 **EA Maven**

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UK Regional Air Mobility Opportunity

Cranfield Aerospace Solutions
Hydrogen B-N Islander Case Study

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Foreword

Assessment of the Hydrogen B-N Islander Aircraft for the UK Market

Electric Aviation Maven (EA Maven), in collaboration with Cranfield Aerospace Solutions (CAeS), has evaluated the performance characteristics of the Hydrogen B-N Islander aircraft. This aircraft is powered by a fuel cell system and electric motors, incorporating Reaction Engines technology to manage thermal output.

Using operational data provided by CAeS, EA Maven assessed the Hydrogen B-N Islander's potential to serve the Regional Air Mobility market in the United Kingdom.

Our analysis, based on EA Maven's UK Regional Air Mobility Opportunity dataset, outlines the aircraft's total market potential and a forecast for 2035, considering its operation on various routes and airports across the UK.

Key Findings:

- The Hydrogen B-N Islander could operate from 63 airports across 619 routes, covering 90% of the 684 routes identified by EA Maven.
- To support this network, there would be a need for 1,420 aircraft.
- The total time savings could amount to up to 39.9 million hours, valued at £924 million to the economy through increased productivity.
- Operator ticket revenue could reach and exceed £3.6 billion per year.
- Assuming the use of green hydrogen, the aircraft could help remove 426,000 tonnes of carbon emissions from other surface modes of transport, though this would require 2.3 TWh of green electricity.

This assessment demonstrates the significant potential of the Hydrogen B-N Islander aircraft to enhance regional air mobility in the UK, providing substantial economic, operational, and environmental benefits.



Total UK vs CAeS RAM Potential Summary

Route Network

Total RAM Potential*

63

Airports

684

Viable routes



Average
Sector Length
143mi

Hydrogen B-N Islander RAM Potential

63

Airports

619

Viable routes



Average
Sector Length
121mi

The Hydrogen B-N Islander could operate from 63 airports across 619 routes, covering 90% of the 684 routes identified by EA Maven.

* Total RAM potential regardless aircraft type

Total UK RAM Potential Summary – CAeS Aircraft

 **63/619** airports*/routes**

 **TM – 416.8m** travellers annually***

 **83.3%** of journeys by car producing significant carbon emissions

 **22.2%** business, **77.8%** leisure/VFR travellers

 **39.9m** hours saved weekly/annually if switched to RAM**** 4.5k years annually!

 **£3.6bn** Annual operator ticket revenue

 **Up to 1,420** aircraft required*

 **426.3k tonnes – H2 Aircraft**
Carbon emission savings (on people switching from cars and rail) **annual** assuming using **Green Hydrogen only**

 **113.2k tonnes – H2 Aircraft**
Carbon emission savings (on people switching from cars and rail) **annual** assuming using Hydrogen (**22% of blue and 78% grey hydrogen**)***

 **2,359 GWh** of sustainable electricity to create the **45m kg** of hydrogen for an all-hydrogen system

 **£663m**
Annual airport operator revenue from landing and ground handling charges

* Based on LAU1 UK spatial division of 400 shapes. Each airport and its respective catchment based on the shape where each airport is located plus the adjacent shapes.
** Total possible routings between all airports and their respective catchment areas with a minimum distance of 70 statute miles and maximum of 250 miles (max CAeS aircraft range, excluding 45 mins' reserve). Excluding routes touching London.
*** Sum of all travellers on all 619 routes analysed. Demand numbers based on airports' catchment areas.

* Assuming all routes are operated. Calculations based on a CAeS 9-seater aircraft. Annual aircraft utilisation at max 2000hrs.
** Across all routes
*** CO2 emission of 9kg per 1kg of grey hydrogen, 2kg of CO2 per 1kg of blue hydrogen, and 0.5kg of CO2 per 1kg of green hydrogen.

Total UK RAM Potential Summary – CAeS Aircraft

Economic Boost by Top Regions (annually)

RAM

£227.5m

£143.5m



£924m per year****

Economic stimulation through increased productivity

£54.2m

£35.2m

£82.3m

£149.6m

Data: R. J. NOAA, U.S. Navy, NGA, GEBCO
Image: Landsat, Copernicus

Total UK RAM Potential Summary CAeS Hydrogen B-N Islander

Assuming 10% of routes operated in 2035

Total UK AAM Potential Summary – CAeS Aircraft

10% routes operated in 2035



 23/67 airports*/routes**

 79.0% of travellers by car producing significant carbon emissions

 27.5% business vs 72.5% leisure/VFR travellers

 4.2m hours saved annually if switched to RAM****
481 years annually!

 110.1m per year****
Economic stimulation through increased productivity

 Up to 194 aircraft required*
Assuming 7 operators operating on 67 routes from 15 hubs

 56.2k tonnes
Carbon emission savings (on people switching from cars and rail) **annual** assuming using GREEN Hydrogen

 11.2k tonnes
Carbon emission savings (on people switching from cars and rail) **annual** assuming using Hydrogen (22% of blue and 78% grey hydrogen)***

 339.7 GWh to create the 6.47m kg of hydrogen for an all-hydrogen system

* Based on LAU1 UK spatial division of 400 shapes. Each airport and its respective catchment based on the shape where each airport is located plus the adjacent shapes.
** Total possible routings between 23 airports and their respective catchment areas with a minimum distance of 70 statute miles and max distance of 250 miles (max CAeS aircraft range, excluding 45 mins' reserve). Excluding routes touching London.

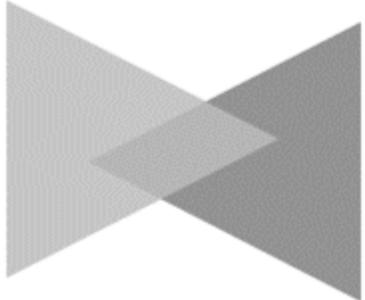
* Assuming all routes are operated. Calculations based on a CAeS 9-seater aircraft. Annual aircraft utilisation at max 2000hrs.
** Across all routes
*** CO2 emission of 9kg per 1kg of grey hydrogen, 2kg of CO2 per 1kg of blue hydrogen, and 0.5kg of CO2 per 1kg of green hydrogen.

Total UK RAM Potential Summary – CAeS Aircraft

10% routes operated in 2035 – **RAM** Operators Analysis



Operator	Hubs	Routes	Aircraft	Pilots	Maintenance	Landings (k)	Pax (k)	Revenue (£m)
1	6	42	30	178	3.0	60.4	511.4	£65.9
2	4	36	28	171	3.0	66.5	565.8	£65.1
3	4	29	18	108	2.0	42.6	360.3	£41.1
4	7	47	43	255	5.0	90.8	772.5	£95.7
5	4	35	27	163	3.0	54.2	459.8	£60.2
6	5	37	24	144	3.0	53.0	448.9	£54.1
7	5	36	24	146	3.0	47.7	406.8	£53.8
Total	15	67	194	1,165	22	415.3k	3.5m	£435.9m



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