



Ground Operations of Liquid hydrogen Aircraft

Project duration: 48 months
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UK Research and Innovation
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Coordinator: Airbus SAS



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The GOLIAT project develops LH2 technologies and conducts studies and demonstrations to overcome the current barriers to hydrogen-powered aviation and airport operations.

In the near future, **hydrogen will be a solution to decarbonise short- and medium-haul aviation**. However, **airport infrastructure and operations have to be adapted** to the challenges posed by the introduction of hydrogen aircraft.

In this context, GOLIAT will focus on three pillars :

1. Development and tests of a **large-scale LH2 refueller prototype** for aircraft
2. Advancing the readiness level of airports with **ground demonstrations of LH2 aircraft operations** at three airports
3. Progress on **safety, regulations and standardisation aspects** as well as **techno-economics assessment** of hydrogen operations at airports



Picture credit: Airbus



Picture credit: European Commission



Picture credit: Budapest Airport



Picture credit: Stuttgart Airport

WHAT

- Development and tests of a LH2 refueller prototype, scaled-up for future large commercial hydrogen aircraft
- Ground operations demonstration with small LH2-powered aircraft (HY4) at three European airports to progress on LH2 handling and regulations at airports
- LH2 refuelling standardisation and certification preliminary framework & techno-economic assessment

WHY

The GOLIAT consortium partners share the ambition to enable a commercially viable, hydrogen-powered commercial aircraft to enter service.

However, existing LH2 technologies are tailored for specific industrial or mobility contexts. They are limited in capacity and performance and expensive for the aviation market.

Additionally, there's an insufficient understanding of the operational, regulatory and economic framework that will enable handling large quantities of hydrogen at airports.

WHO

To achieve the project objectives, the GOLIAT partnership brings together:

- An aircraft manufacturer (Airbus)
- Technology providers (Chart Industries, H2FLY)
- Universities (TU Delft, Leibniz University Hannover)
- Airport operators (Vinci Airports, Schiphol Airport, Rotterdam Airport, Stuttgart Airport, Budapest Airport)

WHERE

Large-scale demonstration of LH2 ground operations will be implemented at three European airports:

- Stuttgart (2026)
- Rotterdam (2026)
- Lyon (2027)

The three iterative demonstrations will provide insights on how small aircraft and vehicles using hydrogen can be refuelled and safely operated on airports.

Additionally, the LH2 refueller will be demonstrated at the Airbus premises.

EXPECTED RESULTS



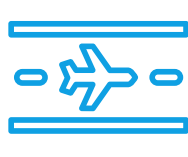
Models

- Assessment of hydrogen demand at airports in Europe and globally
- Hydrogen supply chain model and costs evaluation
- H2-aviation airport ground operations and support equipment allocation



Technologies

- Innovative high-flow ground-based refuelling systems for liquid hydrogen
- Competitive aircraft-based hydrogen refuel technologies
- Target:
 - 2 to 4 tons LH2 mobile refueller
 - Refuel flow rates of 5-6 tons per hour to ensure competitive turnaround time



Demonstrations

- Demonstration of hydrogen-powered aircraft ground operations at three EU airports to provide lessons learnt for the future operations at airports, including:
 - parking
 - taxiing
 - manoeuvring
 - refuelling



Framework

- Guidelines covering:
 - Standardisation : future LH2 mobile refuelling, storage and supply equipment and its operation
 - Certification: LH2 refuelling procedures, ground equipment and systems at airports

TIMELINE



IMPACT

In the medium and long term, the GOLIAT project will:

1 De-risk the introduction of future large hydrogen-powered commercial aircraft, which has the potential to greatly reduce emissions from air transport.

2 Bring a major competitive edge to European industry by developing the next-generation of LH2 refuellers tailored for aviation.

3 Contribute to the social acceptance of LH2 for aviation and other applications through ground demonstrations.



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