



Cranfield  
**Aerospace  
Solutions**

# CRANFIELD AEROSPACE SOLUTIONS

Introductory Presentation – April 2024

# CRANFIELD AEROSPACE SOLUTIONS AT A GANCE

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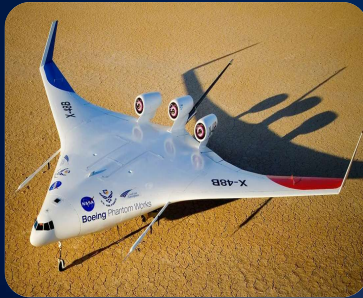
**Cranfield Aerospace is developing scalable hydrogen-electric propulsion systems.**

- Three business activities
  - Development of zero emissions propulsion systems for commercial aircraft
  - Aircraft Maintenance, Repair & Overhaul (MRO)
  - Design and manufacture of flight and motorsport simulators
  
- Access to unique aviation expertise, research and resources
  - CAeS is located at Cranfield Airport, a commercial and research facility
  - Cranfield University, an academic world leader in aerospace, is a shareholder





# TRACK RECORD



Designed & manufactured sub-scale blended wing flight test vehicle

**NASA**

**BOEING**



"Red Team" on flight safety documentation for Spirit of Innovation world-record breaking electric aircraft



Design of structure to install and operate jet engine/electric generator inside RJ100 aircraft cabin

**AIRBUS**



Designed & certified modifications to convert BAE 146 to atmospheric research aircraft

**Met Office**



Designed & built full scale ground test eVTOL



# SHAREHOLDERS & INVESTORS



**Safran Corporate Ventures:** Investment arm of Safran, a world leading supplier of aircraft and rocket engines, aerospace equipment, avionics, electronics, navigation and communication systems and satellites with ~€25 billion revenue



**HydrogenOne Capital (HGEN):** London Stock Exchange-listed investment fund investing clean hydrogen and energy storage for the energy transition. HGEN has a range of unquoted and quoted investments across diverse industry sectors



**Strategic Development Fund (SDF):** Investment arm of Tawazun Economic Council, a UAE sovereign wealth investment entity. SDF targets sectors including aviation and aerospace, urban mobility, autonomous systems, robotics, and energy & power technologies



**Cranfield University:** One of the world's premier postgraduate academic institutions for aeronautical engineering and transportation systems. Also conducts research into hydrogen production, storage, transportation and utilisation



**Motus Ventures:** Early-stage venture capital fund focused on innovative technology disruptions across global industrial markets, especially transportation

# HYDROGEN FUEL CELLS IN AVIATION



# HYDROGEN-POWERED BRITTEN-NORMAN ISLANDER



Zero CO<sub>2</sub> emissions  
& less air pollution



6 to 8 passengers



400km + reserve



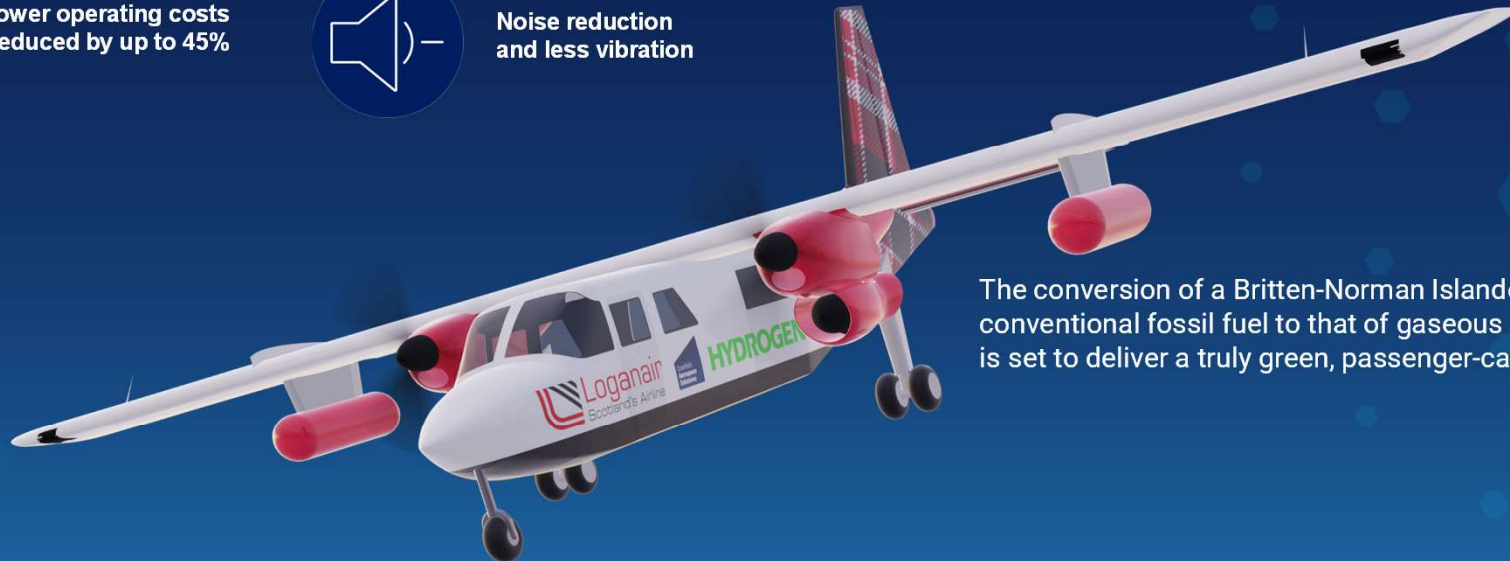
Entry into  
service by 2027



Lower operating costs  
Reduced by up to 45%



Noise reduction  
and less vibration



The conversion of a Britten-Norman Islander 9-seat aircraft from conventional fossil fuel to that of gaseous hydrogen propulsion is set to deliver a truly green, passenger-carrying aircraft.



# TECHNOLOGY DEVELOPMENT

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## DEVELOPMENT PARTNERS



### ELECTRIC PROPULSION

220kW Electric Propulsion units.  
Motor and inverter-controllers

### POWER DISTRIBUTION

Hardware and control  
systems associated with  
high voltage, high power  
electrical system

### HUMAN MACHINE INTERFACE

Modified controls & displays

### 240kW HYDROGEN FUEL CELL SYSTEM

Fuel cell stacks, balance  
of plant and control unit

### HYDROGEN FUEL TANKS (GASEOUS)

700 bar high pressure tanks  
& associated hardware

### THERMAL MANAGEMENT

High efficiency, low drag, low  
mass heat exchangers



# REGIONAL AIR MOBILITY MARKET

Regional air mobility is expected to see an acceleration of growth over the next decade driven by 4 main mega-trends



Technology Advances – Innovations in propulsion and aircraft design and manufacturing



Importance of Sustainability – Governments and the public are increasingly focussed on this which will help shape the future of the aviation industry



Road and airport congestion - Need for a fast transportation mode that avoids congested airports and major airports



Rise of mobility as a service - The last decade has seen significant rise in public appetite for mobility as a service

- The regional air mobility market segment will act as a catalyst for the growth of net zero flying and will be the proving ground for new technology aviation including hydrogen

**The market size for passenger sub-regional flights is expected to be up to US\$115 billion by 2035 and will require up to 36,000 aircraft<sup>1</sup>**



# LETTERS OF INTENT / MoUs

Skybus

EVIA AERO

MONTE

AIR NEW ZEALAND

Torres  
Strait  
AIR

STRATUS 9

LOGANAIR  
SCOTLAND'S AIRLINE

DRONAMICS

- Existing Islander operator

UK

3

- Start-up airline and renewable infrastructure provider

GERMANY

15 +  
10 x 19-seater  
aircraft

- Lessor specialising in green sub-regional aircraft, set up by Montrose Global Aircraft Management

UK

40

- CAeS selected as sole hydrogen partner as part of Air New Zealand's Mission Gen Next Gen Aircraft programme

NEW ZEALAND

23

- Existing Islander operator; tripartite MoU with MONTE

AUSTRALIA

10

- California-based aircraft fractional ownership company

USA

15

- MoU in place to establish partnership and collective aim to introduce hydrogen powered Islander into Scotland

UK

- Startup developing large cargo UAV; successful first flight in April 23 with conventional fuel
- Feasibility study complete to assess application of CAeS H2 technology to platform

UK / Bulgaria

Lols for  
**106** Islander modification kits  
+ 10 x 19 seat aircraft

# Thanks for listening

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