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WELCOME TO HyperMorph

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Liquid hydrogen is not just fuel. Used to cool electric motors to near-superconducting temperatures, it opens up an entirely new class of lightweight, high-efficiency propulsion systems.

That insight is the foundation of **HyperMorpH** – Synergistic Integration of Hyperconducting Electric Propulsion and Composite Structures with Intelligent Morphing for Hydrogen-Powered Aviation. A new Horizon Europe initiative bringing together seven leading European partners to advance the technologies that will make climate-neutral aviation a reality.

Our **mission** is to develop a synergistic aircraft architecture where hydrogen, composite materials, self-morphing structures and AI-powered digital tools reinforce each other to push the boundaries of sustainable flight.

Five core objectives

- Cryogenic, ultra-light hyperconducting electric motors using sustainable thermoplastic composites.
- Self-morphing intake and rotor-tip-casing aerostructures optimised for boundary layer ingestion.
- AI-supported digital toolkit and Digital Twin for concurrent multidisciplinary optimisation.
- Lab-scale validation of the integrated propulsor–aerostructure system at TRL 4.
- Sustainability and scalability assessment, with a technology roadmap for future exploitation.

[Learn more about HyperMorpH...](#)

PROJECT AT A GLANCE

Aviation accounts for around 2.5% of global CO₂ emissions and reaching climate neutrality by 2050 demands a step change.

Behind the headline numbers below sits a synergistic aircraft architecture in which liquid hydrogen, cryogenic hyperconducting electric motors, self-morphing composite aerostructures and AI-supported digital tools reinforce each other to push Europe closer to climate-friendly flight.



7 partners

*5 European
countries*



42 months

*Jan 2026 -
- Jun 2029*



~€5M

*EU funding
GA 101192711*



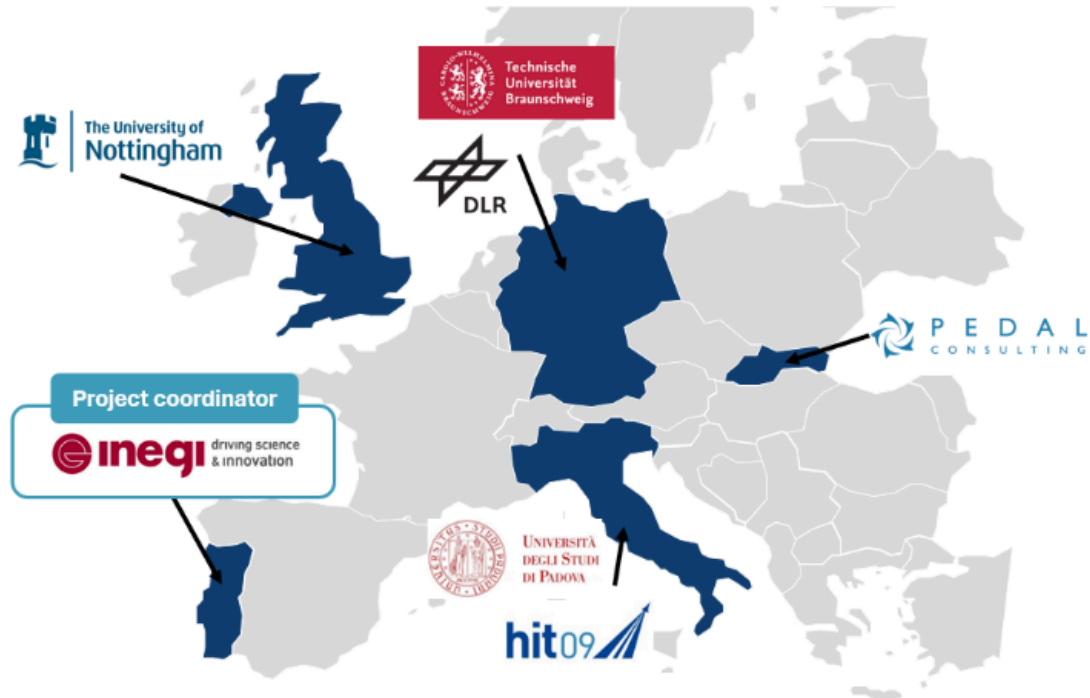
TRL4

*Lab-scale validation
by 2029*

MEET THE CONSORTIUM

The powerhouse behind HyperMorphH

HyperMorphH brings together seven complementary partners across composites, propulsion, aerostructures, digital engineering and dissemination – uniting leading research centres, technical universities and specialist small and medium-sized enterprises from five European countries.



INEGI (Coordinator) — *Porto, Portugal*. Leads project management, materials and manufacturing for cryogenic propulsion integration, and the integrated BLI demonstrator.

TU Braunschweig (TUBS) — *Braunschweig, Germany*. In charge of Digital Twin, intelligent agents and surrogate models powering the cyber-physical design framework and contributes to morphing component development.

DLR — *Cologne, Germany*. Germany's national centre for aeronautics and space is responsible for the development and demonstration of self-morphing composite aerostructures and hosts the fan test bed validation.

Università di Padova (UNIPD) — *Padova, Italy*. The university studies the aeroelastic behaviour of propulsor subsystems and leads statistical and uncertainty analyses underpinning the Digital Twin's validation framework.

HIT09 — *Padova, Italy*. UNIPD spin-off specialises in aeronautic and aerospace propulsion components. It leads the aero-propulsive system design for the integrated BLI concept and develops Machine Learning-based digital models.

University of Nottingham (UoN) — *Nottingham, United Kingdom*. UoN takes care of the design, development and validation of the FRP composite-based hyperconducting cryogenic electric motor through its Composites Research Group and PEMC research group.

PEDAL Consulting — *Martin, Slovakia*. The company deals with communication, dissemination, exploitation, intellectual property strategy and synergies with sister projects across the European innovation ecosystem.

Get to know the consortium...

KICK-OFF in PORTO

On 29 January 2026, the HyperMorphH consortium gathered in Porto, Portugal to officially launch the project. Hosted by the coordinator, the meeting brought all seven partners together for the first time to align on the shared



"To create world leading and disruptive zero-emission aviation, Europe needs solutions that work at system level, not just isolated technologies. HyperMorphH combines complementary expertise across Europe to move hydrogen-powered propulsion closer to real-world aircraft applications."

— Nuno Correia, Unit Director at INEGI and HyperMorphH Project Coordinator

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STRONGER TOGETHER: THE ATLAS CLUSTER

HyperMorphH is one of five Horizon Europe projects funded under the same call (HORIZON-CL5-2024-D5-01-08) and clustered as ATLAS (Advanced Technologies for Lightweight Aerostructures and Sustainability).

Together, the five ATLAS projects form a coherent ecosystem covering the full innovation chain for next-generation aircraft: from advanced material design and manufacturing optimisation to digital engineering and certification, to future propulsion systems. HyperMorphH represents the future-propulsion pillar, bringing hydrogen-based, hybrid-electric concepts that close the loop on the cluster's vision of cleaner, lighter, certifiable European aviation.



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THE FUTURE OF AVIATION DOESN'T FLY SOLO.

5 projects.
1 cluster.
ENDLESS INNOVATION.

#ATLASCluster is live!



PAIRAMID



PLEIADES



The five ATLAS projects:

- **CompSTLAR:** composite structures: design, manufacturing and validation
- **TOSCA:** manufacturing processes, monitoring and quality control
- **PLEIADES:** digital engineering and model-based certification
- **pAramid:** virtual qualification and certification framework
- **HyperMorph:** hydrogen-powered, hybrid-electric propulsion (that's us)

By aligning approaches across materials, manufacturing, certification and propulsion, ATLAS creates a continuous digital thread that accelerates innovation and amplifies impact across the European aviation research community.

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technologies, advanced composites and digital engineering.

And/or follow HyperMorphH journey on social media.



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