

ULTRA-EFFICIENT AIRCRAFT TECHNOLOGIES ROADMAP

AIRCRAFT CONCEPTS

PROPULSION & POWER

ADVANCED SYSTEMS

AERO STRUCTURES

2020

2025

2030

2040

2050



UHBR ground demo - Composite fan & gearbox, high performance core & low emission combustor

UHBR advanced manufacturing and assembly technology

Hybrid UHBR demonstrator

Flight control systems for highly flexible wing ground test

High efficiency, low noise propeller systems

UHBR propulsion/airframe integration flight demo

More highly integrated engine, nacelle and pylon structures

Ultra efficient open rotor demonstrator

Variable pitch fan demonstrator

Energy harvesting and reuse systems and sensors

Systems to enable reduced crew operation

Ultra lightweight SAF compatible fuel management & gauging technology

Advanced thermal management systems

Adaptable flight control systems for composite next-gen wings

Next-gen low weight and cost sustainable landing systems

TARGETS
1.2 Gt of CO₂ saved through aircraft technological efficiency improvements (2021-2050)

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

Integrated antenna with structures

Next-gen cyber secure avionics technologies including enablers for autonomy

Next-gen low power, ice and rain protection technologies

Highly flexible advanced wing

9.5% of annual aviation CO₂ avoided by ultraefficient aircraft in 2050

More electric non-propulsive electrical power systems

Manufacturing and assembly of ultra high accuracy, highly flexible laminar wing components, torque box and assemblies

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

Materials & Process Development for NNS, AM and composites for HT applications

Folding wing tips with highly integrated systems

Lightweight lightning strike protection structures and materials

More laminar flow wings and aerodynamic devices

£1.6 trillion global market opportunity for ultra-efficient aircraft to 2050

Simulation demonstration of industrial system for HARW

Laminar flow nacelle manufacturing technologies

Demonstration of high rate manufacture and assembly of composite HARW and other structures

Load alleviation and flutter suppression technologies for HARW

The UK could potentially have up to 15% share of future global ultra-efficient aircraft market.

72,000 aerospace jobs on ultra-efficient aircraft by 2050