



PRESS RELEASE

(Seville, January 2020)

Launch of HEAVEN, an FCH2 JU research project that will allow zero-emissions long-range flights powered by cryogenic hydrogen.

The aviation industries ambitious goals demand for a reduction of greenhouse gases and noise. To that end, all aircraft and equipment manufacturers are embarked in the current environmental-friendly trend towards *All Electric Aircraft*, in which the traditional hydraulic and pneumatic systems are replaced by electrically driven systems that offer higher performance and reliability, combined with lower operating costs. These manufacturers are indeed also seeking a reduction of greenhouse gas emissions through a strong reduction of fuel consumption by introducing electric power supplies using non-fossil fuel as an alternative for propulsion aircraft system.

While state-of-art battery technology does not provide the necessary energy for realistic missions and hybrid drive technologies based on combustion engines are not emission-free, fuel cell technology achieves enough energy densities without emitting pollutants. However, the power generation by the FC currently used in the aviation sector and storage of the required hydrogen are also a challenge.

HY4 demonstrator

During the NASA Green flight challenge the competing Pipistrel-built, battery-powered Taurus G4 (from which the HY4 aircraft was developed) had to fly 200 miles with a reserve of 30 minutes.. Including the reserve that is a total range of about 400km. The HEAVEN drivetrain developed, based on high power fuel cell and **cryogenic hydrogen storage technology**, will supersede this range by far. The energy available will be enough for roughly **12 hours of flight, equaling a range of approximately 1800km**. This feature allows meeting the most basic requirement of transport aviation and can thus be viewed as a key enabler for electric propulsion.

Scalability to other aircraft models up to 19 PAX and extrapolation to UAV applications

The systems designed within the HEAVEN project is being built up over a modular architecture so that they can be then scale-up then to other sizes of aircrafts and UAV applications, which allow emission-free regional air mobility, providing an autonomy range of **more than 800 kilometers** and for up to **19 passengers**.

The technology developments will be also complemented with safety and regulation analysis and enriched with economic and business assessments producing estimations of the total



cost of ownership for the entire life cycle of the technology and business plan for the deployment of the technology in different aeronautics applications.

HEAVEN PROJECT

HEAVEN (High powEr density FC System for Aerial Passenger VEHicle fueled by liquid HydrogeN) is a collaborative research project awarded 3,9MEuro funding from the Fuel Cells and Hydrogen 2 Joint Undertaking under the European Horizon 2020 framework programme for Research and Innovation.

Starting in January 2019 and lasting 4 years, the project is coordinated by Ayesa Foundation and brings together a multidisciplinary team with complementary expertise of leading experts and key stakeholders covering the necessary disciplines of fuel cell technology, H₂ tank technology, FC-aircraft integration, UAVs applications developers, testing and system integration.

HEAVEN CONSORTIUM

A European collaborative research project consolidated consortium is behind all this. Representing 4 EU countries, made of 6 organisations and composed of key industrial actors, top level research organizations and SMEs that will bring together their previous experiences and synergies of the project:

Ayesa Foundation – FAY (Spain)

With a deep experience in manufacturing engineering, industrial process or LEAN manufacturing for aeronautical industry, this Spanish industrial entity leads the project coordination.

Air Liquid Advanced Technologies – ALAT (France)

World leader in high technologies in the field of gas, ALAT has for mission to develop the know-how in environments with strong technological contents. The competences of ALAT's team have been built over the years around an alliance between experts in gases and experts in specialized area such as Space, Aerospace, Cryogenics and Hydrogen mobility.

ElringKlinger – EK (Germany)

As an automotive supplier, ElringKlinger has become a trusted partner to vehicle manufacturers – with a firm commitment to shaping the future of mobility. Be it optimized combustion engines, high-performance hybrids, or environmentally friendly battery and fuel cell technology, ElringKlinger provides innovative solutions for all types of drive systems.

DLR (Germany)

DLR is Germany's national research centre for aeronautics and space. The Institute of Engineering Thermodynamics conducts renewable energy research and technology development for efficient and environmentally clean energy conversion and utilization. Activities are oriented to basic research, laboratory and prototype development, as well as design and testing of plants for demonstration purposes with specialization in highly efficient



energy conversion technologies and the accelerated market penetration of sustainable energy carriers.

H2FLY

The H2Fly GmbH is set up with the intention to accelerate the realization and demonstration of the emission free fuel cell technology for aircraft applications and the propagation of the emission free flight idea to the public. For this the H2Fly GmbH has become the owner of the Taurus G4 parts to assemble the twin fuselage Aircraft HY4 to be used for R&D project activities. So the aircraft is used for the main business activity of H2Fly GmbH which is the provision of the new developing Aircraft as a test platform which will be used to test (on ground and in flight) newly developed components and systems needed for the realization of electric flight.

PIPISTREL VERTICAL SOLUTIONS – PVS (Slovenia)

Pipistrel Vertical solutions is an R&D activity in field of aerodynamics, airborne electronic hardware and software, structures, CAD design, mechanical design, rapid prototyping, electronics design, structural and flight testing. The company is known for the extremely energy efficiency aircraft and for the pioneering role in electric aviation – it is the only company in the world having two different electric aircraft on the market.

PROJECT CONTACT

PROJECT COORDINATOR

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SOCIAL MEDIA

More information on the project is available on: <https://heaven-fch-project.eu/>

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