

ZERO-CARBON EMISSION AIRCRAFT TECHNOLOGIES ROADMAP

AIRCRAFT CONCEPTS

2020

2050

PROPULSION & POWER

BATTERY H₂ FC LH₂ GT

ADVANCED SYSTEMS

H₂ CROSS CUTTING

AERO STRUCTURES

SUB-REGIONAL/EVTOL (BATTERY)

FUEL CELL AIRCRAFT (GH₂)

FUEL CELL AIRCRAFT (LH₂)

GAS TURBINE AIRCRAFT (LH₂)



H₂ combustion sector rig test

Full annular low NOx combustion rig test

Engine control systems ground test

Propulsion systems ground demonstration

Low temperature fuel cell system

Fuel cell power train full scale test rig

High power density aero battery development centre

Distributed propulsion motor systems rig test

LH₂ engine ground demo

Gas turbine flying test bed

GH₂ fuel cell flying test bed

LH₂ fuel cell flying test bed

High power motors & drive systems for electric propulsion

High temperature fuel cell rig test

Sub-regional battery powered aircraft demonstrator

Integrated energy management systems

LH₂ cryogenic generation 2 fuel system storage and distribution

Sensing and prevention systems for health management, fire protection and leaks

LH₂ cryogenic generation 1 fuel storage rig test

Systems ground test demo

H₂ APU/secondary power engine ground test

Next-gen low weight and cost sustainable landing systems

Next-gen cabin systems, passenger connectivity & environmental control system

LH₂ cryogenic generation 1 fuel system rig test

Novel heat exchanger development for fuel cell and gas turbine applications

Next-gen low power, ice and rain protection technologies

Large aircraft demonstrator including dry wing

More electric non-propulsive electrical power systems

Integrated antenna with structures

Next-gen cyber secure avionics technologies including enablers for autonomy

Regional aircraft demonstrator including dry wing

Regional aircraft demonstrator including dry wing

Materials & process development for AM, composites, cryogenic and high temp. applications

Sealing systems and joint integrity

Multi-functional structures for thermal management

Cryogenic assembly systems rigs and test

Advanced large dry wing demo

Passive dry wing wind tunnel & functional testing

eVTOL production wing demonstrator

Cryogenic component/sub-system rig and test

Advanced dry wing wind tunnel and functional test

60,000 aerospace jobs on zero-carbon emissions aircraft by 2050

Flight control systems for highly flexible wing ground test

Energy harvesting and reuse systems and sensors

Systems to enable reduced crew operation

TARGETS

0.7 Gt of additional CO₂ saved through zero-carbon emissions aircraft (2021-2050)

8% of annual aviation CO₂ avoided by zero-carbon emissions aircraft in 2050

90% NO_x reduction & 65% reduced perceived noise per aircraft by 2050 vs 2000 platforms

£0.6 trillion global market opportunity for zero-carbon emissions aircraft to 2050.

£ The UK could potentially have up to 19% share of future global zero-carbon emissions aircraft market, securing a position for future generations of aircraft