

CRANFIELD AEROSPACE

Delivering zero-emissions for global aviation



INVESTOR PRESENTATION
NOVEMBER 2022

Cranfield
**Aerospace
Solutions**

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(i) you are a member of a network or syndicate of business angels and have been so for at least the last six months prior to the date of the Statement; (ii) you have made more than one investment in an unlisted company in the two years prior to the date of the Statement; (iii) you are working, or have worked in the two years prior to the date of the Statement, in a professional capacity in the private equity sector, or in the provision of finance for small and medium enterprises; (iv) you are currently, or have been in the two years prior to the date of the Statement, a director of a company with an annual turnover of at least £1 million; and (d) you accept that you can lose property and other assets from making investment decisions based on financial promotions and that it is open to you to seek advice from someone who specialises in advising on shares in unlisted companies. Where this Presentation is issued to a Self-Certified Sophisticated Investor, it is exempt from the restriction in Section 21 of the FSMA on the communication of invitations or inducements to engage in investment activity on the ground that it is made to a Self-Certified Sophisticated Investor, for the purposes of article 50A of the Order. If you are in any doubt about the investment to which this Presentation relates, you should consult an authorised person specialising in advising on securities of the kind described in this Presentation.

Investment Highlights



Cranfield Aerospace (CAeS) has the critical capabilities to deliver regulatory-certified technology

- Only zero emissions aviation business with track record and regulatory approvals, backed by aerospace OEM (Safran)
- Industry-leading senior management and highly experienced advisory board supported by team of >100 employees
- Revenue-generating from aircraft maintenance and training simulator divisions



Market entry strategy aligned with operator need and maturity of technology

- On track to deliver world's first certified, zero emissions aircraft in Q1 2026, with demonstrable cost and CO₂ savings
- Phase 1 retrofit market opportunity of \$1.0bn to 2030 with product scale-up through to 100 seats of over \$115bn in 2050
- Current pre-orders of over \$140m



Attractive investment profile validated by committed shareholders

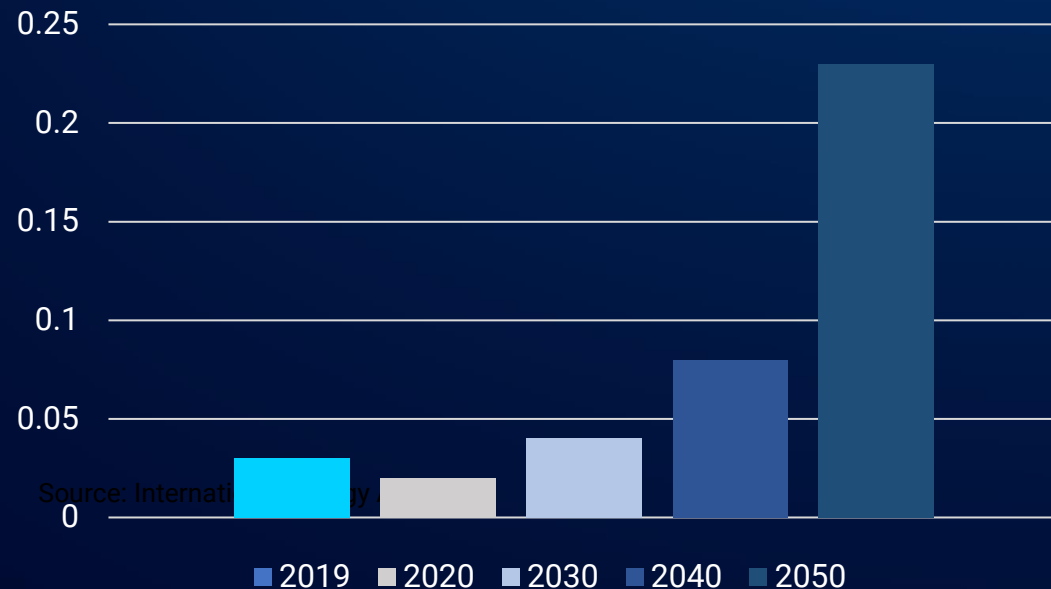
- Value creation and protection strategy based around type certification, patents, know-how and programme management
- Raising £37m (\$43m) Series B round, supported by shareholder group including Safran, HydrogenOne and Tawazun SDF
- Projected investor returns of >6x based on exit in 2028

Compelling investment case for investors seeking exposure to decarbonisation and/or energy transition in the aviation sector

The Challenge

- Aviation's share of global GHG emissions will increase rapidly as demand for air travel grows with no action on decarbonisation

Aviation Emissions as a Proportional of Global Emissions



- The industry's current decarbonisation plans require significant investment in new technology

Multiple decarbonisation pathways



Hydrogen (fuel cell and combustion)



Batteries (inc hybrid)



Sustainable Aviation Fuels (and e-fuels)



Fleet renewal & continued aircraft development



Airspace redesign and operational efficiencies

“There is no viable path to a zero carbon or climate neutral aviation system that does not involve hydrogen” ⁽¹⁾

The Solution



Sub-regional and regional airline sectors (worth \$91bn in 2035)⁽¹⁾ are widely regarded as the frontier markets for zero emissions aviation

- Range requirements can be met by new propulsion technology
- Attractive value proposition for operators with often ageing fleets



CAeS is developing a zero emissions solution for this entire market through overlapping development phases

- **Phase 1** Conversion of 9-seat BN Islander to H₂ fuel cell propulsion (Q1, 2026)
- **Phases 2 & 3** 10-19-seat conversion (2028) and optimised 20-50-seat new aircraft design (2032)
- **Phase 4** Optimised new design for up to 100-seat regional aircraft (2035)



Focus on financially-viable solutions that can secure regulatory certification

- Selection of H₂ fuel cell based on performance, deliverability, economics and sustainability
- Critical importance of integrating new propulsion technology at the aircraft level

Cranfield Aerospace offers the airline industry an economically-viable route to zero emissions

Cranfield Aerospace

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CAeS is a world leader in complex aircraft modifications and new aircraft design:

- Delivered cutting-edge products for Airbus, Boeing, Rolls-Royce, Raytheon and others
- Holds critical Design Organisation (DOA), Production Organisation (POA) and Maintenance Organisation (MOA) approvals
- Track record of securing regulatory certifications from UK CAA, EASA, US FAA & others

Three business activities:

- Fresson: development of zero emissions propulsion systems for commercial aircraft
- Aircraft Maintenance, Repair & Overhaul (MRO)
- Design and manufacture of flight training and motorsport simulators
- £3.7 million normalised revenue in FY2022 from MRO and simulator divisions

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, operating businesses and regulatory approvals strongly differentiate CAeS from aviation technology start-ups



Senior Management & Advisers

PAUL HUTTON



CEO

CEO since 2015
Previously held executive positions at Thales and Astrium (Airbus UK)
Built Computer Science Corporation's Cloud & Cyber business in UK
Former CCO of Vocality, communications systems

HANIF NABI



COO

COO since 2021
Over 35 years in aerospace, defence, automotive & manufacturing
Previously held senior roles at Qualis Primus, Denso, Marshall Aerospace and Vector Aerospace
BEng in Aeronautical Engineering Technology

ANDY CRAWFORD



CFO

Appointed in 2021
37 years finance career in FTSE-100 and start-ups
Over 25 years manufacturing experience
Experience in fundraising and trade exits
Chartered Management Accountant

JENNY KAVANAGH



CSO

Joined 2017; CSO since 2020
17 years' leadership experience in aerospace new product development
Aerospace Technology Institute Advisory Group member – Zero Carbon Technology
Chartered Engineer

RICHARD MOODY



CIO

Appointed in 2022
Over 25 years investment banking leadership experience
Most recently, Global Head of Transportation Finance at Deutsche Bank
Previous roles at RBC Capital Markets and HSBC

ROB MARSH



**Engineering
Director**

MEng, MSc, CEng, FIMechE, FRAeS
Ex-RAF engineer officer; maintenance, structural integrity, logistic support, continuing airworthiness, fast jet, transport, historic
Ex-JLR logistics programme manager, new plants and vehicles

NICK SIBLEY

Adviser

Former Engineering Director for BAE Systems civil aircraft division

IAN GRAY CBE

Non-Exec Director

Spent his executive career at the highest levels within the aerospace industry, initially at British Aerospace and then Managing Director of Airbus UK.

JOHN ROBERTS

Adviser

Former Airbus UK Chief Engineer for the A380

PAUL CRAIG

Non-Exec Chairman

Former senior executive at Rolls-Royce, holding positions including Chief Engineer and President of Services & Operations.

Broad and deep management team leading >100 employees

Key Relationships



CAeS has built strong strategic relationships across the aviation and hydrogen eco-system

Shareholders



- Safran Corporate Ventures is the 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 and >80,000 employees
- HydrogenOne Capital (HGEN) is a 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) is the 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 and power technologies
- Motus Ventures is an early stage venture capital fund focused on innovative technology disruptions across global industrial markets, especially transportation
- Founded in 1946, Cranfield University is one of the worlds premier postgraduate academic institutions for aeronautical engineering and transportation systems, also conducting research into hydrogen production, storage, transportation and utilisation

Series A investors have validated CAeS's commercial and technical approach

4 phase market strategy



CAeS has current pre-orders of over \$140m in an addressable market for Phase 1 and 2 of over ~\$14 billion

Fresson Phase 1

Conversion of Britten-Norman Islander to H₂ propulsion

H₂ Fuel Distribution

(pipework from tanks to fuel cell)

240kW H₂ Fuel Cell

(stacks, balance of plant & control unit)



Power Distribution

(high voltage, high power electrical system)

H₂ Tanks

(high pressure)

220kW Electric Propulsion Units

(motors & inverters)

Propellers

(3-blade, variable pitch, 2,300 RPM)

Human Machine Interface

(modified controls & displays)

Thermal Management

(high efficiency, low drag & mass heat exchangers)

Key achievements to date:

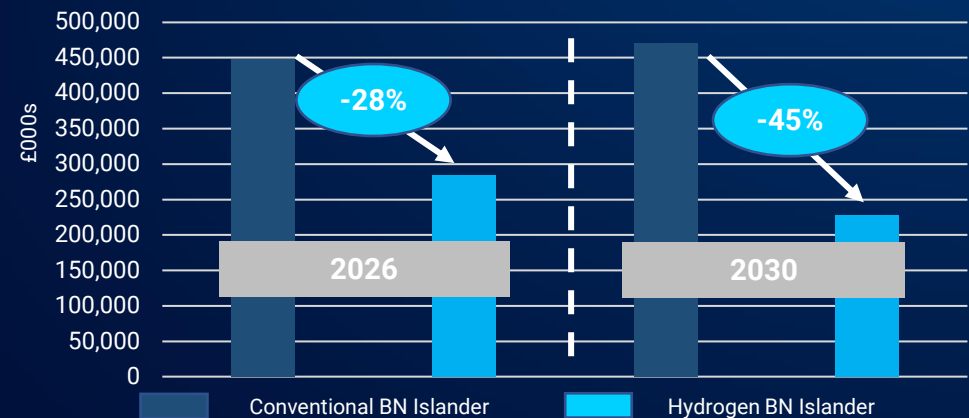
- Concept design review complete
- Preliminary Design Review complete
- Critical Design Review complete
- Key supplier design reviews complete:
 - Hydrogen fuel cell system
 - Electric motor
 - Hydrogen fuel tanks
 - Thermal management system
- Electrical system simplification
- Mass (weight) savings
- Advanced consultation with regulator (UK CAA)

Modification of existing, certified airframe reduces both technical and commercial risk

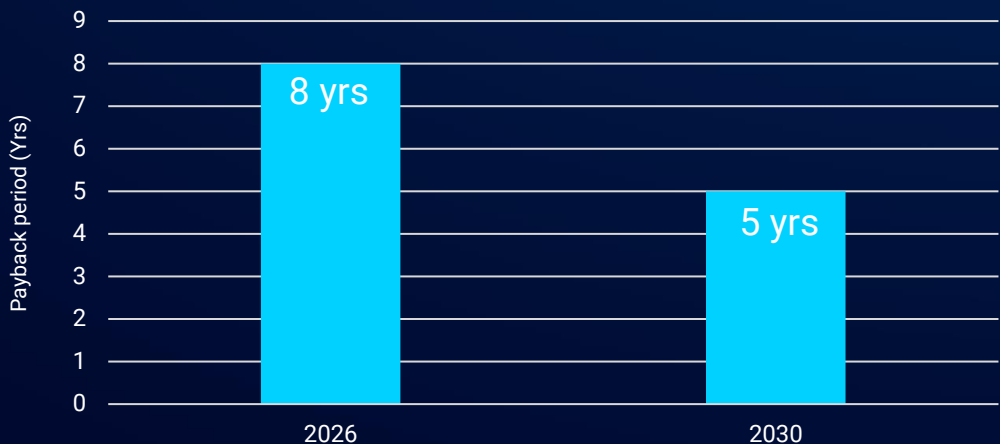
Economic and CO₂ benefits for operators

Economic ⁽¹⁾

Annual aircraft operating cost savings

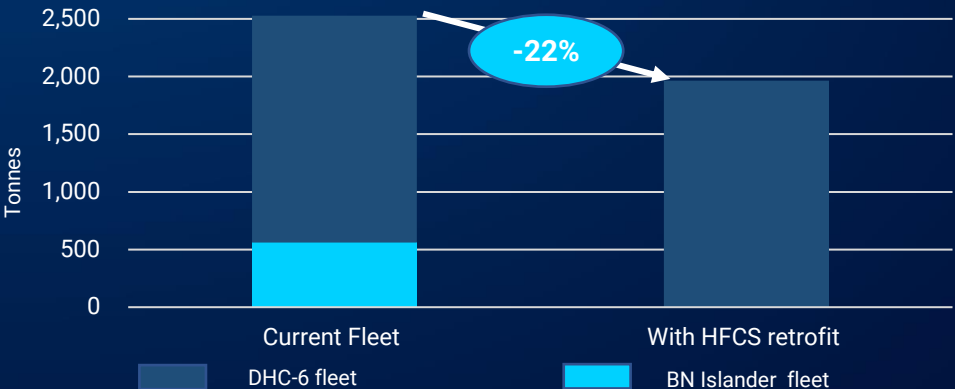


Payback Period of H₂ system

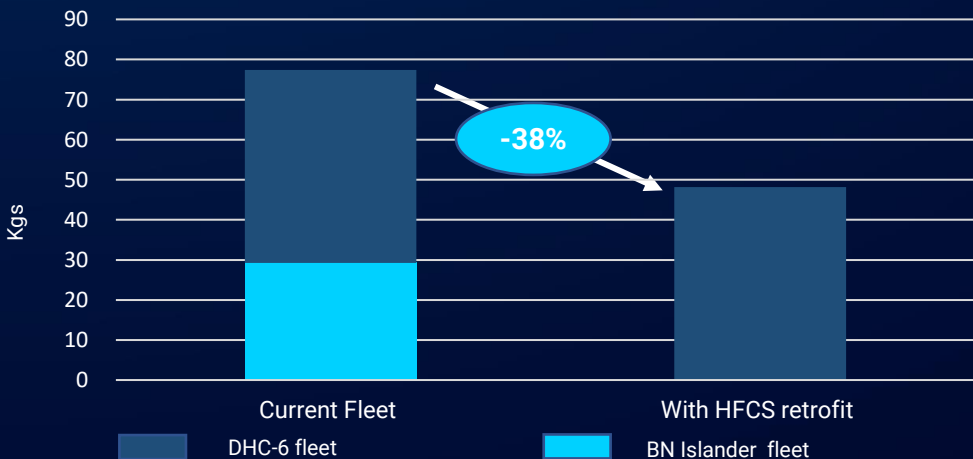


Environmental ⁽²⁾

Total annual fleet CO₂ emissions ⁽¹⁾



Annual CO₂ footprint per pax



⁽¹⁾ Source: CAeS research
· H₂ assumed to cost £2.50/kg in 2025 & £1.50/kg in 2030; Avgas @ £3.00 in 2025 + 1% annual increase
· Assumed to be £50/t CO₂ in 2025 & £100/t CO₂ in 2030
· Using latest factory overhaul charges for LY engine; assumes 30% of cost of H₂ system every 3500FH

⁽²⁾ Based on European operator with fleet of 4 x Islanders and 4 x DHC-6. 600 hours per aircraft pa. BN x 8 pax; DHC-6 x18 pax. BN using AVGAS; DHC-6 using A1. Operating costs per ⁽¹⁾

Development of new technology aircraft, alongside other decarbonisation pathways, is essential for aviation to meet its 2050 net zero goals

CAeS has limited competition in the zero-emissions aviation space

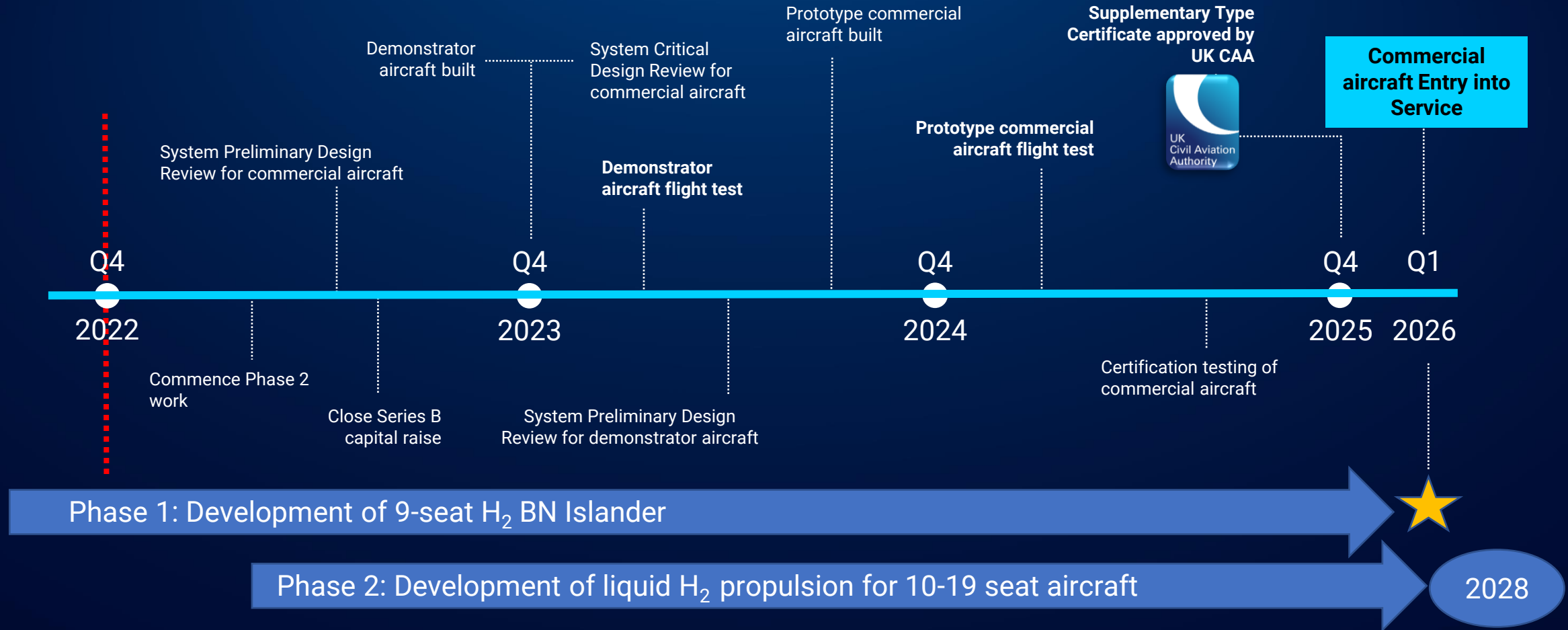
- Battery-electric and hybrid-electric do not deliver the essential combination of range and zero emissions
- CAeS is one of very few developers of H₂ propulsion technology with the aircraft integration capability and approvals required to secure regulatory certification
- Clear market strategy centred on a 4 phase development approach with initial focus on sub-regional market as optimal entry point for zero-emissions technology

Sustainable Aviation Fuel (SAF) has a role to play in decarbonising aviation

- The only medium-term solution for larger (medium/long haul) aircraft; industry needs both SAF & H₂ technologies to decarbonise
- Synthetic fuels (e-fuels) are the only sustainable form of SAF and require hydrogen for their production
- Unlike H₂ from renewable electricity generation, SAF is not zero emissions & will not deliver net zero by 2050 on its own

The aviation industry requires simultaneous development of multiple technologies and pathways to drive the decarbonisation agenda

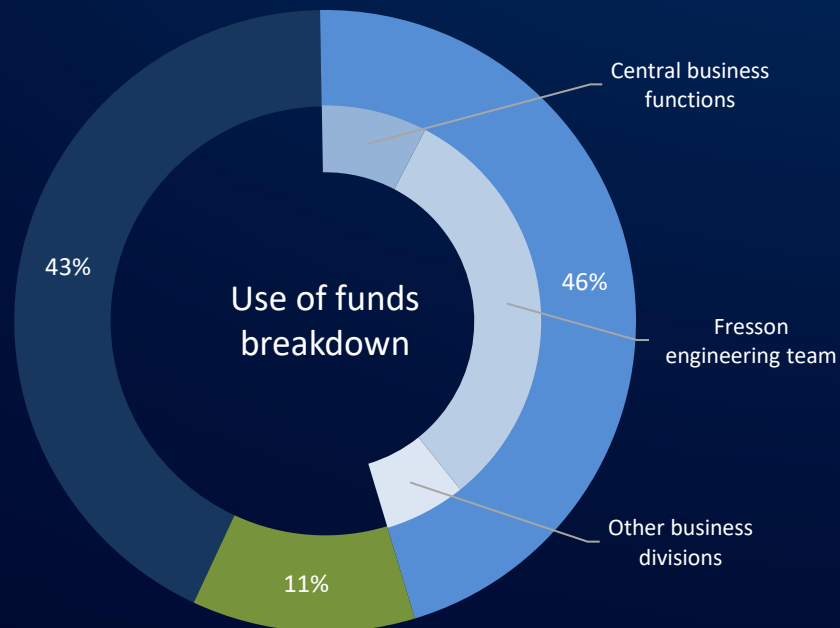
Timeline to Phase 1 Market Entry



Credible multi phased programme to deliver market entry products in parallel with technology scale-up

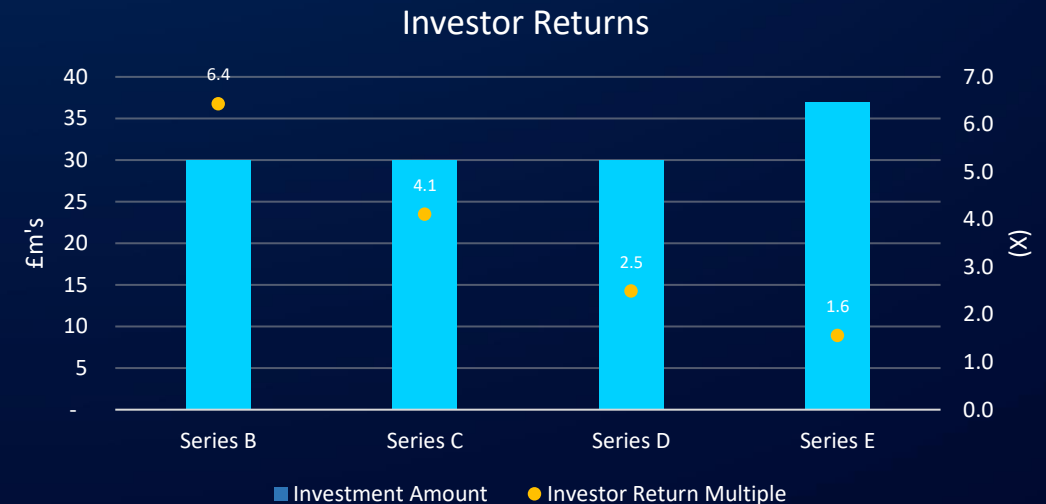
Capital Raising

- Over £21m (\$24m) of capital raised to date:
 - £6.5m (\$7.5m) grant from UK Aerospace Technology Institute
 - £14.4m (\$16.6m) Series A equity
- Currently raising £37m (\$43m) Series B



■ Subcontractor & supplier costs ■ Personnel costs ■ Overhead & general business costs

- Primary use of funds:
 - Take BN Islander H₂ conversion to commercial prototype build stage
 - Complete Preliminary Design Review for 10-19 seat airframe H₂ conversion
- ~20% participation in round by existing shareholders



Appendix



Aircraft Design & Modifications for Global OEMs



Designed & manufactured sub-scale blended wing flight test vehicle



"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



Designed & built full scale ground test eVTOL



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

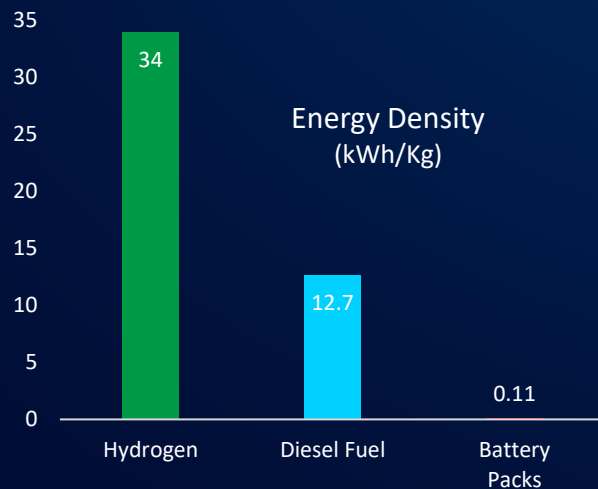


Cranfield has been trusted by global aerospace OEMs and UK government to integrate new technologies

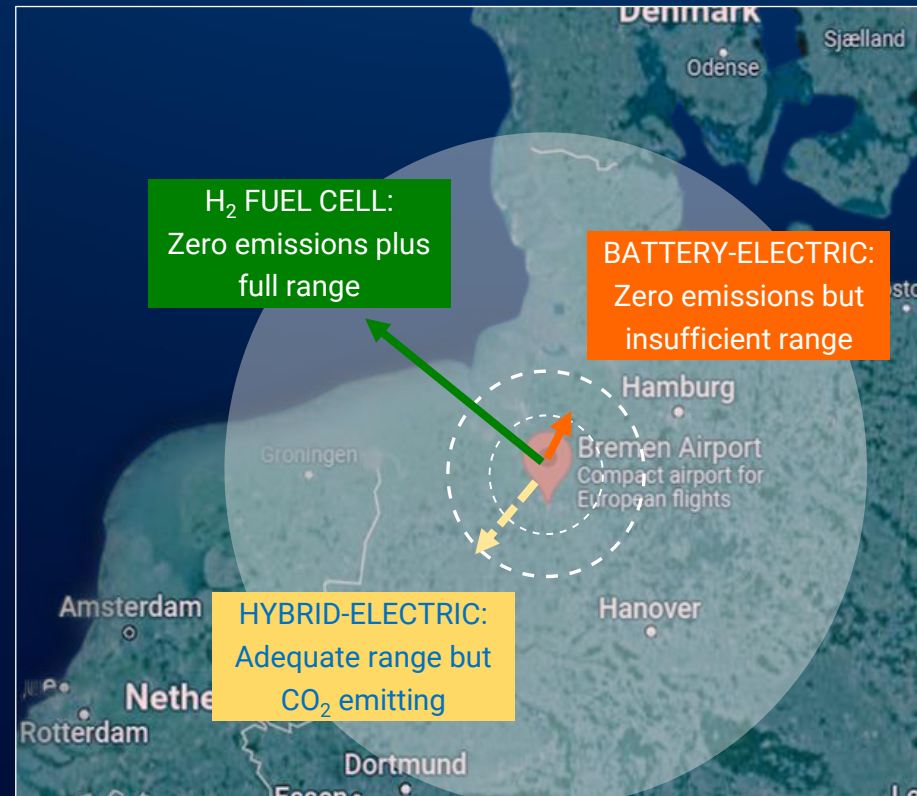
Phase 1 Technology Selection

BN Islander requires 60mins flight time + 45mins regulatory reserve to cover >80% of use cases

H₂ is the only solution providing range and zero emissions:



Gaseous H₂ has lowest production costs and most deliverable fuelling infrastructure requirements



Battery-Electric:

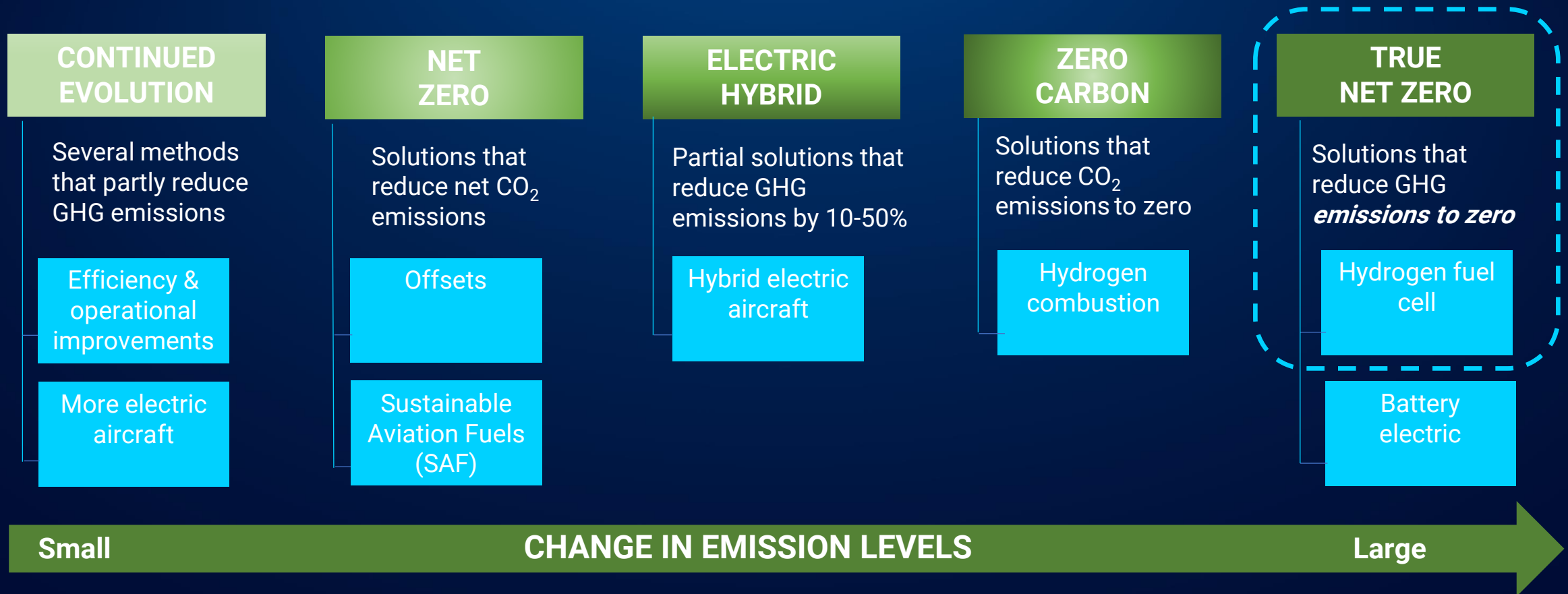
- Like H₂, a zero emissions solution at point of use
- But much less energy dense than either H₂ or conventional aviation fuel
- Cannot provide the required range or allow for regulatory reserve

Hybrid-Electric:

- Battery-electric supplemented by conventional engine
- Meets range requirements but carries significant extra weight
- Emits CO₂ for majority of flight, resulting in minimal benefit

H2 propulsion is the only technology offering required range and zero emissions

Aviation Sustainability Pathways



Source : Adapted from Roland Berger

“There is no viable path to a zero carbon or climate neutral aviation system that does not involve hydrogen”⁽¹⁾

Hydrogen Climate Impact

	Direct CO ₂	NO _x	Water vapour	Contrails, cirrus	Climate impact reduction potential
Synthetic Fuel	0% -100% (net)	0%	0%	-10-40%	-30-60%
Hydrogen Turbine	-100%	-50-80%	150%	-30-50%	-50-75%
Hydrogen fuel cell	-100%	-100%	150%	-60-80%	-75-90%

Source : Hydrogen powered aircraft – Clean Sky 2

“Hydrogen propulsion is projected to be 2-3x more effective than synthetic fuels in reducing aviation’s climate impact”⁽¹⁾