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Antares H3: DLR and Lange Aviation develop the next generation of fuel-cell powered aircraft

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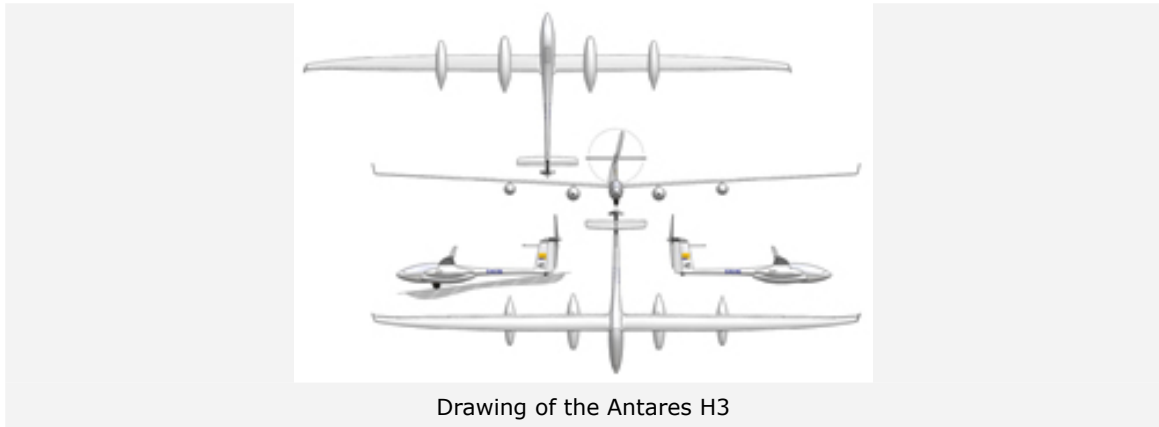
The Antares H3 – a next-generation fuel-cell powered aircraft

The German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) is developing the Antares H3 in cooperation with Lange Research Aircraft GmbH. The Antares H3 is a higher-performance successor of the Antares DLR-H2, the world's first piloted aircraft capable of performing a complete flight powered by fuel cells alone. The Antares H3 will set new range and endurance benchmarks. The project started in August 2010 and the first flight is scheduled to take place in 2011.

Technically, the new aircraft is based upon the Antares 20E as well as the fuel-cell powered Antares DLR-H2. The Lange Aviation Antares 20E is a self-launching motorised glider with battery-powered electrical propulsion, which has been in series production since 2004. The fuel cells, which replace the batteries, use hydrogen as fuel. The hydrogen is transformed into electrical energy in a direct and non-combustive electrochemical reaction with oxygen taken from the surrounding air. The only reaction product is water. The aircraft flies carbon dioxide-neutral, if the hydrogen is created using energy from a renewable source.

6000-kilometer range using fuel cells

In 2010, the project partners tested how fuel cells perform in aviation using a flying test-bed, the Antares DLR-H2. During one of these tests, an altitude record of 2560 metres was set. The Antares H3 will demonstrate significantly increased performance – the developers plan to achieve a range of up to 6000 kilometres and endurance of more than 50 hours. For the Antares H2, these values were 700 kilometres and 5 hours respectively. The aircraft will have a wingspan of 23 metres, a maximum takeoff weight of 1.25 metric tons, and it will carry payloads of up to 200 kilograms. The aircraft will use four external pods to house the fuel cells and fuel.



"The fuel-cell powered Antares flies carbon dioxide-neutral, and emits significantly less noise than other comparable motorised gliders. It represents a new milestone in the area of efficient, emission-free energy transformation," said Dr Josef Kallo, Head of Electrochemical Systems at DLR's Institute of Technical Thermodynamics (Institut für Technische Thermodynamik). "We will continue to expand our partnership with Lange Research Aircraft over the next three years," Dr Kallo added.

The institute, which is located in Stuttgart, will assemble the modular fuel-cell system and perform the technical evaluation. Lange Research Aircraft GmbH is responsible for the overall integration and for operating the aircraft. The project is being supported by the German Federal Ministry of Transport, Building and Urban Development (Bundesministerium für Verkehr, Bau und Stadtentwicklung; BMVBS) in the framework of a national innovation programme for hydrogen and fuel cell technology (Nationale Innovationsprogramm Wasserstoff- und Brennstoffzellentechnologie).

"The efficiency, dynamics and endurance of Antares set new benchmarks in the area of aviation systems. This opens up completely new applications," explained Axel Lange, CEO of Lange Research Aircraft GmbH. The optimised flight qualities and the simple handling will allow the Antares to fly both piloted and, at a later point in the development, unmanned. As an unmanned aerial vehicle, the Antares H3 could perform numerous tasks, for example, Earth observation and surveying. As a first cooperative step towards a commercial product, the developers at Lange and DLR have set their sights on the maiden flight, which is planned for 2011.



Axel Lange und Josef Kallo mit der Antares DLR-H2

The project partners

The German Aerospace Center, DLR, researches innovative energy supply systems for aviation. DLR's Institute of Technical Thermodynamics was responsible for the fuel-cell system for the Antares DLR-H2. DLR is also developing fuel-cell systems intended to replace the current generation of auxiliary power units in airliners such as the Airbus A320.

Lange Research Aircraft GmbH is a high-tech enterprise which cooperates closely with Lange Aviation GmbH. Lange Aviation GmbH was founded in 1996, and employs more than 30 people. The company develops, builds and distributes both motorised and conventional gliders. In 2009, the company, in cooperation with DLR, developed the Antares DLR-H2, the world's first aircraft capable of performing a complete flight on fuel-cell power alone.

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