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Antares DLR-H2 fuel cell aircraft presented at Stuttgart Airport

30 September 2008



Presentation of the Antares DLR-H2 fuel cell aircraft

Powerful, quiet, clean and multifunctional - aviation meets the fuel cell. On Tuesday 30 September 2008, the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) presented the world's first self-launching piloted aircraft with fuel cell propulsion at Stuttgart Airport, in the presence of Prime Minister Günther H. Oettinger of Baden-Württemberg. The Antares DLR-H2 flying test bed was developed by the DLR Institute of Technical Thermodynamics (DLR-Institut für Technische Thermodynamik) together with Lange Aviation GmbH. The aircraft's maiden flight will take place before the end of this year - powered by energy from its own on-board fuel cell system. Until 14 October 2008, visitors can see the aircraft, together with an accompanying exhibition about the future of fuel cells in aviation, in the entrance hall of Terminal 1.

"With the Antares DLR-H2, DLR and Lange Aviation have created a technology platform that will significantly advance the use of fuel cells in aviation", said Professor Dr Joachim Szodrich, the DLR Executive Board member responsible for aeronautics, underlining the importance of this research project. After the opening address by Professor Georg Fundel, Managing Director of Flughafen Stuttgart GmbH, Prime Minister Günther H. Oettinger congratulated all parties responsible for and involved in this "highly ambitious joint project by Baden-Württemberg and the Rhineland Palatinate".



Antares DLR-H2 approaching Stuttgart Airport

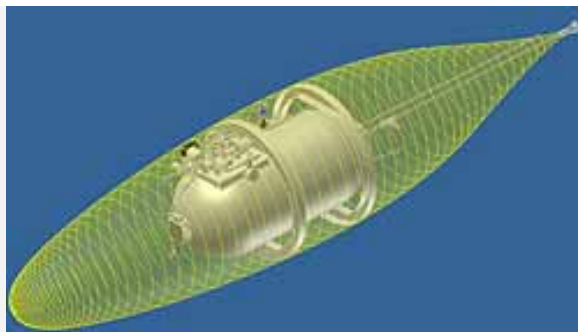
Reliable on-board power supply for civil aviation

The Prime Minister expressed his delight at having a leading research institution in Baden-Württemberg that is dedicated to investigating sustainable energy technologies and thereby protecting the climate and the environment for the sake of future generations. "Both inside Germany and abroad, we are at the threshold of a new era of technological leaps and innovations. The central driving force for these developments is formed by the challenges of environmental and climate protection, but also those posed by the limited availability of natural resources on our planet." According to Mr Oettinger, this motivated Baden-Württemberg to strategically support and extend research into and development of fuel cell technology.

DLR's research is aimed at the deployment of fuel cells as reliable on-board power supply for civil aviation. "In this context, the fuel cell is an important alternative for the energy delivery systems used at the moment", said Professor Dr Hans Müller-Steinhagen, Head of the DLR Institute of Technical Thermodynamics. The fuel cell combines high efficiency with low pollutant emission, safe aircraft operation and increased passenger comfort.

Animation: Antares DLR-H2 (Video: DLR/Lange Aviation)

Cooperation between DLR and Lange Aviation

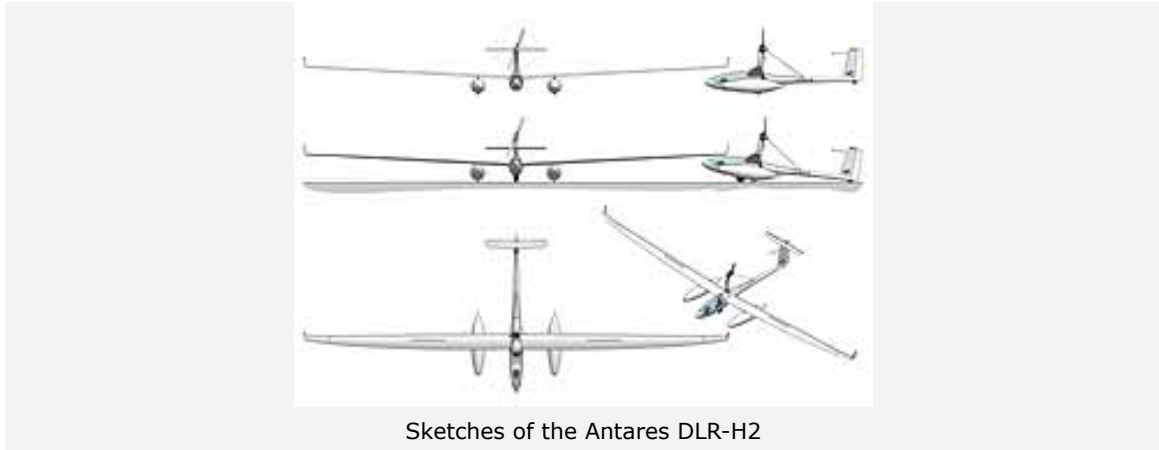


Hydrogen pressure tank of the Antares DLR-H2

The Antares DLR-H2 flying high-tech test bed, developed in cooperation with Lange Aviation, provides a cost-efficient test platform for the development of fuel cell systems for use in aviation. It is based on the single-seat Antares 20E motorglider built by Lange. It has a wingspan of 20 metres and it weighs 660 kilogrammes. A fuel cell system, specially prepared by the DLR Institute of Technical Thermodynamics, is used as the primary propulsive energy source for the Antares DLR-H2. Together with the hydrogen tank, it is fitted in two additional external pods underneath the wings, which have been strengthened for this purpose. It supplies the electrical energy for the powertrain developed by Lange Aviation, which consists of power electronics, motor and propeller.

"The advantages of using fuel cells in aviation lie in the fact that they generate electricity with a high level of efficiency and low emission levels", explains Professor Dr Josef Kallo, project manager at the DLR Institute of Technical Thermodynamics. "The basic process taking place inside a fuel cell, the electrochemical oxidation of hydrogen, proceeds without generating noise and vibrations - this makes

them even more useful." A special feature of fuel cell systems for use in aviation is their multifunctionality: In addition to generating energy, fuel cells also yield other products and advantages that can be put to use in the aircraft, such as the water that is produced in the electrochemical reaction. This makes it possible to carry substantially less water on board at takeoff. The exhaust air, which is very low on oxygen when it leaves the fuel cell, is also used in an innovative way. It is ideally suited to reduce the flammability of the kerosene-air mixture in the tank, thereby enhancing the aircraft's operational safety.



Sketches of the Antares DLR-H2

As a technology platform, the Antares DLR-H2 optimises the test time of DLR's Airbus A320 ATRA research aircraft (Advanced Technology Research Aircraft), as its fuel cell system is roughly identical to the on-board energy supply system used in wide-body aircraft. For more than five years already, the Stuttgart-based DLR Institute of Technical Thermodynamics and Airbus Deutschland GmbH have been working together in a strategic partnership, investigating the applicability of fuel cell systems in aircraft. In the ATRA, the two project partners successfully implemented a fuel cell system as the auxiliary power supply for the hydraulic pumps of the aircraft's control system. As a next step, the permanent deployment of a fuel cell system as on-board power supply is envisioned. On 29 September 2008, DLR and Airbus received the silver f-cell award 2008 for their research into fuel cell technology in aviation.

DLR's companion exhibition on fuel cell technology in aviation

In an accompanying exhibition in Terminal 1 (level 4) at Stuttgart Airport, DLR presents the advantages of using fuel cell technology in passenger aircraft. Opening hours are 9am - 6pm daily.

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