HERACLES

HERACLES is developing concepts for hydrogen-electric propulsion systems in regional aircraft with up to 50 passengers.

Three partners

The consortium led by H2FLY brings together propulsion development, avionics and research.

36 months

From August 2026 to July 2029 the requirements catalogue takes shape: from the assessment of aircraft concepts to the basis for a demonstrator.

Several aircraft concepts

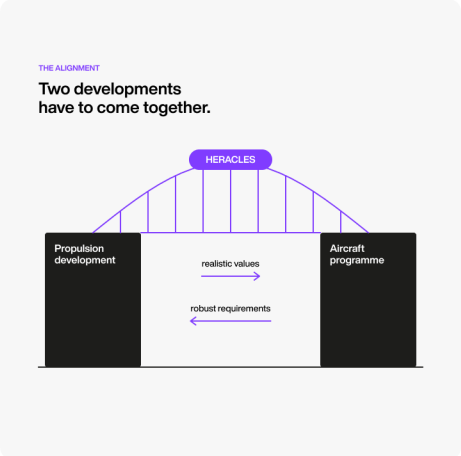
Three to five configurations are compared using certification-relevant metrics and refined step by step.

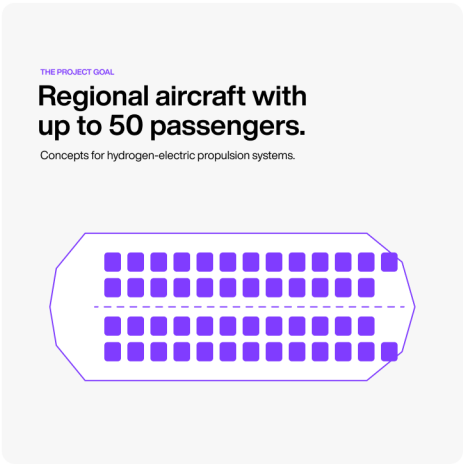
Federally funded

HERACLES is part of the aviation research programme LuFo Klima VII-1.

THE CHALLENGE

For hydrogen-electric regional aircraft to reach the market, two developments have to come together: aircraft design needs realistic values for future liquid hydrogen and fuel cell systems, and propulsion development needs robust requirements from the aircraft. This alignment is key to assessing integration concepts and steering development priorities such as technology readiness in a targeted way.





THE PROJECT GOAL

HERACLES is developing integration and aircraft concepts for regional aircraft with up to 50 passengers – with a view to how hydrogen-electric propulsion, including systems and control, can become ready for market entry. To this end, several aircraft configurations are assessed using certification-relevant metrics, and a validated, quantified requirements catalogue is derived from them: with target values for, among other things, the power density of the fuel cell system and the voltage level of the electrical power distribution. A comparison with the technology readiness level (TRL) shows where development is needed. The results form the basis for further aircraft and propulsion development and for a demonstrator.

HOW THE CONSORTIUM WORKS

Three partners from research and aviation industry work together in HERACLES.

The partners take an iterative approach: they design aircraft concepts, align them with the power, mass and safety requirements of the hydrogen-electric powertrain and refine them step by step. Through market analyses and workshops, the consortium assesses how mature the available technologies are and what development potential they have. In addition, concepts are developed for controlling and monitoring the propulsion system based on integrated modular avionics (IMA). The findings feed into the planning of a demonstrator.

PARTNERS AND FOCUS AREAS

H2FLY

Support of the aircraft and integration concepts with the boundary conditions of the liquid hydrogen fuel cell propulsion system, assessment of the concepts from a technology perspective including existing technology gaps, and derivation of requirements for future system and component development

German Aerospace Center (DLR)

Lead on aircraft design for hydrogen-electric regional aircraft with up to 50 passengers, development of demonstrator concepts – including for the Do328 UpLift – and set-up of a virtual iron bird (digital system test rig) in the UpLift avionics lab to test the control of multiple fuel cell stacks

Diehl Aerospace

Feasibility assessment of highly reliable control systems based on integrated modular avionics (IMA) for megawatt-class fuel cell propulsion systems, use of its own control computers as real hardware in the hybrid validation environment and further development of the technology for configuring avionics platforms

FUNDING

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