CATAPULT
Connected Places

FUTURE OF AIR MOBILITY ACCELERATOR 2024

COHORT INDUSTRY TRIAL OVERVIEWS

ABOUT THE PROGRAMME

The Future of Air Mobility accelerator is a challenge led, 6-month accelerator programme in partnership with the Future Flight Challenge from UK Research and Innovation (UKRI).

Connected Places Catapult have selected ten SMEs to join the programme to receive support from a consortium of partners on the trialling and testing of their disruptive innovations as well as bespoke support including, investment readiness, technology and product development support and introductions to potential customers.

This year's challenges are:

INTEGRATION OF FUTURE AIR MOBILITY

FUTURE AIRPORT & VERTIPORT OPERATIONS

FUTURE AIRPORT SECURITY OPERATIONS

DECARBONISING FUTURE AIR MOBILITY

INCLUSIVE PASSENGER ACCESSIBILITY

ABOUT:ENERGY

About:Energy provides software to improve decision-making throughout a battery's life cycle. Our platform supports industries in accelerating the development of electrified products.

Trial Partner: A leading eVTOL company

Scope of Trial: Exploring how digital tools can assess battery technology and design iterations for aerospace applications.

Trial Implementation: About Energy developed advanced datasets and models for aerospace-grade battery systems, focusing on eVTOL applications. Key products included electrical, thermal, and electrochemical models, and degradation datasets for high-power, weight-sensitive cylindrical lithium-ion cells. We mapped customer pain points to our offerings, demonstrating how our models can reduce design iterations and accelerate time-to-market. This trial helped establish product market fit, generate case studies, and identify future opportunities in the electric and hybrid aerospace sector.

Outputs of Trials:

- Established product market fit for our battery aerospace sector offerings.
- Generated case studies and marketing content to enhance commercial traction.
- Secured endorsements from industry players on the technical and commercial aspects of our products.

Key Learnings:

- A tailored commercial strategy for the eVTOL vertical is crucial for product development and project acquisition.
- Distinct messaging for economic and technical buyers simplifies make vs. buy decisions.
- Aerospace battery sector demands simpler solutions compared to the automotive sector despite higher requirements.
- Our scenario modeling tools for battery utilization can support commercial teams in assessing operational economics.

Moving Forward / What's Next:

- Solidify an aerospace-specific product roadmap, leveraging both high-end products and simplified digital tools to unlock revenue streams.
- Develop partnerships with more aerospace value chain players to reduce time-to-market for customers.
- Increase the commercial attractiveness of our products and drive technical improvements for batteries in the decarbonizing aerospace sector.

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OPTIMISE-AI

Nearly 90% of commercial buildings lack Building Management Systems (BMS), leaving them unmonitored for energy and carbon reduction, and rectifying this could save over 10 million metric tons of carbon dioxide equivalent (10MtCO2e).

Trial Partner: Luton Airport

Scope of Trial: Utilisation of a digital twin to minimise energy and carbon emissions in operations.

Trial Implementation: Optimise-AI is leveraging airport operational data, including energy meters, the Building Management System, occupancy data, and flight data, to simulate, predict, and optimise energy and carbon emissions within the airport terminal. The goal is to create a digital twin that accurately reflects real-time operational dynamics and identifies areas for efficiency improvements.

Outputs of Trials:

- Trial to Commence

Key Learnings:

- Key learnings will be reported upon the completion of the trial.

Moving Forward / What's Next:

- Optimise-AI will conduct the trial at Luton Airport, gathering data and insights to refine and enhance the digital twin technology. Additionally, the company plans to connect with other interested parties to understand how this digital twin offering can best benefit their individual needs, from airports to vertiport operators.

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OneSky

OneSky is a global UAS Traffic Management (UTM) company developing airspace assessment, operations, and traffic management solutions for the aviation industry.

Trial Partner: Supernal, Ferrovial

Scope of Trial: Establishing a simulation framework to analyse how flight route characteristics, aircraft performance, flight spacing requirements, and vertiport operations spacing requirements impact maximum passenger volume capacity. This analysis is crucial for vertiport designers, community planners, and other stakeholders of vertiport infrastructure.

Trial Implementation: OneSky leveraged its subject matter expertise and modelling and simulation IP to create a prototype simulation for analysing UAM/AAM capacity requirements. The simulation considered a notional eVTOL flight route network in London, airspace constraints, basic aircraft performance, flight spacing requirements, and assumptions about vertiport operations spacing. Insights about maximum eVTOL aircraft numbers that can operate in the route/vertiport network were revealed, which can be translated to maximum passenger volumes given differing aircraft designs.

Outputs of Trials:

- A physics-based simulation framework suitable for analysing vertiport and UAM/AAM capacity requirements of any eVTOL route network globally.

Key Learnings:

- Stakeholders face challenges in defining specific quantitative value assessments due to uncertainties in the eVTOL/vertiport marketplace. However, informed assessments of capacity requirements are crucial to avoid over-engineering and negative impacts on project profitability.

- OneSky's simulation tool enables stakeholders to realise pre-construction benefits similar to those seen in other aerospace markets that have adopted "digital engineering."

Moving Forward / What's Next:

- OneSky routinely interacts with UAS and AAM market participants, including ANSPs, drone operators, eVTOL manufacturers, local governments, vertiport developers, and data suppliers.

- The vertiport/network capacity simulation enabled by the FoAM3 project will provide added value to these participants.

- Partnerships with Supernal and Ferrovial may also lead to additional opportunities benefiting from OneSky's software offerings.

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meteomatics

Meteomatics is a weather intelligence and technology company that creates precision forecasts of the weather's impact on businesses anywhere in the world, any time.

Trial Partner: Supernal

Scope of Trial: The trial focused on analysing the suitability of flight routes based on Supernal aircraft design thresholds, aiming to uncover the benefits of using high-resolution weather data for route selection planning and operational purposes.

Trial Implementation: Meteomatics compared its high-resolution weather data with traditional coarse-resolution datasets to evaluate if different operational decisions would be made using Meteomatics data.

The trial aimed to demonstrate the value of high-resolution weather data in improving operational reliability and selecting economically viable routes based on potential operational availability.

Outputs of Trials:

- The trial successfully demonstrated the effectiveness of Meteomatics' models in identifying localised weather conditions such as icing, turbulence, precipitation, and thunderstorms that disrupt Advanced Air Mobility operations.

- The detailed insights provided by the data show promise for enabling better decision-making regarding route selection and operational planning in both AAM and conventional aviation.

Key Learnings:

- Meteomatics' high-resolution weather data accurately identifies localised weather conditions critical to AAM operations, enhancing safety and efficiency.

- Detailed weather data leads to more informed decisions regarding route selection and operational planning, reducing delays and cancellations, optimising flight paths and energy consumption, and improving risk management and public perception. This can help the industry maximise economic viability when planning operations.

Moving Forward / What's Next:

- Meteomatics plans to seek additional partners to present high-resolution weather data to AAM operators, vertiport planners, and other stakeholders.

- The company will explore additional applications within conventional aviation and other sectors, focusing on forming strategic collaborations to expand its market presence and continue to refine its offerings.

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optimal cities.

Optimal Cities provides an intuitive solution for the integration of future air mobility, from site search and analysis to planning and monitoring of infrastructure.

Trial Partner: Iona Drones, Midlands Aerospace Alliance, Transport for Greater Manchester, Oxfordshire County Council, The British Standards Institution.

Scope of Trial: Creating a geospatial companion to support the integration of air mobility.

Trial Implementation: Optimal Cities engaged with end users and regulators to define meaningful and compliant parameters and functionalities while applying a user-centric approach.

Outputs of Trials:

- A system prototype was created and demonstrated in an operational environment with meaningful private and public sector users and stakeholders.

Key Learnings:

- **Viability:** In isolated areas, Air Mobility is the most viable alternative to infrastructure for deliveries of critical equipment and services, saving billions of £ compared to road and railway infrastructure.
- **Regulatory Landscape:** Regulation is likely to follow technology and case studies, requiring evidence and policies from national to local levels.
- **Perception:** Addressing issues of public perception and wellbeing is key, not only regulatory and policy matters.
- **Competitiveness:** Accommodating the future integration of air mobility will make real estate more competitive.

Moving Forward / What's Next:

- Completing and qualifying the system for the UK market and expanding into ASEAN and North America.

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Sequestim

Sequestim is a Cardiff University spin-out company that employs technology from astronomy to create walk-through airport security scanners.

Trial Partner: Glasgow Paisley Airport

Scope of Trial: Walk-through Passenger Security Screening

Trial Implementation: Sequestim has developed a unique ultra-sensitive imaging capability that detects all objects hidden beneath and between clothing. Passengers simply walk through the scanner, and screening takes no more than 4 seconds.

This capability is to be exploited in conjunction with automated threat detection for accreditation for airport use within the next 2 years.

A prototype scanner was modified and arranged for use at Glasgow Paisley airport, screening passengers for an 8-week period ending June 21st, 2024.

Outputs of Trials:

- Approximately 15,000 passengers passed through the scanner, generating a library of over 75,000 still frame images.
- Feedback from airport partners is very positive, indicating further collaborations with Glasgow as product development progresses.
- The project achieved all intended goals on time and within budget.

Key Learnings:

- The prototype scanner met all requirements and expectations throughout the project, working reliably and continuously for over 2 months.
- Initial data analysis indicates the scanner detected objects missed by operational body scanners. The scanner did not hinder normal security channel operations.

Moving Forward / What's Next:

- The data library will be used to demonstrate threat detection and false positive alarm probabilities.
- The next major step is implementing a fully functional scanner in an airport for a longer period to gather more data for the first version of automation software.
- Sequestim aims to present the fully operational first version of the integrated solution for accreditation to ECAC and TSA by 2025.

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NWpro

NW PRO is a security focused artificial-intelligence company. Our experts and products help organisations harness the power of artificial intelligence, in their security systems, to supercharge both security and efficiency.

Trial Partner: Heathrow Airport

Scope of Trial: NW PRO LTD addressed critical issues within airport security lanes through their Tray Hygiene Monitoring Module (THMM) and Empty Tray Detection Module (ETDM).

THMM identifies oversized or improperly placed items on trays, while ETDM automatically clears idle trays. Both modules are part of the larger Tray Person Monitoring System (TPMS).

Trial Implementation: THMM and ETDM were meticulously tailored to solve specific pain points observed in airport security lanes. THMM was designed to analyze all objects and trays, identifying items that are too large or not wholly within a tray, thus preventing jams within CT/X-ray machines. ETDM, on the other hand, addresses the problem of idle trays on lanes by providing an AI-based solution to identify and automatically clear them.

These individual modules were the primary focus of the trial, conducted on a pilot lane at Heathrow Terminal 5. Results were monitored in real-time to assess accuracy and timeliness, showcasing their real-time capabilities in a fast-paced environment without disrupting operations.

Outputs of Trials:

- Over 10,000 trays were reviewed during the 3-week trial period, with THMM and ETDM demonstrating high accuracy (>99%) in all functions.
- THMM showed the potential to increase availability by at least 1 hour per week per lane, while ETDM could reduce collection bay time loss by 14 minutes per hour.

Key Learnings:

- THMM demonstrated significant potential to enhance availability without affecting throughput, potentially contributing to smoother operations and reduced waiting times for passengers. The trial evidenced a potential increase in availability of a minimum of 1 hour per week per lane.
- ETDM's impact was evident in the reduction of collection bay time loss, potentially leading to more efficient resource utilization and increased daily tray processing. The trial showed a potential reduction of 14 minutes per hour in collection bay time loss.

Moving Forward / What's Next:

- Full integration into Tray Person Monitoring System (TPMS) product range.
- Further trial and integration at Heathrow in July.

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VIRTUAL
TOUR EXPERTS

Our mission is to make the world more accessible through detailed 360° content, empowering everyone to navigate transportation hubs with confidence.

Trial Partner: Exeter Airport

Scope of Trial: The trial aimed to develop and deploy a next-generation virtual tour of Exeter Airport, with a focus on enhancing accessibility for all passengers, particularly those with disabilities. Key activities included capturing 360° images, integrating accessibility features, and testing the solution with diverse user groups.

Trial Implementation: Focused on developing an accessible virtual tour, the trial aimed to reduce travel anxiety and increase confidence in navigating the airport, particularly for passengers with disabilities. The solution underwent extensive testing and refinement, incorporating feedback from accessibility groups and airport personnel.

Outputs of Trials:

- The trial demonstrated the demand and need for an accessible virtual tour, showcasing its potential to reduce assistance requests, improve operational efficiency, and enhance passenger satisfaction. Positive feedback and potential commercial benefits indicate the solution's capacity to set new accessibility standards for airport navigation.

Key Learnings:

- **Enhanced Accessibility:** Incorporating features like BSL and an accessibility widget improved usability for passengers with disabilities, setting a new benchmark for airport navigation tools.
- **Personalised Journey Planning:** Tailored routes based on user specifications increased personalisation and user satisfaction, reducing travel anxiety.
- **Operational Efficiency:** The virtual tour could reduce assistance requests, leading to cost savings and improved resource allocation for airports.
- **Commercial Potential:** Increased engagement with airport services demonstrated the financial viability of the virtual tour, encouraging investment in similar technologies.
- **Scalability and Standardisation:** The solution's scalability and adaptability promote standardisation in airport navigation tools, benefiting the entire industry.

Moving Forward / What's Next:

- Secure investment to scale the solution
- Conduct trials at other airports
- Enhance technology based on feedback
- Expand market presence domestically and internationally
- Continue innovation in virtual tour technology
- Collect post-launch data and engage with investors and potential partners

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HELLO LAMP POST

Hello Lamp Post is the platform to better connect people, place and information.

We do this by creating digital assistants for public places.

Trial Partner: Glasgow Airport

Scope of Trial: Deploy Hello Lamp Post in the terminal at a small scale, primarily to support PRM (Persons with Reduced Mobility) passengers, with a secondary goal of demonstrating support for non-PRM passengers.

The trial aimed to handle more passengers, improve passenger satisfaction, enhance airport efficiencies, unlock insights, and enhance the airport's accessibility.

Trial Implementation: Phase 1 of the trial launched with 25 signs, resulting in almost 4000 interactions. User testing with individuals with varied accessibility needs informed Phase 2, the current rollout across the whole airport.

Outputs of Trials:

- Approximately 50% reduction in PRM team queries
- Increased support for passengers per week
- 100% of passenger queries successfully resolved
- 100% satisfaction rate from users
- Improved accessibility to airport information

Key Learnings:

- Signage integration into the terminal surroundings is crucial to prevent confusion.
- User testing highlighted areas for improving user experience and accessibility.

Moving Forward / What's Next:

- Rollout of Hello Lamp Post across Glasgow Airport
- Deployment of the platform on the airport website and as an interactive QR code
- Expansion to other airports within the AGS group (Aberdeen and Southampton)

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WeWALK

Our mission is to make the world more accessible through detailed 360° content, empowering everyone to navigate transportation hubs with confidence.

Trial Partner: Royal National Institute of Blind People (RNIB) and Gatwick Airport

Scope of Trial: The trial aimed to evaluate the effectiveness of the WeASSIST remote sighted guidance system in enhancing the travel experience of visually impaired passengers at Gatwick Airport.

Trial Implementation:

- **Mapping and Documentation:** Meticulous mapping of the airport layout and creation of comprehensive training materials.
- **Internal Test:** RNIB helpline advisors underwent training as remote agents to ensure proficient use of the system and resolve any technical issues.
- **Explorer Trial:** Visually impaired volunteers, referred to as explorers, navigated the airport using the WeASSIST app. They were guided by remote agents and tasked with completing various real-life scenarios, such as locating amenities and boarding flights.

Outputs of Trials:

- **Proficient Remote Guidance:** The RNIB Helpline team demonstrated high proficiency in providing remote guidance to visually impaired travellers at Gatwick.
- **Efficient Task Completion:** Explorers successfully completed tasks, including navigation and utilising airport services, in a timely manner, ensuring they caught their scheduled flights. This included locating amenities and boarding flights without assistance.
- **Positive User Feedback:** Users praised the WeASSIST system for its ease of use and the helpfulness of remote agents, describing the experience as empowering and liberating.

Key Learnings:

- **Wi-Fi Connectivity:** A robust Wi-Fi connection is essential for seamless remote guidance. Efforts are underway to enhance Wi-Fi coverage at critical zones within the airport.
- **Continuous Training:** Ongoing training for remote agents is vital to refine navigation techniques and build confidence, ensuring a superior level of service for passengers with diverse needs.
- **Complementary Service:** WeASSIST is viewed as a valuable addition to existing special assistance services, offering passengers greater flexibility and choice in navigating the airport environment.

Moving Forward / What's Next:

- **Enhanced Connectivity:** Plans are in place to improve Wi-Fi connectivity in key areas of the airport to support WeASSIST users.

- **Agent Training:** Further training sessions will be conducted to familiarise agents with new locations and optimise their remote guidance skills.

- **Expansion Plans:** WeWALK aims to extend the deployment of WeASSIST to additional airports, transport operators, and retail partners, broadening its reach and impact.

- **App Enhancements:** Continuous enhancements to the WeWALK app will focus on incorporating user feedback, integrating location-specific features, and accommodating user preferences for a tailored experience.

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🖥 **https://wewalk.io/en/**

Partners

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