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Antares shows off its unique abilities at ILA 2010

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By Manuela Braun

On the way to the airfield

Antares is an elegant motorised glider – the only aircraft in the world capable of taking off using power from fuel cells alone. An idea conceived at DLR Hamburg just two years ago, it flew at the Berlin Air Show, ILA, for the first time on 8 June 2010.

Two years ago, during the previous ILA, the glider was still in the making. The concept was born at DLR Stuttgart in November 2007, and the official contract for the project was signed in March 2008. The plane was built by April 2009 – an incredible speed for a project of this kind – and the first flight was conducted in May 2009.

Antares' ability to take off powered only by fuel cells is what makes it unique. We asked Project Manager Josef Kallo, Head of Electrochemical Systems at the DLR Institute of Technical Thermodynamics in Stuttgart, and he told us that Antares has no competition.

Changing a tyre

In aircraft powered by a conventional piston engine, energy is released by combustion of the fuel, and then translated into movement. This movement turns the engine and propels the aircraft. The efficiency of this process (converting fuel into usable energy) is limited to about 28 percent. Conventional aircraft powered by fossil fuels typically only use between 18 and 25 percent of the energy in the fuel for propulsion.

Antares is powered by a hydrogen fuel cell. An electrochemical reaction takes place in this fuel cell, combining the hydrogen with oxygen from the atmosphere to produce water and electricity. This electricity powers the motor directly. The efficiency of this direct process is 42-43 percent, much higher than that of a conventional piston engine.

Pilot Axel Lange and Project Manager Josef Kallo

As long as its hydrogen fuel comes from a renewable source, Antares is carbon-neutral, releasing only water vapour into the atmosphere. It also emits no particulates – another advantage compared to conventional aircraft engines. The aircraft itself is extremely lightweight, being made primarily of carbon-fibre reinforced composite materials.

Antares completed its first flight at ILA on the morning of 8 June, to obtain approvals for the first official flight at ILA later that afternoon. Routine checks were performed that morning and the fuel cells were allowed to warm up before the flight began. Antares climbed to roughly 100 metres during its first ILA approval flight.

Antares and the Airbus A380

For the pilot, sitting in Antares is comparable to sitting on a recumbent bike. The flight control layout is also somewhat unusual.

The glider can normally soar to 1500–2000 metres, although the team are confident that 3000 metres poses no challenge. Until now, Antares has flown about 10 to 12 flights in all, 7 or 8 of which have been test flights.

Dr Kallo shared with us the plans for the next generation. The team is working on a fuel cell hybrid. This next generation plane will be more powerful, with the capacity to take on a wider range of missions while remaining carbon-neutral.

Related Contacts

Manuela Braun
Deutsches Zentrum für Luft- und Raumfahrt (DLR) - German Aerospace Center
Corporate Communications
Tel: +49 2203 601-3882
Fax: +49 2203 601-3249
E-Mail: manuela.braun@dlr.de

Prof. Dr.-Ing. Josef Kallo
German Aerospace Center
Institute of Engineering Thermodynamics, Energy System Integration
Tel: +49 711 6862-672
Fax: +49 711 6862-747
E-Mail: Josef.Kallo@dlr.de

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