

# AAM UK City Index

## UK Cities Market Assessment

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# Introducing Electric Aviation Maven or EA Maven

# Team



**Darrell Swanson**  
Director | Co-Founder

- ▶ 25 years' experience in airport master planning, design, acquisition due diligence
- ▶ Electric aviation thought leader with reference to the evolution of Distributed Aviation as enabled by electric propulsion systems
- ▶ Development of country wide demand modelling for electric aircraft operators
- ▶ NASA TVF Working Group Leader/Advisor
- ▶ Board member of the British Aviation Group
- ▶ Advisor to CAMI, ADS AAM, VFS, Flight Crowd and Civata Global on Electric Aviation



**Jarek Zych**  
Director | Co-Founder

- ▶ 16+ years of experience in the commercial aviation sector focusing on airline and airport network development services
- ▶ Development of advance air mobility demand modelling tool and regional air mobility indexing method
- ▶ Development and optimisation of airline networks, schedules, operations, fleet, and revenues
- ▶ Strategy development and route analysis resulting in British Airways, Lufthansa and Hainan Airlines establishing services at San Jose, Air France at Taipei including network development, business planning and market assessment projects
- ▶ Advising leading airlines and airports by providing traffic, schedule, and real-time aircraft operations data

# Advanced Air Mobility will change the 'why' you choose to fly

EA Maven is a management consultancy firm focusing on solving the key challenges in the area of AAM infrastructure through the provision of AAM strategy support, demand modelling, infrastructure design and due diligence services.

AAM Demand  
Modelling &  
Scheduling



AAM Air Service  
Development



AAM Market  
Assessment



Advanced  
Air Mobility  
Infrastructure



AAM Air/Vertiport  
Acquisition  
Due Diligence



AAM Carbon  
Emission Savings  
Assessment



AAM Revenue  
Forecasting



# Foreword

- The AAM UK City Index is an extension of EA Maven's approach to demand modelling for traditional and Advanced Air Mobility aircraft operations.
- AAM market assessments allow OEMs, airlines and investors to understand the potential for new routes given the performance of AAM eVTOL aircraft and access to novel sources of data.
- The AAM UK City Index ranks which city have the highest potential of securing new AAM services using AAM eVTOL aircraft.

# Distributed Aviation & Regional Air Mobility





# Distributed Aviation leads to Regional Air Mobility



## Advanced Air Mobility Group

Championing the UK as a world leader in Advanced Air Mobility. This ADS Special Interest group is for ADS members and stakeholders involved in the smaller-vehicle, more autonomous



Mark Moore • 1st

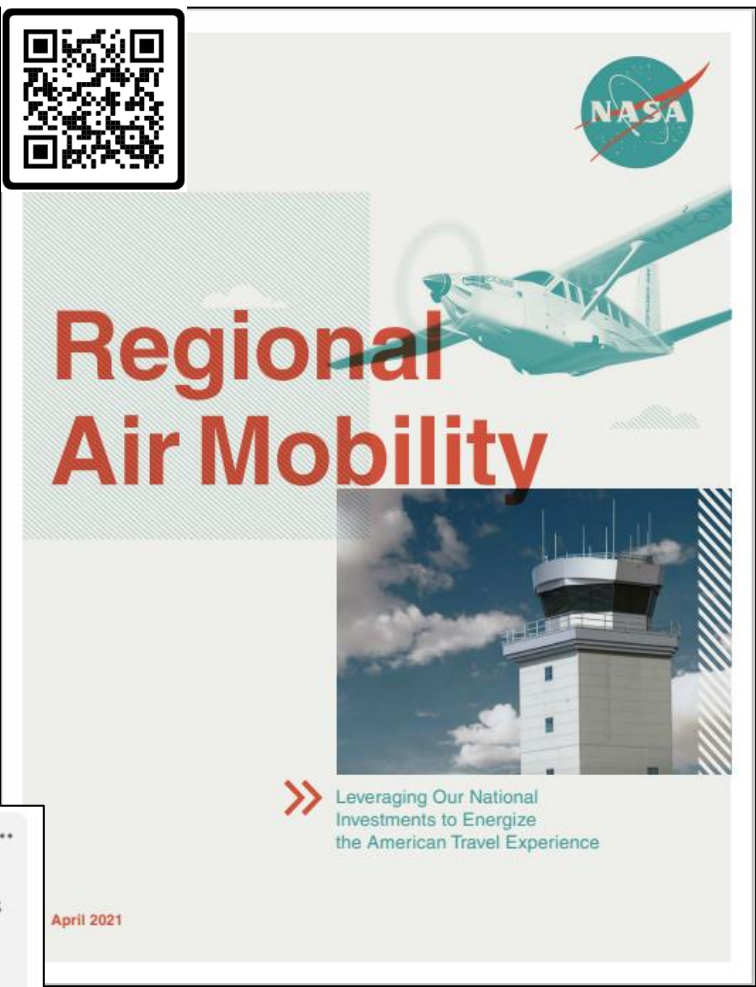
Starting Something New at Coming Soon...

1d \*\*\*

An excellent white paper that focuses on the important economic details that make electric aviation so compelling for these shorter urban and regional routes. This is about much more than the UK market, and is a great sounding board for any global market who are thinking about developing compelling electric aircraft networks.

Like · 5 · Reply

<https://www.adsgroup.org.uk/blog/distributed-aviation-a-new-economic-model-for-electric-aviation>



» Leveraging Our National Investments to Energize the American Travel Experience

April 2021

<https://sacd.larc.nasa.gov/ram>



With advanced air mobility (AAM) shaping the future of flight, Darrell Swanson and Jarek Zych explain how Electric Aviation (EA) Maven's Regional Air Mobility Index works and how it can help airports identify opportunities for new routes.

The aviation industry is undergoing significant changes, with advancements in traditional hydrocarbon-powered and electric aircraft.

In 2021 EA Maven published a paper titled Distributed Aviation - A New Economic Model for Electric Aviation, which looked at how these advancements in technology will lead to a shift from the traditional hub and spoke model of commercial aviation to a newer more direct system. It also set out the economics of future air mobility.

Building on this work, EA Maven has more recently collaborated with UK Research and Innovation to explore advanced air mobility opportunities in the UK, by taking a deep dive into 20

potential routes for electric aviation services. Expanding on this, EA Maven has now created a Regional Air Mobility (RAM) index which analyses the opportunities for electric aircraft between 32 regional airports in the UK.

### MODELLING ON UK HUBS

Using airports affiliated with the Regional and Business Airports (RABA) group, the UK RAM index ranks which of these airports have the highest potential to secure new routes.

This assumes using traditional aircraft, electric conventional take-off and landing (eCOTL) aircraft and electric vertical take-off and landing (eVTOL) aircraft. The RABA Group represents 42

airports which account for 75% of all the airports in this category in the UK. Collectively they carry more than 10 million passengers per annum.

Out of the 42 RABA airports, insights were provided for 32 regional hubs, with the RAM index looking at the total flow of travellers between catchment areas around these airports.

The ranking process considers several factors that indicate the propensity for a traveller to switch from one mode of transport to another, with a focus on traditional aviation services or future AAM services powered by electric propulsion systems.

A total of 1,050 possible routes (the total number of connections between all the airports but not including connections where there was no traffic) were considered across the network covered by the 32 airports.

The Total Addressable Market (TAM) is just over five million travellers per week or 242 million travellers per annum, which is a measure of the unfilled potential markets. Due to a lack of public transportation options, a staggering 81% of these travellers usually travel by car,

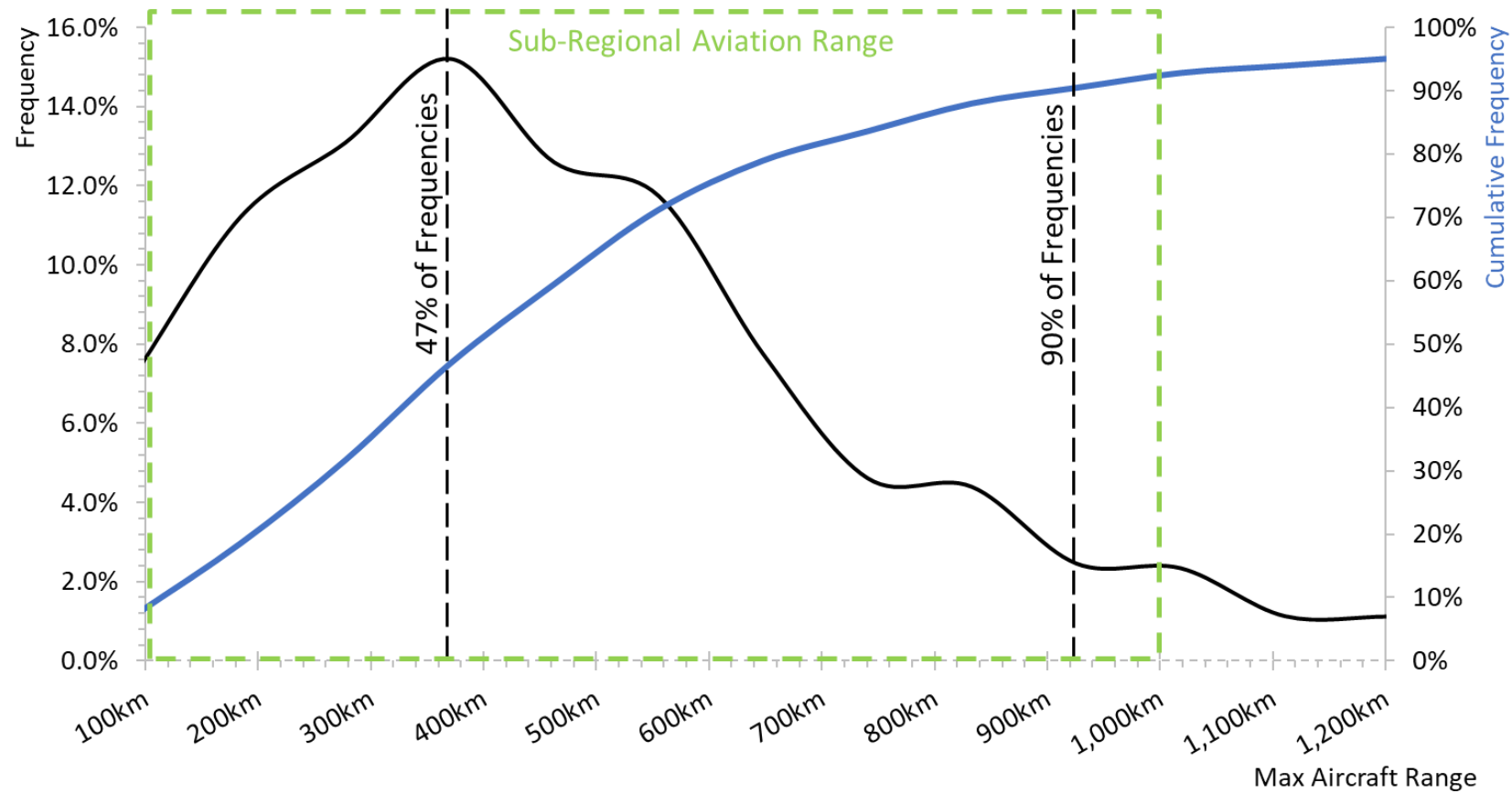
Regional Gateway | 49

[https://www.regionalgateway.net/mags/SXNzdWUxNiBNYXJjaDIwMjNj\\_March\\_2023c/index.html](https://www.regionalgateway.net/mags/SXNzdWUxNiBNYXJjaDIwMjNj_March_2023c/index.html)



## Regional Jets/Turbo Props Frequency Distribution vs Cumulative Frequency - Europe

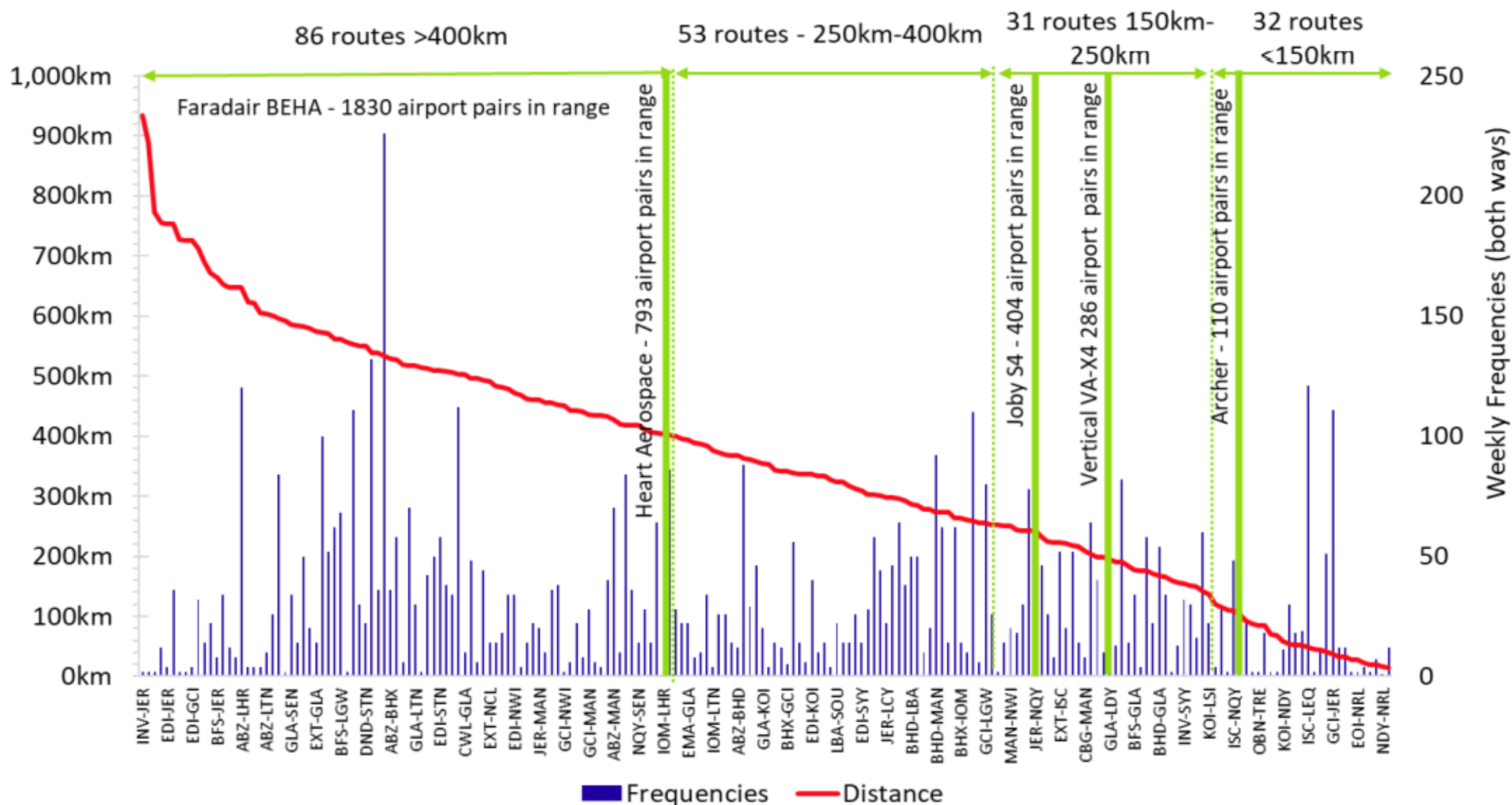
Source: EAMaven analysis



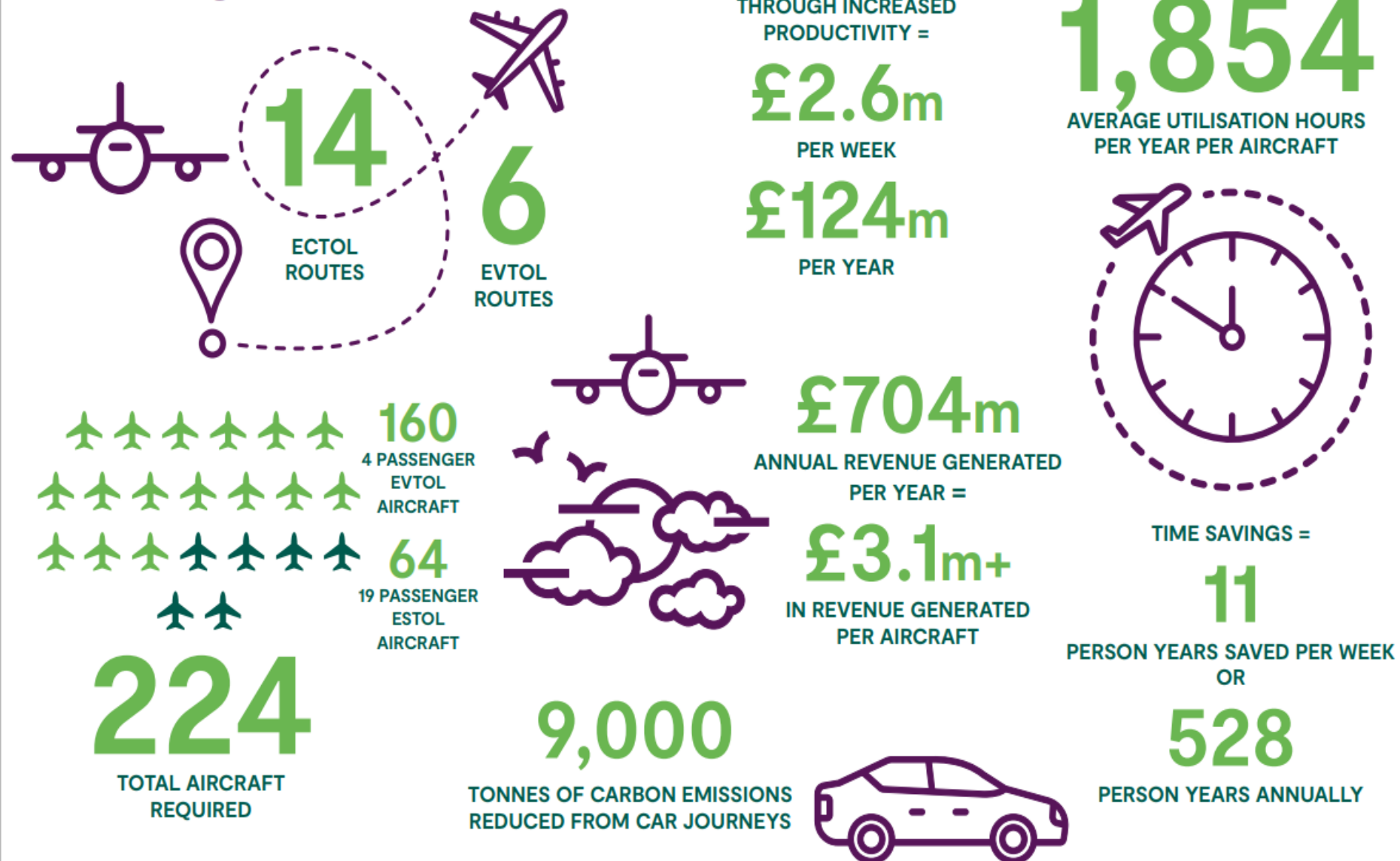
- ▶ 47% of frequencies in Europe are offered within 400km, and 90% of frequencies are within 900km.
- ▶ There is a clear demand for sub-regional services up to 1000km.

# UK Domestic Flights - Distance & Frequencies (Both Ways)

Source: EAMaven analysis



# The Big Numbers at a glance



UK Research  
and Innovation



Date 2022

## UK Advanced Air Mobility (AAM) Market Assessment

An analysis of 20 potential routes in the UK for AAM aircraft operations



# UK Cities Market Assessment

# AAM UK City Index - Big Numbers – all routes



368 cities analysed\*



13,281 routes analysed\*\*

of 40,906 routes in total (with no distance restrictions)



TAM – 9.8m/470.4m travellers weekly/annually\*\*\*



80.3% of travellers by car producing significant carbon emissions



31.4% business travellers 68.6% of leisure/VFR travellers

\* Based on LAU1 UK spatial division of 400 shapes. 1 shape = 1 city (largest), London includes 32 shapes.

\*\* Total possible routings between all cities within distance (50-120 statute miles) and with population (min 20k inhabitants per city)

\*\*\* Sum of all travellers on 13,281 routes analysed. Demand numbers scaled down based on population distribution (city-city demand adjustment).

# Big Numbers – top routes



264/994 cities\*/routes\*\* analysed



TM – 6.6m/316.8m travellers weekly/annually\*\*\*



75% of travellers by car producing significant carbon emissions



33.3% business vs 66.4% leisure/VFR travellers



1.7m/85.4m hours saved weekly/annually if switched to AAM\*\*\*\*  
203/9.7k years! weekly/annually



£46.7m/£2.2bn per week/year\*\*\*\*

Economic stimulation through increased productivity

\* Based on LAU1 UK spatial division of 400 shapes. 1 shape = 1 city (largest), London includes 32 shapes. Cities selected based certain sifting criteria.

\*\* Total possible routings between all cities based on 3 main selection criteria: distance (50-120 statute miles), population (min 20k inhabitants per city), travellers (min Xk travellers per week)

\*\*\* Sum of all travellers on 994 routes analysed. Demand scaled down based on population distribution (city-city demand adjustment).

\*\*\*\* Based on mixed capture rates of top 994 routes (proxied against other EA Maven AAM demand modelling analysis). Time savings based on flight time vs car/rail travel time ratios for business and leisure travellers.

Economic stimulation based on the DfT WebTag data.

# Big Numbers – Business Travellers



**69.6%** of business travellers travel by car on all **994 routes**



**475** routes with business travellers % share of more than **30%**

**26** routes with business travellers % share of more than **50%**



On top 26 business routes

**TM – 160k/7.6m** travellers weekly/annually\*\*\*



**48.7%** of business travellers by car on **top 26 business** routes



**£335k/£16.1m** per week/year\*\*\*\*

**Top 26 routes**

Economic stimulation through increased productivity

\* Based on LAU1 UK spatial division of 400 shapes. 1 shape = 1 city (largest), London includes 32 shapes. Cities selected based certain sifting criteria.

\*\* Total possible routings between all cities based on 3 main selection criteria: distance (50-120 statute miles), population (min 20k inhabitants per city), travellers (min Xk travellers per week)

\*\*\* Sum of all travellers on 994 routes analysed. Demand scaled down based on population distribution (city-city demand adjustment).

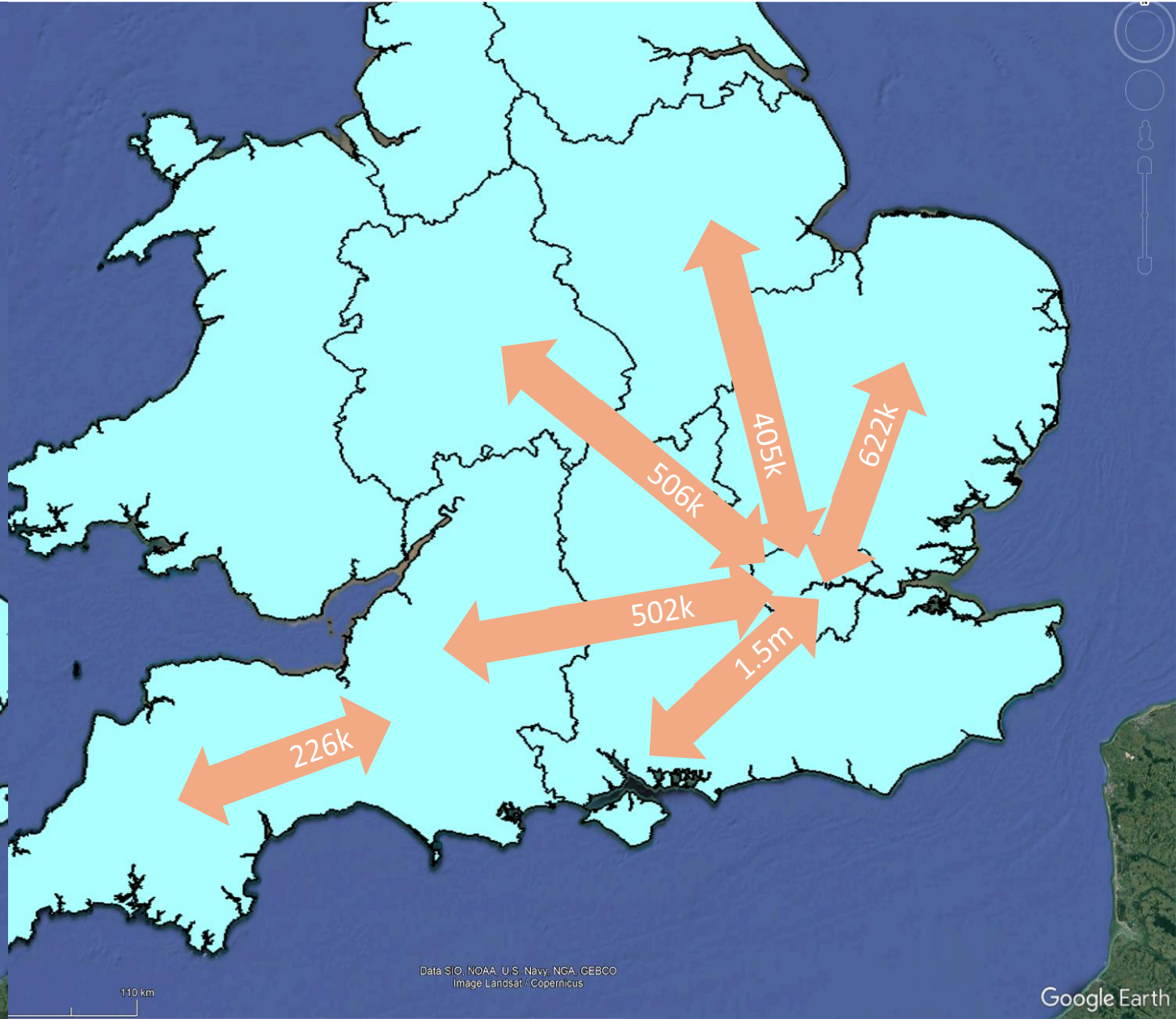
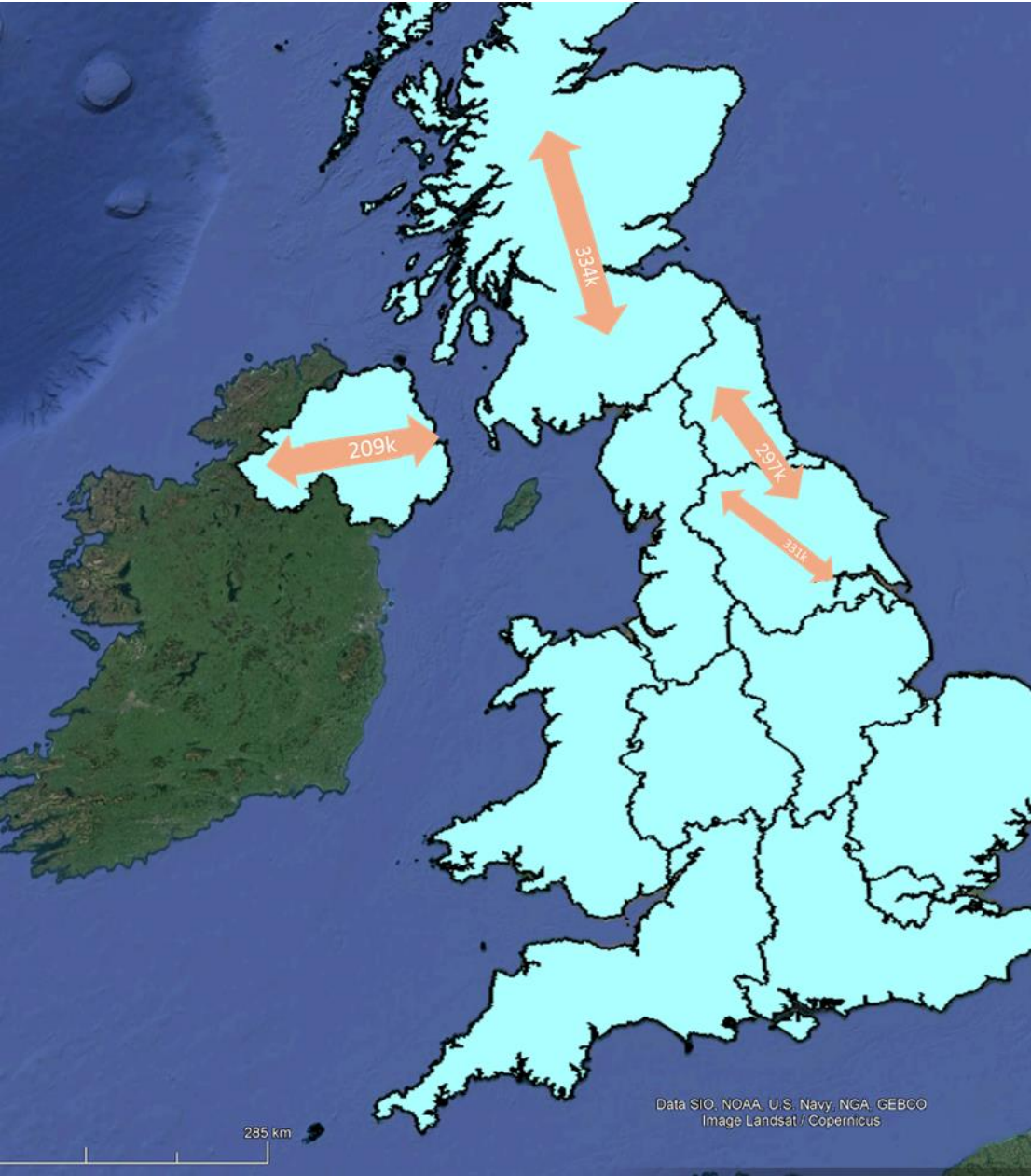
\*\*\*\* Based on mixed capture rates of top 994 routes (proxied against other EA Maven AAM demand modelling analysis). Time savings based on flight time vs car/rail travel time ratios for business and leisure travellers.

Economic stimulation based on the DfT WebTag data.



# Weekly travellers both ways by region (top 10)

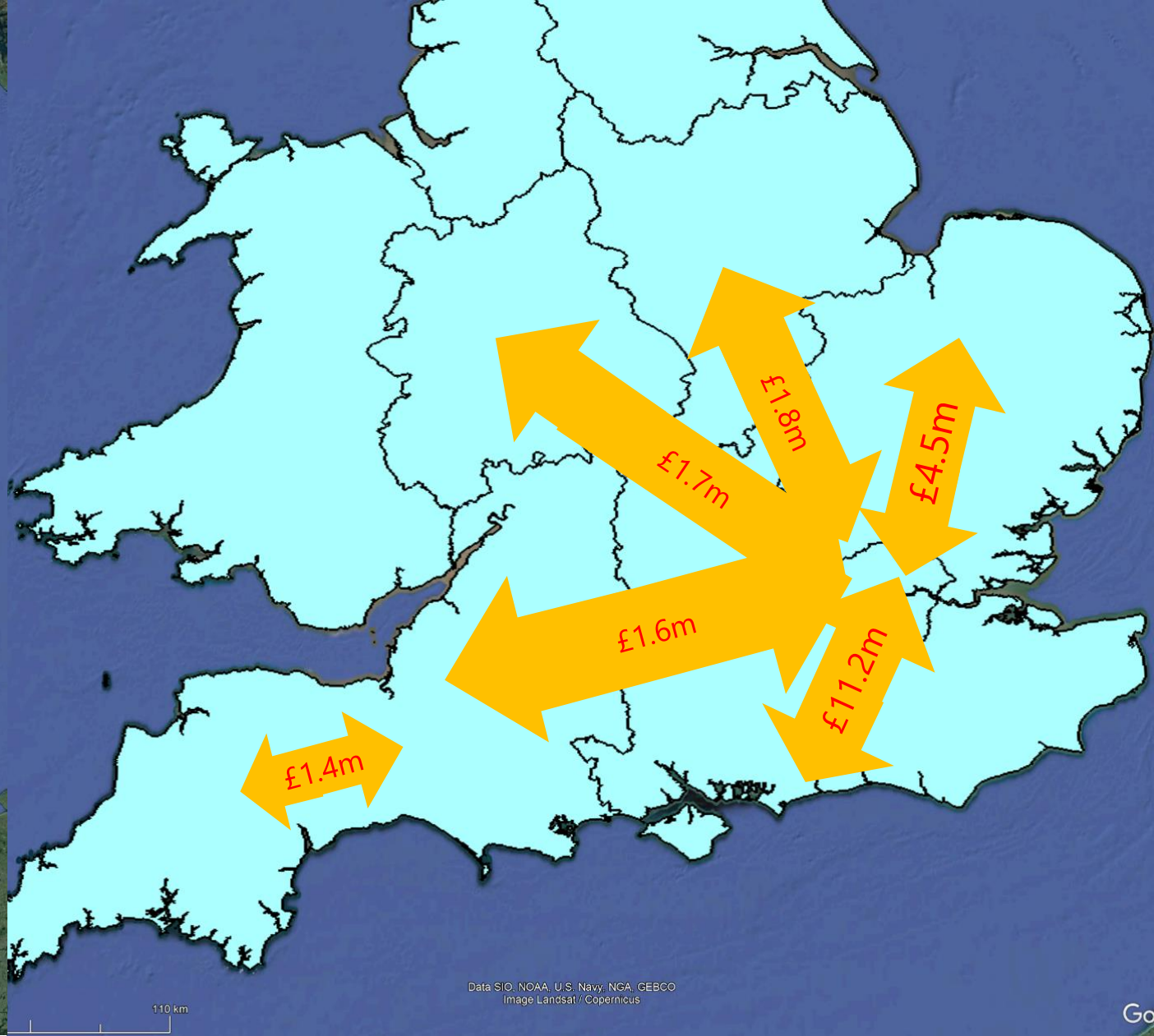
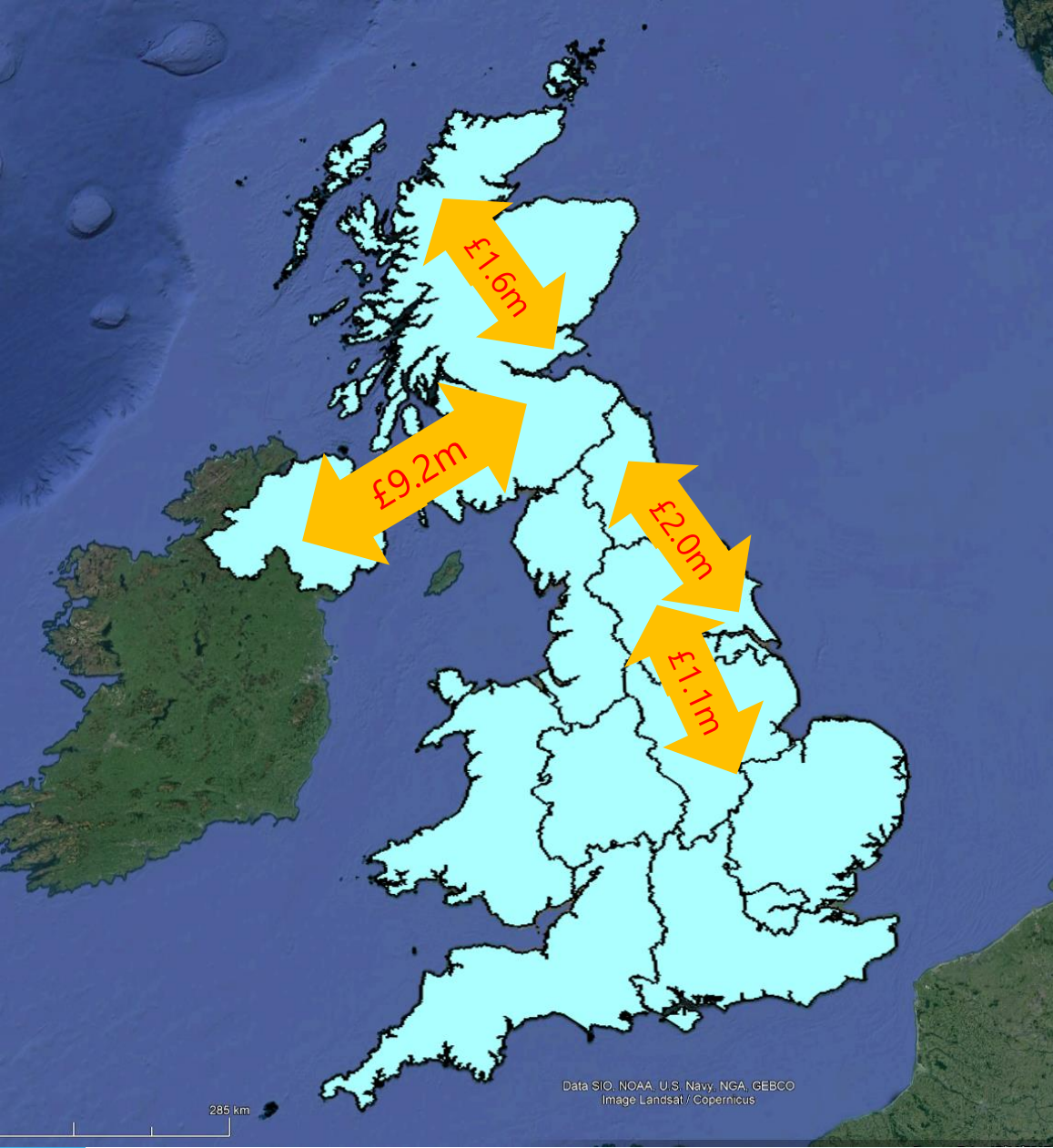
Based on top 994 routes between 264 cities, routes between 50-120 miles, population min 20k, Xk traveller's weekly minimum.





# Weekly Economic Boost by Region (top 10)

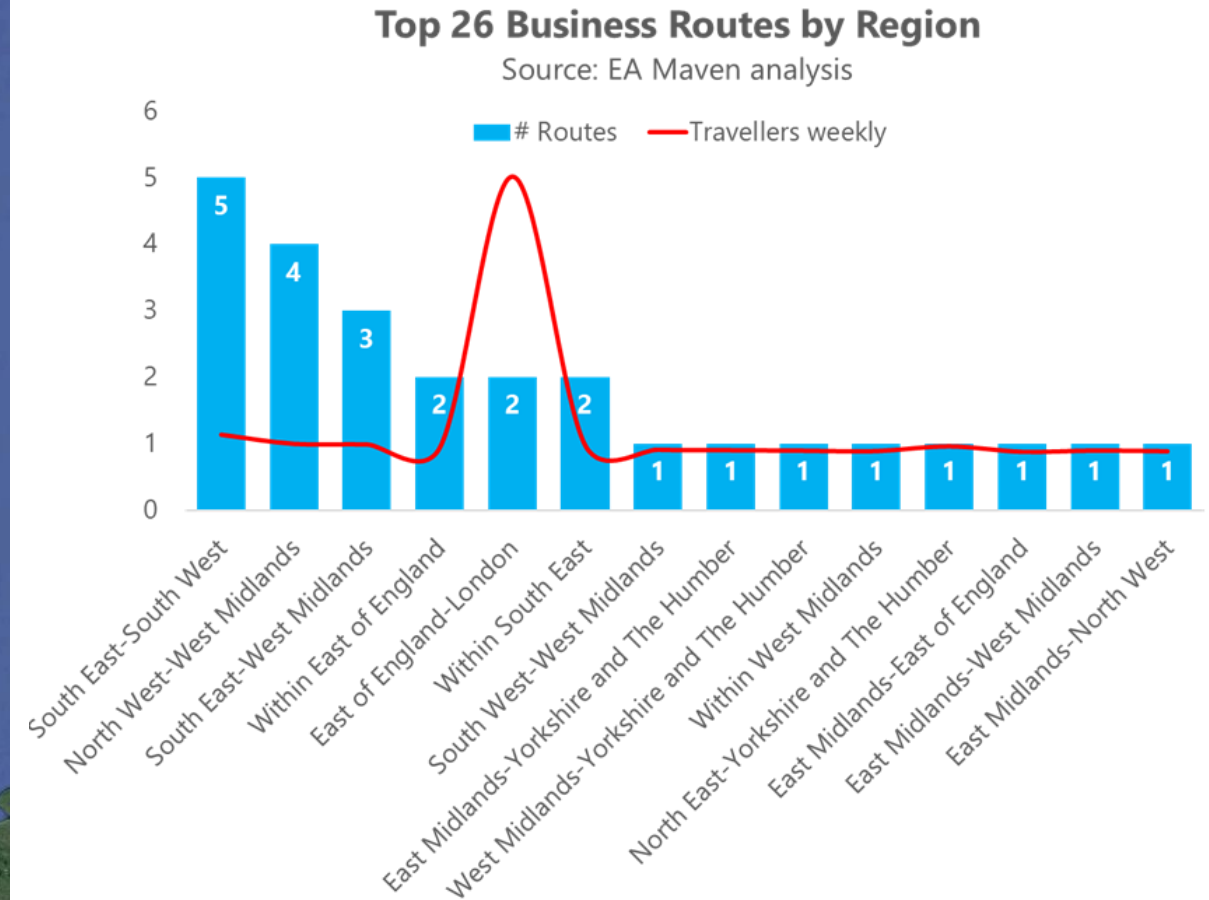
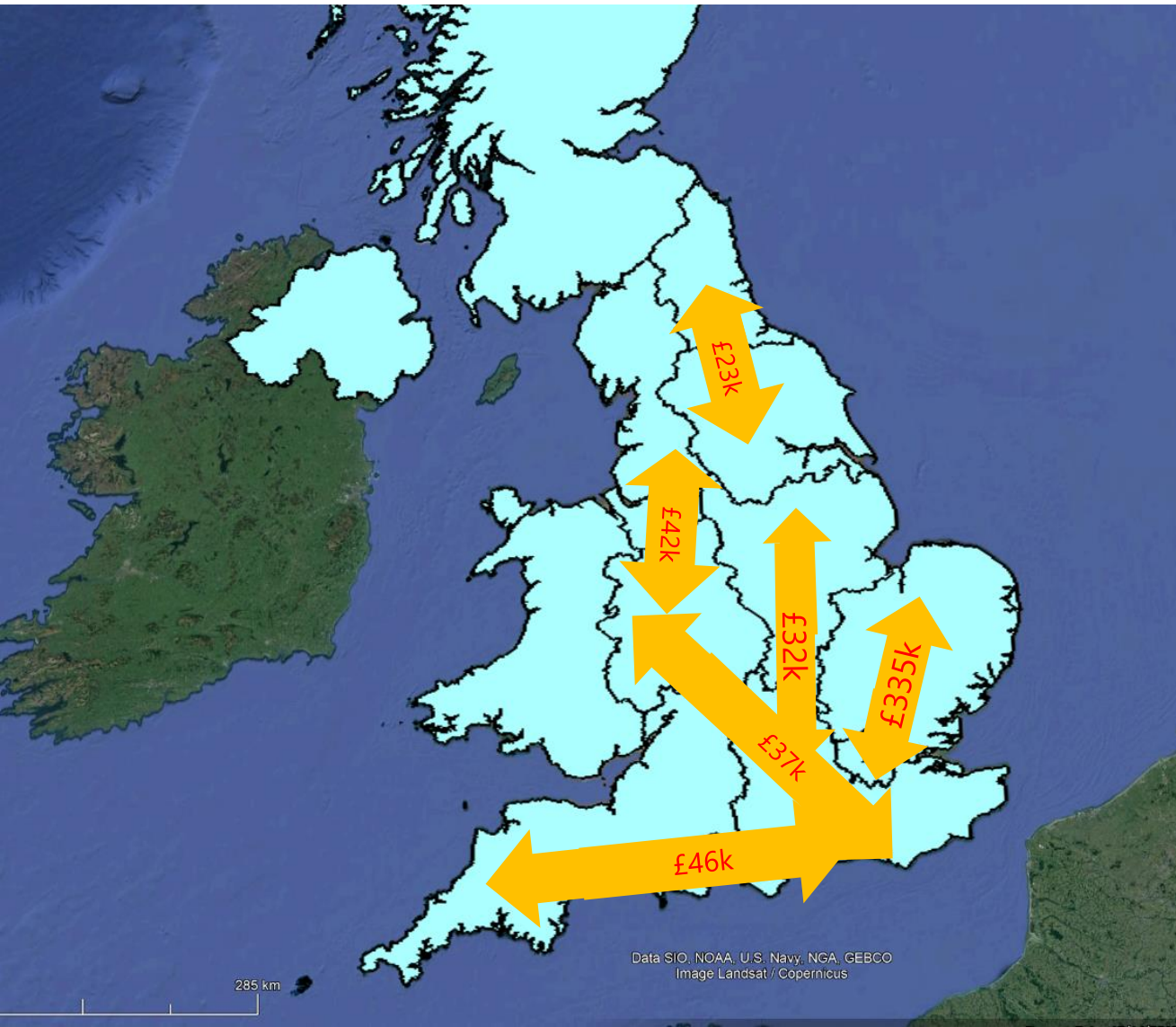
Based on time saved from switching modes



# Top 26 Business Travellers' Routes\*

## Weekly Economic Boost by Region (top 5)

Based on time saved from switching modes



\* Total possible routings between all cities based on 3 main selection criteria: distance (50-120 statute miles), population (min 20k inhabitants per city), travellers (min Xk travellers per week) and >50% of business/work travel.

# Big Numbers – Top Cities – Networking Potential



264

Cities with a share of  
994 routes\*



= > 50

routes  
3 cities – go on, have a guess

20-49

routes  
15 cities

10-19

routes  
47 cities



96

routes  
For the top city

3.5m

Travellers weekly on the 96 routes  
from the top city

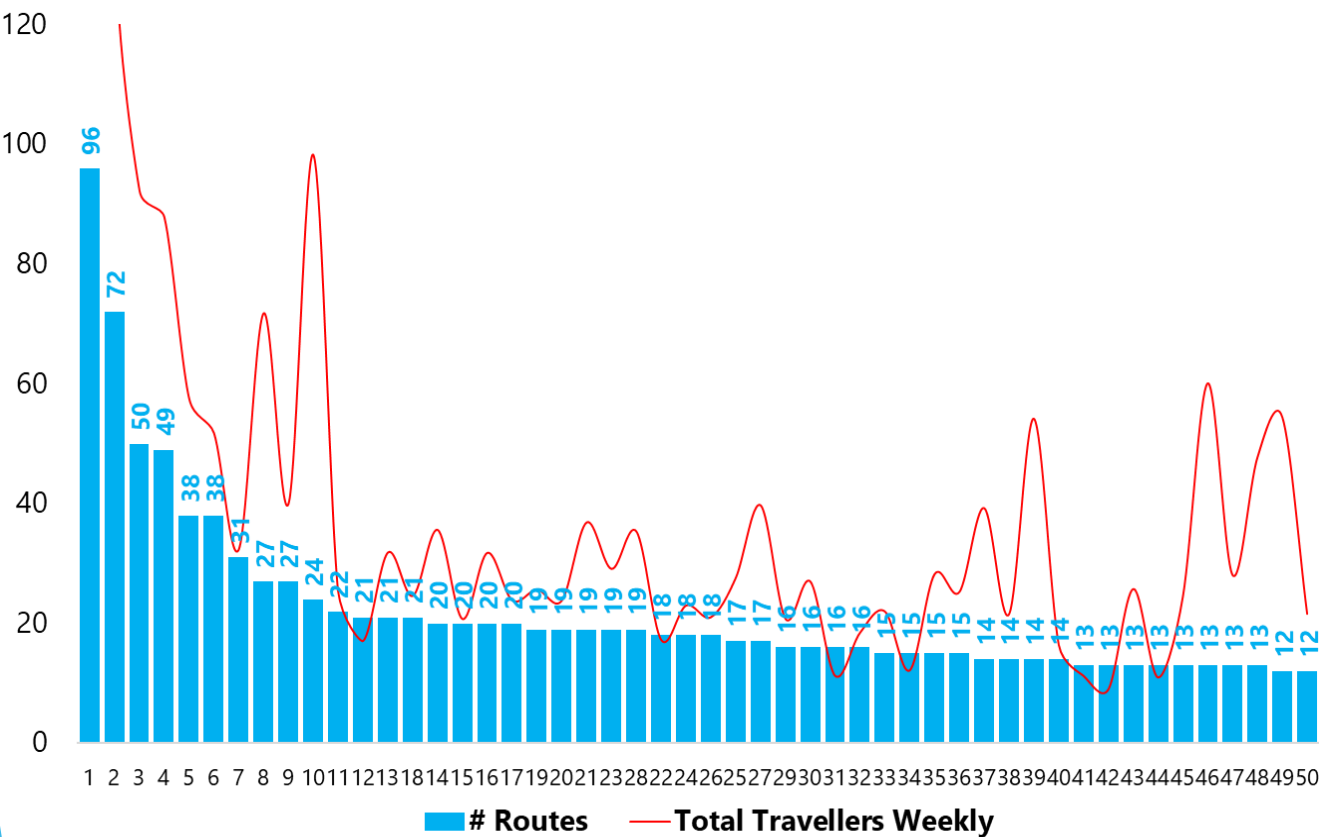
\* All routes from/to cities with at least Xk weekly demand, based on weekly travels mobility data, annualised.



# Market Assessment (Top 994 routes - travellers)

## Top UK Cities - networking potential The number of routes & total travellers weekly

Source: EAMaven analysis



Routes	In no order	Number of Cities	Travellers weekly combined
21-96	Redacted	14	5.76m
15-20		22	1.59m
<15		228	5.94m

- The top 994 routes identified are served from/to 264 Cities UK.
- The networking potential for each City is analysed based on the number of possible routes that could be served from/to each city.
- Detailed analysis on the routes from each city would be available in the paid version of the report.

\* Based on UK spatial division of 400 shapes. 1 shape = 1 city (largest), London includes 32 shapes. Cities selected based selected sifting criteria. Total possible routings between all cities based on 3 main selection criteria: distance (50-120 statute miles), population (min 20k inhabitants per city), travellers (min Xk travellers per week) Sum of all travellers on 994 routes analysed. Demand scaled down based on population distribution (city-city demand adjustment). Based on mixed capture rates on top 994 routes.

# UK Cities AAM Aircraft Capabilities

## Electric Aircraft (eVTOL)

## Top 994 City Pairs in Range\*\*

## City Pairs in Range\*



EVE Air Mobility – 60m



Volocopter Volo Region – 60m



Wisk – 90m

342

6742

833

12433

\* Based on all possible routings from/to 368 cities (mobility data analysis), with no distance threshold or minimum travellers' restrictions

\*\* Based on top 994 routings from/to 298 cities (mobility data analysis) with distances longer 50-120miles and min Xk travellers per week. Cities with population of 20k minimum



## Electric Aircraft (eVTOL)

## Top 994 City Pairs in Range\*\*

## City Pairs in Range\*



Auto Flight- 100m



Vertical VX4- 100m



Archer Midnight - 100m

895

14455

\* Based on all possible routings from/to 368 cities (mobility data analysis), with no distance threshold or minimum travellers' restrictions

\*\* Based on top 994 routings from/to 298 cities (mobility data analysis) with distances longer 50-120 miles and min Xk travellers per week. Cities with population of 20k minimum

## Electric Aircraft (eVTOL)

## Top 994 City Pairs in Range\*\*

## City Pairs in Range\*



994

23868

24778

\* Based on all possible routings from/to 368 cities (mobility data analysis), with no distance threshold or minimum travellers' restrictions

\*\* Based on top 994 routings from/to 298 cities (mobility data analysis) with distances longer 50-120miles and min Xk travellers per week. Cities with population of 20k minimum

## Electric Aircraft (eVTOL)

## Top 994 City Pairs in Range\*\*

## City Pairs in Range\*



Aerofugia – 185m



BETA – 250m



Elroy Air – 300m

994

29424

35503

37648

\* Based on all possible routings from/to 368 cities (mobility data analysis), with no distance threshold or minimum travellers' restrictions

\*\* Based on top 994 routings from/to 298 cities (mobility data analysis) with distances longer 50-120miles and min Xk travellers per week. Cities with population of 20k minimum

# AAM UK City Index List of Routes

# AAM UK City Index - Routes List

## Top UK City Pairs - Indexing Summary

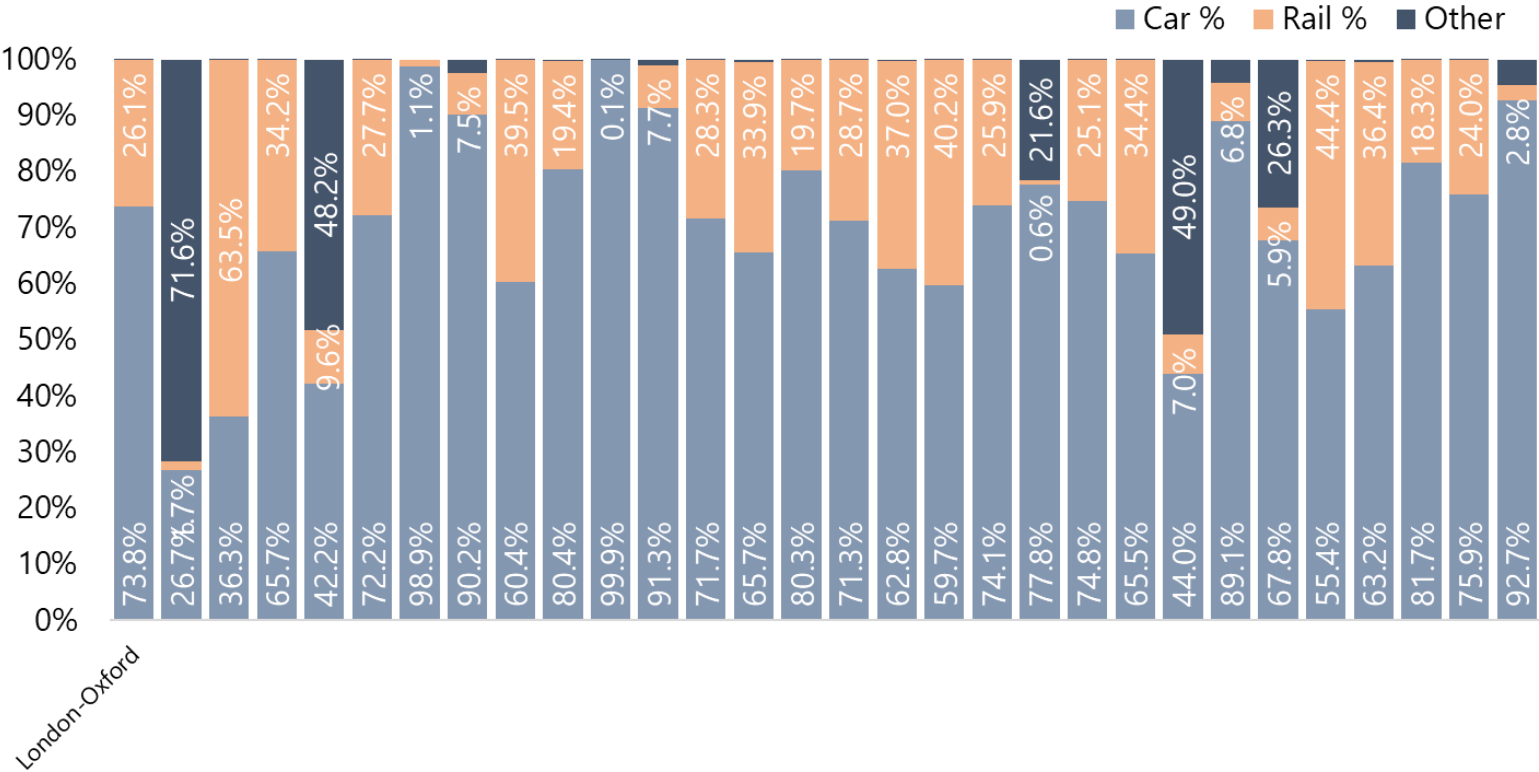
Source: EA Maven analysis



# AAM UK City Index - Routes List

## Top 30 AAM UK City Index Routes by Mode of Transport

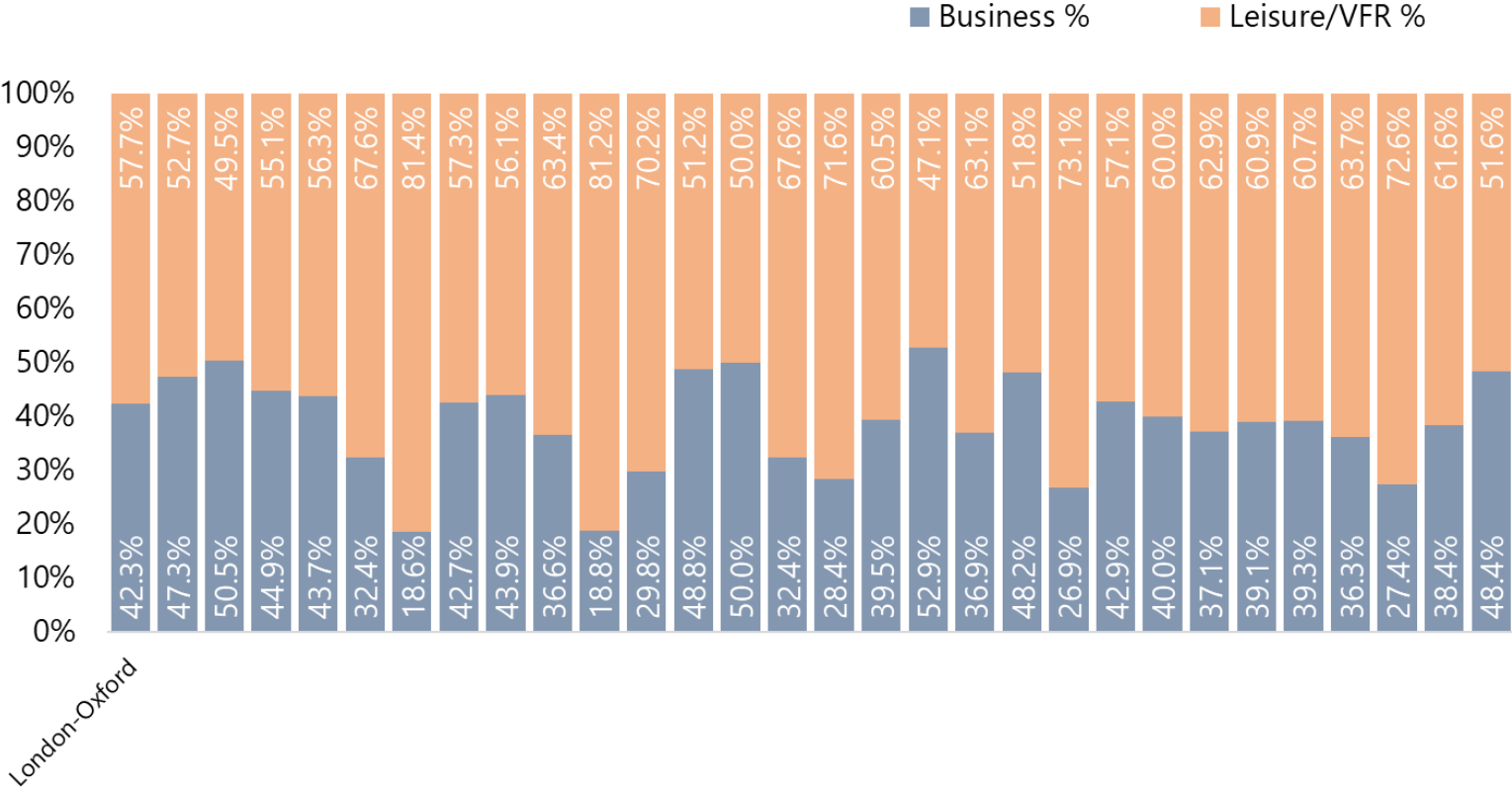
Source: EA Maven analysis



# AAM UK City Index - Routes List

## Top 30 AAM UK City Index Routes by Purpose of Travel

Source: EA Maven analysis





# THANK YOU!

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