

Press Release

FEV presents hydrogen-adapted aviation engine at Paris Air Show

Saint-Quentin-En-Yvelines, June 2023 - FEV, a globally leading provider of engineering, development, testing and consulting services for the sustainable, intelligent mobility and clean energy markets, has successfully converted a light aviation engine to hydrogen in collaboration with seven partners from the NAE Cluster of Excellence. The technology demonstrator was shown earlier this month at the world-renowned Paris Air Show.

For over 40 years, FEV has been working on multi-energy combustion engines and currently has numerous hydrogen projects are underway, involving both fuel cell and hydrogen combustion technologies. Building on its experience and commitment to innovation, FEV recently completed the engineering of a 100% hydrogen combustion engine for light aviation, working in collaboration with seven partners: Agilink, CHANTREUIL, CORREGE, Demgy, LTP, SAB Industries, and TEI. A demonstrator of this engine was presented to attendees of the Paris Air Show at the NAE (Normandie AeroEspace) technology center.

Technical highlights of the engine included air and fuel systems that were redesigned specifically for use with hydrogen. In particular, a high-performance turbocharger, a new injection rail, specific injectors, and a high-pressure manifold were

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implemented. As safety is a core concern, specific instrumentation and controllers for managing the hydrogen supply were integrated, as well as an innovative hydrogen sensor.

Engine specifications:

- Fuel: 100% Hydrogen
- Emission: < 1 g CO₂/kWh
- 75 kW* (102 hp) at 5800 rpm with two H₂ injectors/cylinder
- H₂ consumption: 6.82 kg/h at 75 kW
- Air flow required: 520 kg/h
- 4-stroke flat 4 cylinder engine with 1,300 cm³ of capacity
- Port fuel injection
- Stoichiometry limited to $\lambda = 2$ (ratio O₂/fuel)
- Hydrogen tank storage pressure: 350 bars

*Theoretical power calculated with compressor limitation at compression ratio 2.1

Hydrogen: a promising way to reduce carbon footprint

The solutions needed to decarbonize industry and transport are multi-faceted. The technologies required to develop carbon neutral transportation are cross-functional, extending to all forms of mobility, from passenger cars to aeronautics. FEV's expertise in the fields of electric mobility and hydrogen applications enable the company to rapidly develop robust solutions to serve these emerging markets.

Regarding environmental issues and a focus on meeting the decarbonization goals of the aerospace industry, the use of green hydrogen as a fuel is steadily gaining notoriety as a high value-added and realistic solution. By adapting existing engines, FEV and the industry as a whole can drastically reduce emissions while keeping conversion costs under control. As an added benefit, hydrogen's high calorific value actually improves performance at high engine speeds.

FEV: developing the future of carbon-neutral mobility

At FEV France, the company's 650 employees offer engineering expertise and services for the development of clean, innovative mobility through 2 technical centers: Saint-Quentin-en-Yvelines and Saint-Etienne-du-Rouvray, featuring 30 test benches and accounting for all propulsion technologies. As part of the French government's France Relance Plan, FEV has also invested in three test beds at its Saint-Etienne-du-Rouvray site (Seine Maritime): two for the development of hydrogen-powered internal combustion engines, and one dedicated to fuel cell development, with a capacity of up to 240 kW (326 hp).

FEV's French subsidiary also offers operational safety, testing of rotating machines and mechanical components, battery and electrical machine testing, test bench engineering and more.

Footage



Caption: FEV has developed an hydrogen-fired engine for small aircrafts in a consortium with seven partners

About FEV

FEV has always pushed the limits.

FEV is a globally leading engineering provider in the automotive industry and internationally recognized leader of innovation across different sectors and industries. Professor Franz Pischinger laid the foundations by combining his background in academia and engineering with a great vision for continual progress. The company has supplied solutions and strategy consulting to the world's largest automotive OEMs and has supported customers through the entire transportation and mobility ecosystem.

As the world continues to evolve, so does FEV.

That's why FEV is unleashing its technological and strategic expertise into other areas. It applies its forward thinking to the energy sector. And its software and system know-how will enable the company to lead the way making intelligent solutions available to everyone. FEV brings together the brightest minds from different backgrounds and specialties to find new solutions for both current and future challenges.

But FEV won't stop there.

Looking ahead, FEV continues to push the limits of innovation. With its highly qualified >7,300 employees at more than 40 locations globally, FEV imagines solutions that don't just meet today's needs but tomorrow's. Ultimately, FEV keeps evolving – to a better, cleaner future built on sustainable mobility, energy and software that drives everything. For the company's' partners, its people, and the world. [#FeelEVolution](#)