine indicate fuel savings of 5-10% over kerosene as the biofuel burns more efficiently. "We were amazed that it had better combustion than kerosene," said Botti, who added that engineers had to recalibrate the fuel injection system to restrain engine power within its certificated limits.

Plans call for certifying the AE300 to run on biofuel, and the program has secured 2,000 liters of the algae fuel to achieve that goal.

EADS Innovation Works — the corporate research and technology arm of EADS — is hoping to prove that algae-derived biofuel, which is free from NOX-producing nitrogen and sulfur, is a viable replacement for jet fuel. "So far we've found no undesirable characteristics," says Botti. It could even replace gasoline, he added.

Because "there is no Plan B" for a sustainable, ecologically viable replacement for petroleum-based jet fuel, Botti says EADS has set out to create one.

Botti and EADS are convinced the answer is algae-based biofuels. Its advantages are that it doesn't compete with food for land and water, and it might prove to be the first synthetic fuel that doesn't create more carbon dioxide in its manufacture than it saves in emissions.

EADS has embarked on a mission to prove the viability of algae-based biofuels. Initial trials in the Diamond DA42 test aircraft will be expanded to a larger scale, and collaboration is sought with Airbus, Boeing and the aerospace industry to establish common standards for the fuel.

"We're hoping to generate a snowball effect," said Botti. "This could be the perfect Plan B."

EADS, he added, has no plans to grow algae or refine them into oil, and has no desire to participate in the biofuel market. It is, however, working with partners on a pilot project to develop the necessary industrial infrastructure to achieve the economies of scale from mass production needed to make algae fuel commercially viable.

Here at ILA, EADS is showing a containerized photo-bioreactor made by IGV GmbH as an example of an advanced algae cultivation system. Another exhibit explains the process chain from live algae fed

with carbon dioxide through harvesting, drying, oil extraction and refining to the biofuel used by future aircraft.

Botti explained that algae is a much more efficient fuel base than, for example, the jatropha weed demonstrated in second-generation biofuels. To replace 10% of the world's kerosene needs in 2025-30 would require 100,000 sq km of jatropha farms versus 6,000 sq km of algae beds—a factor of 20, he said. Algae can be grown in salty or dirty water, and require a lot of CO<sub>2</sub>. "One ton of algae needs 1.8 tons of CO<sub>2</sub>; that means we can use CO<sub>2</sub> emitted by factories to feed the algae and perhaps establish a CO<sub>2</sub> equilibrium with a net effect of zero. The question is can we achieve it?"

Algae can also be grown in 3D in industrial plants near CO<sub>2</sub> emitting factories, like the conceptual one shown here at ILA. This eliminates the need to transport huge amounts of biomass to refineries as demanded by second-generation biofuels.

[http://www.aviationweek.com/aw/generic/story\\_generic.jsp?topicName=ila\\_2010&id=news/awx/2010/06/07/awx\\_06\\_07\\_2010\\_p0232525.xml&headline=EADS%20Sets%20First%20Public%20AlgaeBiofuel%20Flight%20At%20ILA%20Berlin](http://www.aviationweek.com/aw/generic/story_generic.jsp?topicName=ila_2010&id=news/awx/2010/06/07/awx_06_07_2010_p0232525.xml&headline=EADS%20Sets%20First%20Public%20AlgaeBiofuel%20Flight%20At%20ILA%20Berlin)