



Cranfield Hydrogen Integration Incubator (CH2i)



Why Cranfield?

The opportunity

Cranfield University is offering industry the opportunity to join its ground breaking Cranfield Hydrogen Integration Incubator programme, CH2i.

CH2i will provide the infrastructure for world-leading research and next generation technology innovation in energy and transportation decarbonisation, including focusing on the hard-to-decarbonise aviation sector.

The CH2i programme is supported by UK Government plus an industry consortium that already includes Airbus, GKN Aerospace, Siemens Energy, Heathrow Airport and Toyota.

New industry partners are now being invited to become a member of the CH2i programme through participation in co-funded research initiatives and infrastructure expansion.

Why Cranfield?

Cranfield has an impressive track record in hydrogen (H_2) research extending back to the early 1960s, working across the whole supply chain from production, storage, transport and usage to environmental impacts.

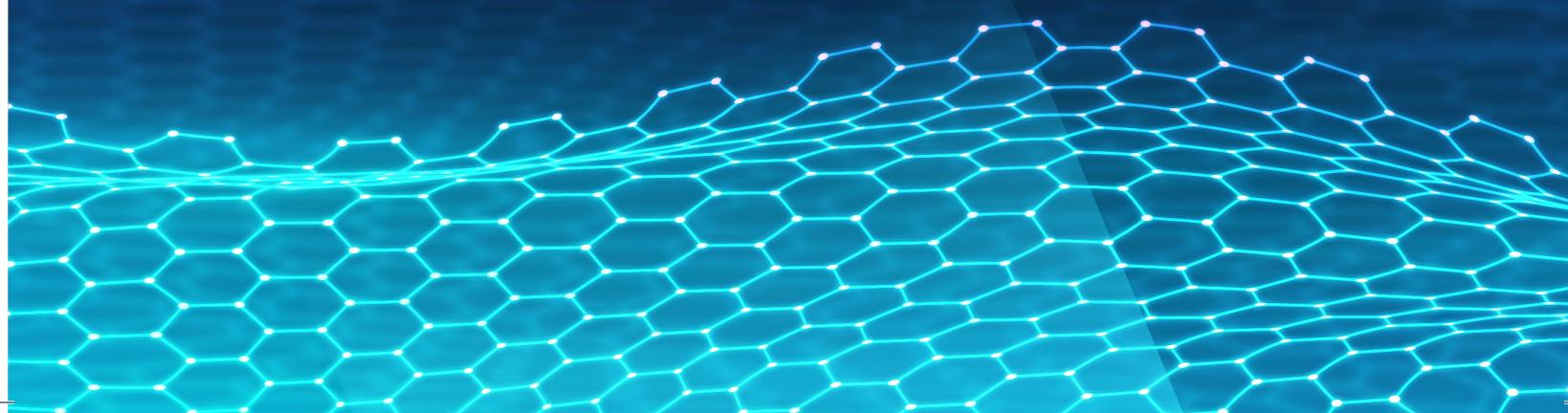
Today, the University is a partner in multiple industry-led international research programmes into the use of hydrogen in advanced aviation propulsion systems and airport fuel handling operations. We have a 1.5 Megawatt-thermal (MWth) pilot reactor for future low emission turquoise (carbon separation) hydrogen generation (HYPER) and an at-scale, zero CO_2 green hydrogen and ammonia generation demonstrator plant, the latter enabling technology development into deriving biofuels fuels from waste.

Uniquely, Cranfield is the only university in Europe to operate its own airport, research aircraft and air traffic control facilities which has enabled it to host the first hydrogen-fuel cell propulsion flight in the UK.

It is the University's proven research capability, spanning aerospace, energy, marine and automotive sectors, that has resulted in it recently being awarded £23 million of UK Government funding[1] towards the £69 million industry co-funded Cranfield Hydrogen Integration Incubator (CH2i) programme to create new and additional world leading hydrogen research facilities.

The new CH2i facilities will further support collaborative research into the production, storage and use of hydrogen in future transportation systems (particularly aviation) with particular emphasis on liquid hydrogen (LH_2) and ammonia fuels.

[1] Research England Grant Number 704.



The incubator facilities

CH2i will provide the opportunity for rapid innovation in a regulated and safety-focused environment.

Four major facilities make up CH2i, including:

Cranfield Power and Propulsion Laboratories (CPPL)

CPPL will focus on the aerodynamic and thermodynamic integration of new power systems within the aircraft. This includes the utilisation of sustainable aviation fuels including hydrogen, electrification and hybridisation and exploring the potential benefits of supercritical CO₂ and other 'unusual' working fluids for thermal management applications.



Opened November 2025

The Hydrogen Integration Research Centre (HIRC)

The Centre will contain laboratory spaces for fundamental research and smaller experiments involving hydrogen and related fuels, including ammonia, methane and H₂-related materials and structures, for developing next generation hydrogen production plants, electrolysis, catalysts and fuel cells. It will include office space for researchers and R&D partners, meeting rooms and an innovation space for events.



Operational from May 2026

Large experimental test area

A large and configurable space, covering an area the size of three football pitches – made available for experiments involving gaseous or liquid hydrogen, Jet-A and methane (natural gas).

From May 2026, the area will host our hydrogen electrolysers producing at least 40kg/day of gaseous hydrogen, some of which will be liquefied for LH₂ experiments from materials coupon testing up to aircraft fuel systems. In addition it will be used by industrial partners for non-aviation uses of hydrogen.

We are also hosting equipment contributions from industrial partners including GKN and Siemens Energy.



Upgraded Cranfield Airport

Cranfield University's unique research airport will have a significant upgrade that will include the strengthening of the main runway plus taxiways to accept larger aircraft. The airport also plans to be capable of handling hydrogen development aircraft which in principle will be used by industry partners for initial airside trials of hydrogen aviation technologies.



Engage with CH2i

CH2i will be open for collaborative R&D with industry and academic partners. Cranfield is currently engaged with dozens of UK and European funded projects and the new facilities will enable even more to be done.

Industry organisations can become a full strategic partner, with priority access to the facilities, or an associate collaborating partner looking to work with Cranfield on a single project or multiple projects. CH2i also acts as a collaborative environment, a community for R&D knowledge-sharing and commercial synergies both within and across different sectors and applications, sharing lessons from a very fast-changing area of technologies.

The University is also home to specific and practical H₂ courses:

- **Hydrogen for civil aviation** (five days on campus).
- **Hydrogen materials challenges** (four days on campus).
- **Hydrogen safety introduction and real-world application** (five days on campus).

Whatever your goal, Cranfield has the experience and facilities to work with you and bring your hydrogen project to realisation.

Hydrogen research projects

While the facilities themselves are new, Cranfield has a history of highly-regarded, industry-focused H₂ research. Some example projects include:

Hydrogen production and transport

Cranfield University is researching clean and efficient ways to produce and transport hydrogen for a broad array of applications including - seawater electrolysis; bio-feedstocks; and SMR+CCS. The plant pictured is our industrial-scale, proof-of-concept plant HyPER - a new generation plant developing bulk production of 'blue' hydrogen on campus with integrated carbon capture, utilisation and storage. Working with the US-based Gas Technology Institute (GTI), and supported by UK Government funding via DESNZ, the 1.5 MWth pilot plant demonstrates how high purity H₂ can be produced at 30% lower cost than conventional steam methane reforming methods. Carbon emissions are cut by 97% compared with traditional hydrogen production. The consortium plans to commercialise the plant for industrial applications where clean hydrogen production from natural gas offers significant environmental and commercial benefit.



Hydrogen propulsion

To enable hydrogen to be used as an aviation fuel, Cranfield University are working closely with industrial partners to overcome the challenges of handling, carrying and using liquid hydrogen (LH₂) on medium-range aircraft as well as those flying inter-continental routes. Such collaborative projects include HYEST (Low-NOx pre-burner for gas-turbines); RACHEL (LH₂ propulsion system integration); LH₂GT (complete fuel system demo), and MINIMAL (an opposed, free-piston engine). Teams are also working on novel fuel-cells for aviation and road transport as well as H₂-fuelled internal combustion engines for road and maritime.



The ENABLEH2 project received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 769241.

Hydrogen in aviation

Bringing hydrogen into the aviation environment requires innovation throughout the operational value-chain. To help make this happen, Cranfield University are developing technology and operational procedures with airports and OEMs including: ZEST1 (LH₂ tanks, safety, airport operations, and whole systems); TARGETH₂ (LH₂ fuel systems and tanks); CRYOSTAR (an EU funded project into the safety/crashworthiness of LH₂ tanks), and UK airports Heathrow, Exeter, Bristol, and Cranfield's own airport with airside trials of hydrogen-powered Ground Support Equipment servicing live aircraft.



Materials and structures

Cranfield University's work on materials and structures for use in gaseous and liquid hydrogen covers coatings; embrittlement; permeation and understanding the fundamental properties of materials interacting with the gas or cryogenic liquid. Our work applies to all transport uses, including aviation, as well as the energy sector when looking at introducing hydrogen into the national gas network. Unique facilities at Cranfield include the LH₂ coupon testing enabled by our partnership with the Royce Institute.



Image is an AI-assisted image using ChatGPT

For other hydrogen projects, please see www.cranfield.ac.uk/hydrogen

Let's connect

We look forward to talking to you about CH2i and how we can support your business with its hydrogen development goals.

**For an initial conversation contact Jon Horsley,
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www.cranfield.ac.uk/ch2i**

Partnering with:

Airbus
Cranfield Aerospace Solutions
Element 2
Energy Research Accelerator
Equilibrion
GKN Aerospace
GTI Energy
Heathrow Airport

HyWaves
Imperial College London
Modular Clinton Global Ltd
National Centre for Atmospheric Science
National Physical Laboratory
Siemens Energy
Toyota (GB) Plc

CH2i is supported by Research England under the
UK Research Partnership Investment Fund (RPIF).