AIRPORT MULTI-MODAL CONNECTIVITY

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CATAPULTS – A FORCE FOR INNOVATION AND GROWTH
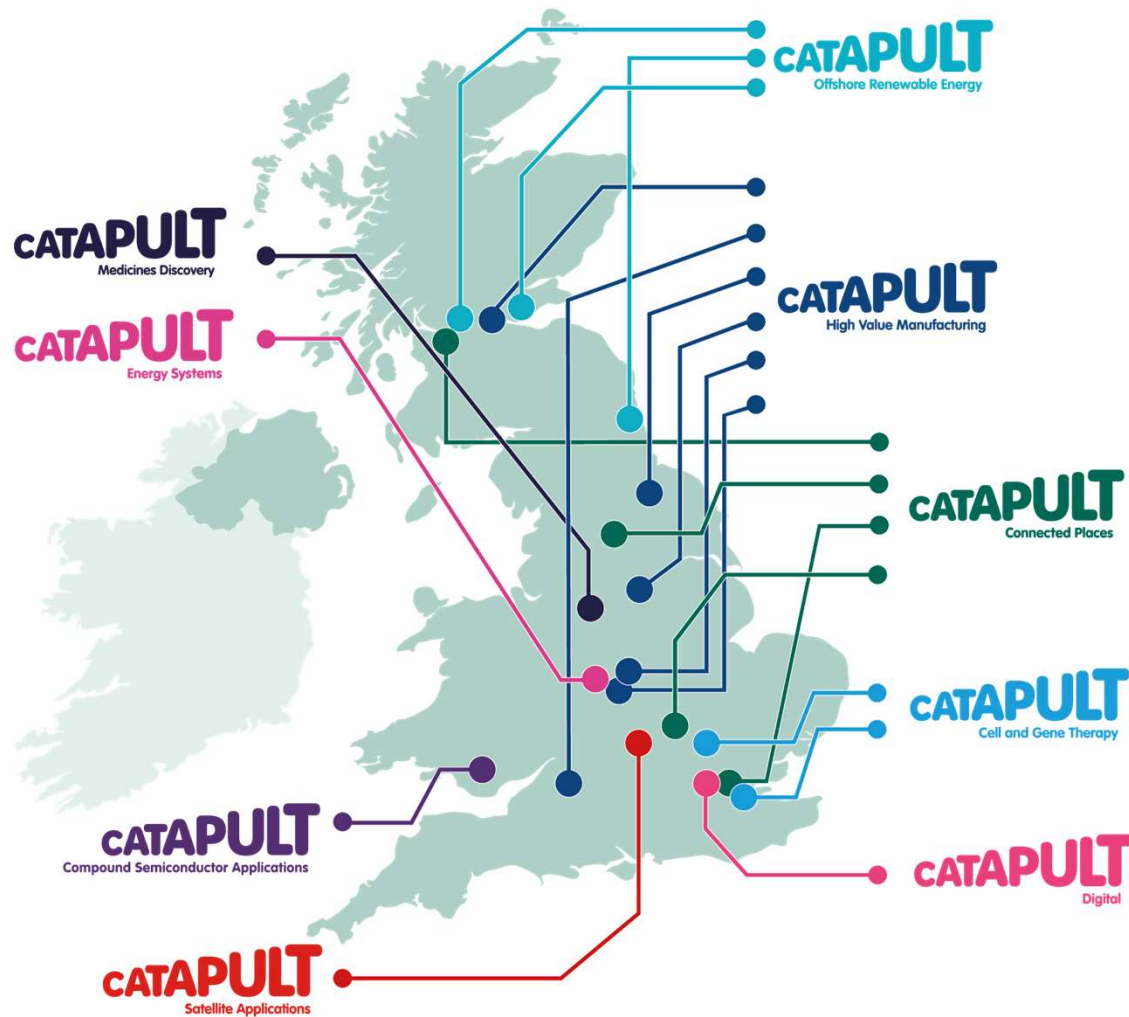
CATAPULT Connected Places

9
Innovation
Centres
across the UK

A network of world leading centres designed to transform and accelerate the UKs capability for innovation and future economic growth.

Connected Places Catapult

CONNECTED PLACES CATAPULT IS THE UK'S INNOVATION ACCELERATOR FOR CITIES, TRANSPORT AND PLACE.

**A neutral, independent, trusted, expert convenor**

We operate at the intersection between public and private sectors, between local and central government, and academia addressing challenges of today and tomorrow.

Our focus is on connecting businesses in order to generate new opportunities and accelerate the creation of innovative products and services which will deliver solutions.

CONNECTED BUT NOT INTEGRATED

- UK transport network based upon original Roman road network and Victorian infrastructure

- Connections primarily between major conurbations

- Poor connectivity rurally and between regions

- Static transport system – lack of flexibility, lack of resilience, South East centric

- Aviation concentrated on international rather than regional connectivity, exception being Public Service Obligation (PSO) Flights
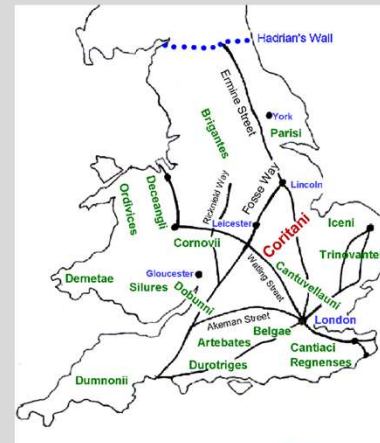
A NEW PARADIGM – ELECTRIC AVIATION

- Advanced Air Mobility and the introduction of electric regional aircraft can create a more flexible, sustainable, economically viable, resilient and integrated transport network

- Introducing an "Integrated Traffic Management System" approach to transport connectivity for all modes

- More options: the journey, not the mode

- Recognises aviation as part of our Critical National Infrastructure, which should be protected and exploited

Image courtesy: Vertical Aerospace

INFRASTRUCTURE

Physical

- Major and medium-sized airports
- GA and regional airfield network
- Vertiports
- Droneports
- "Airfields as energy hubs" concept
- Airport connectivity
- Connectivity to rail, road and transport network
- Connected to the local community
- Environmentally sustainable

Digital

- Communications/4G/5G/5G+
- Digital Air Traffic Management system for all air users
- Real-time data sharing
- Digitally connected end-to-end journeys

Skyports European Vertiport Testing Facility, Cergy Pontoise, Paris

Image courtesy: Skyports

TECHNOLOGY

- Mobility as a Service (MaaS)

- Airspace and "urban airspace" design

- Integrated sustainable logistics

- Zero emission aircraft

- Adoption of autonomous aircraft technology

- Digital technologies, IOT, etc.

- High frequency operations

- Scalability

- Travel Apps

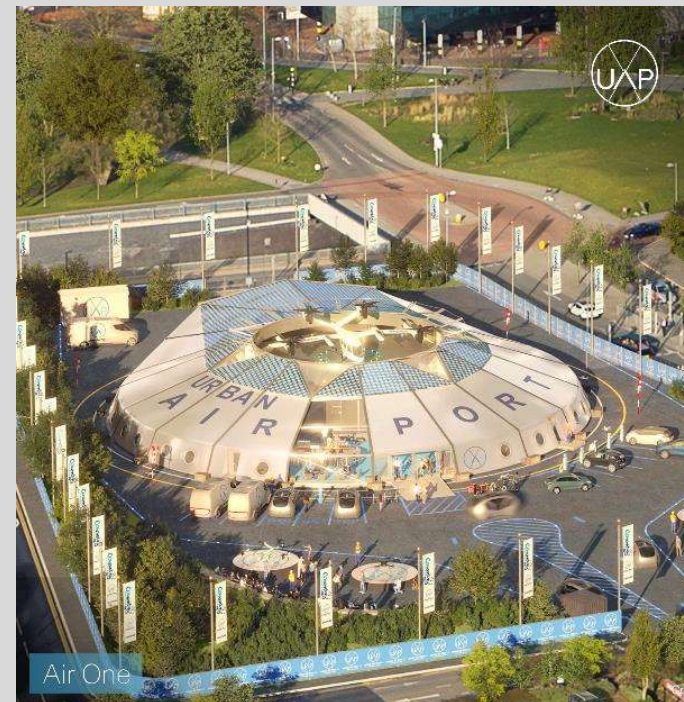- Cyber-Physical Infrastructure (CPI) - networked virtual and physical tools

Image courtesy: Urban Air Port

OPPORTUNITIES AND BENEFITS

- **Social**
  - Connectivity – flexible, point to point, rural, urban
  - Union connectivity
  - More routes – taking loads off our roads
  - Community services
  - Off-grid energy solutions
- **Economic**
  - Business growth
  - Reduced travel times
  - Reduced congestion

- **Economic (cont'd)**
  - New transport hubs
  - Multi-modal transport connectivity
  - Inter-city air travel
 - New logistics networks
- **Environmental**
  - Sustainable solutions
  - Electric and hydrogen powered zero emission aircraft
  - New and sustainable aviation fuels
  - Energy hubs
  - Reduced carbon footprint
  - Significant noise and emission reduction

REGIONAL CONNECTIVITY - EXAMPLE

A Highlands & Islands zero emission regional aviation network system

Current Kirkwall network, routes typically serviced once per day 33 – 48 seat aircraft by Loganair
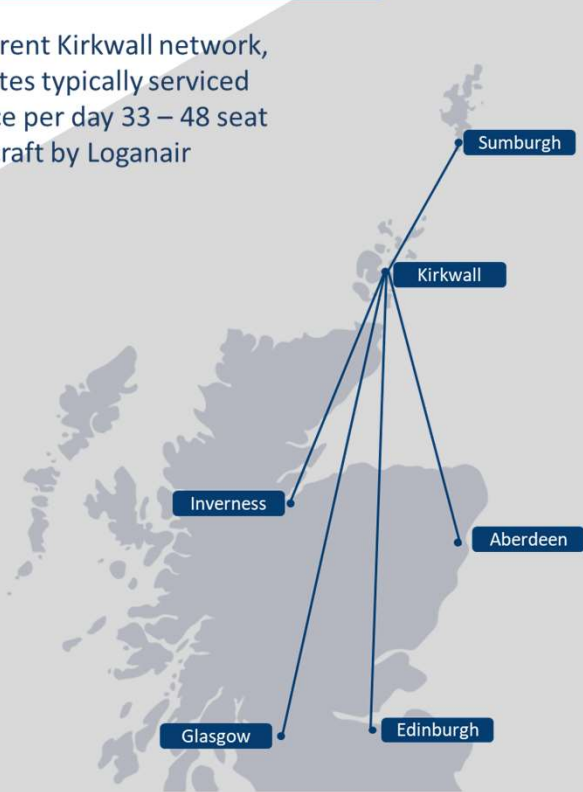
Potential network including logical 1 stop connections. Services operated at high frequency (>6 flights each way per day) with 19 seat aircraft and 15 to 30 min connection times.
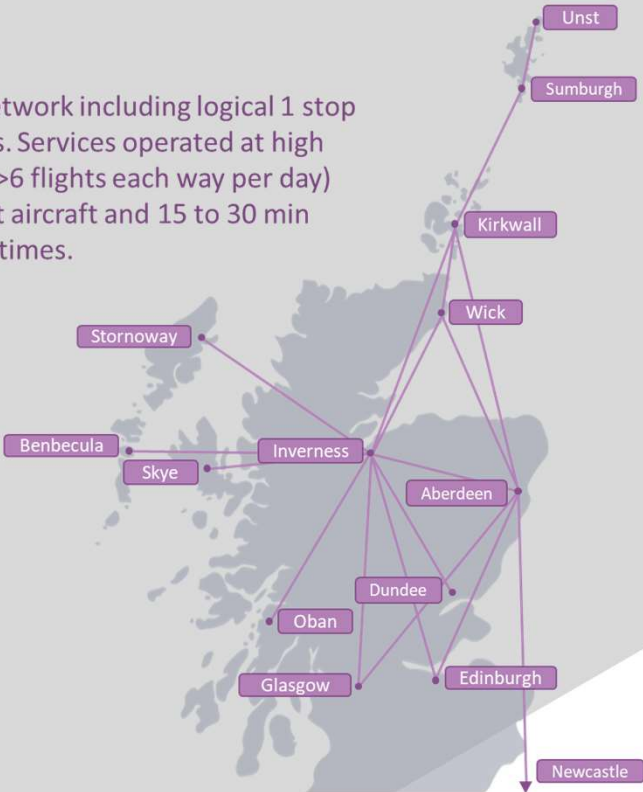
Image courtesy: Highlands and Islands Airports and Loganair

OPPORTUNITIES FOR AIRPORTS

- Integrated eAircraft operations as an integral part of a multi-modal urban and inter-regional transportation driving an integrated approach to sustainable urban mobility

- Improved connectivity between places previously not served or understood by today's commercial aviation

- Infrastructure adaptation, evolution and integration into transport, energy and digital networks for efficient and seamless door-to-door mobility acting as a catalyst for multi-modal transport networks

- Develop an integrated transport model, centred around airport journeys and transportation around the airport environment, including the utilisation of new air mobility systems

- Digitally connected end-to-end journeys

- Sustainability-driven business models: people, planet, profit

- Airports as energy hubs
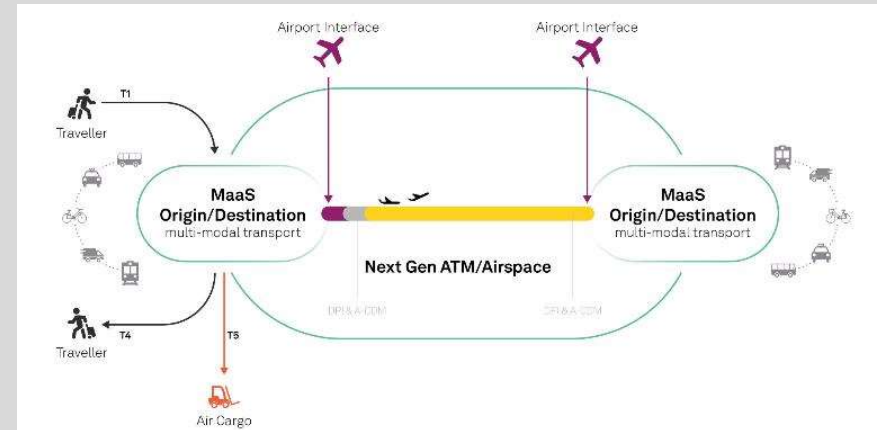
- Introduces the concept of "Airports as Places"

- More integrated living – connecting business, residential, and recreational

- Improved community engagement and public value creation

- Greater collaboration – locally, regionally and nationally

- Green mobility corridors between cities and airports, including opportunities for decarbonised transport systems and modal shift, improve journey times, and passenger experience

CASE STUDY: MOTORWAY MOBILITY STUDY

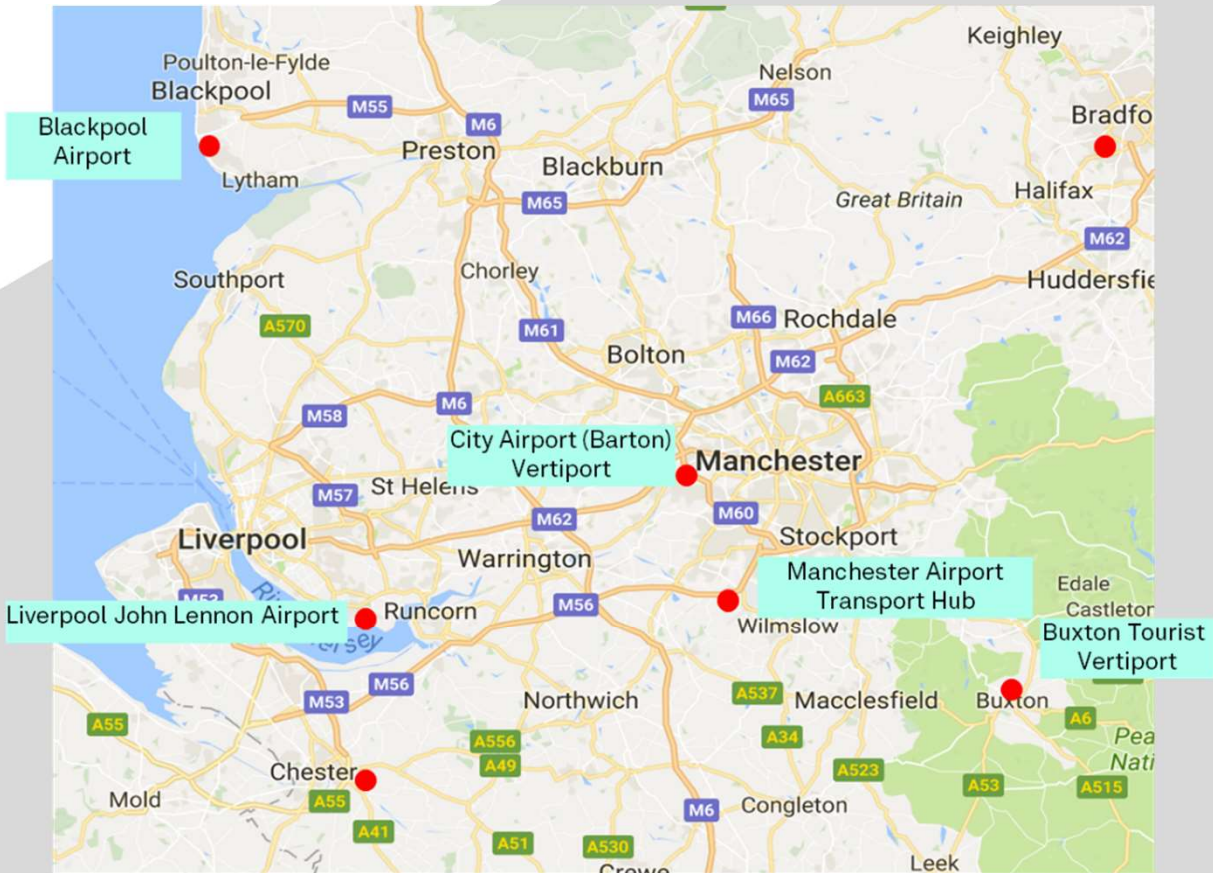**EXPLORING AUTOMATED PUBLIC TRANSPORT SERVICES ON MOTORWAYS**

- Connected Places Catapult previously explored the use of existing motorway infrastructure together with autonomous vehicles and new transport hubs near to motorways, to provide new or more frequent services between a wide variety of locations across the country.

- The study explored how frequent and convenient services of this type throughout the day and night could enable users to switch from the private car to public transport.

- Airport workers travel to work test case.

- 'Stations' could be created on or near motorways
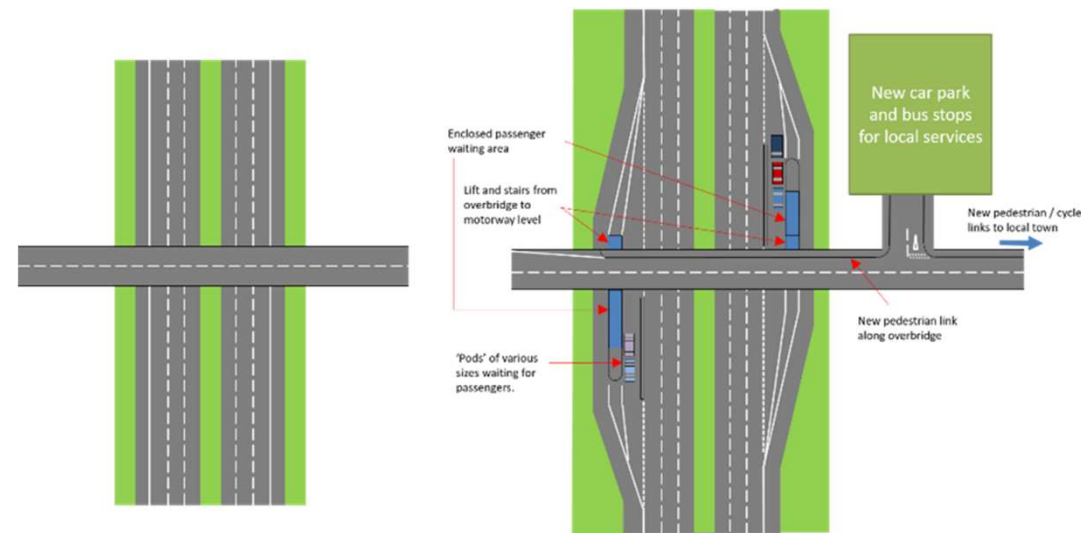
Before

After: Station constructed to provide interchange between vehicles and local transport modes

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IMPROVED CONNECTION TIMES BY ELECTRIC AIR TAXI*

Image courtesy: Vertical Aerospace

Manchester Airport Transport Hub by Air Taxi to:

Blackpool Airport	20 minutes
Liverpool John Lennon Airport	12 minutes
City Airport (Barton)	5 minutes
Bradford City Centre Vertiport	22 minutes
Buxton Tourist Vertiport	9 minutes
Chester Vertiport	12 minutes

*Based on current Vertical Aerospace VX-4 performance specification

And all points in between!

FINAL THOUGHT – FOR TODAY

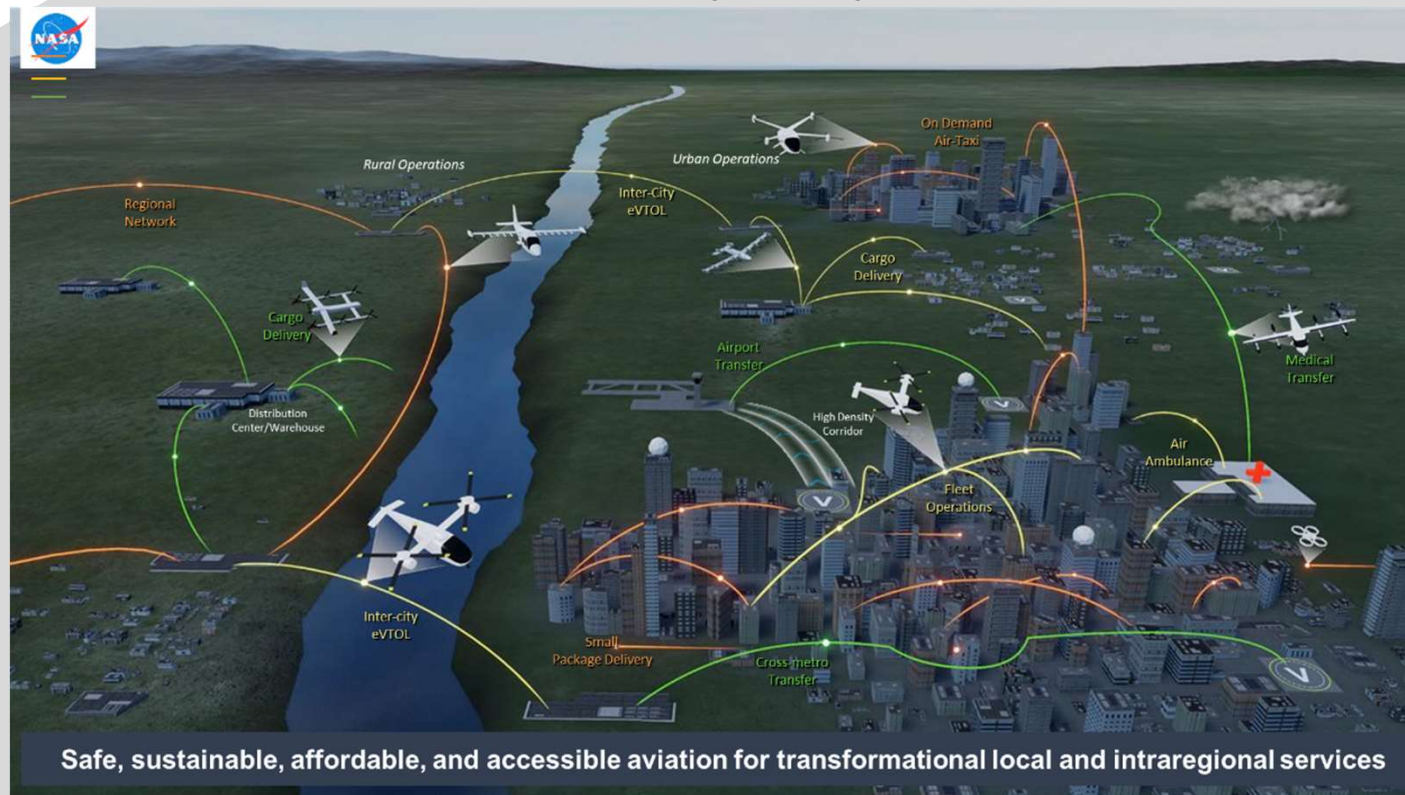"One mile of surface transportation takes you one mile, whereas one mile of aviation land can take you anywhere"

Image courtesy: NASA

THANK YOU

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