Future Mobility Board

Where passion, experts, and networks thrive

Advanced Air Mobility (AAM)

Advanced Air Mobility is set to transform urban mobility - what will determine success?

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Meeting Date	Meeting Theme	Guest Speakers
25th February 2025	Advanced Air Mobility (AAM)	• James Bircumshaw (Skyports) • Matheu Parr (Rolls-Royce) • Mike Doran (Bicester Motion)

Key Findings:

1. Is the Aerospace Industry Ready for a Paradigm Shift?

Driven by advancements in battery technology and sustainable ambitions, the aviation industry has seen the emergence of a new segment, Advanced Air Mobility (AAM), with the goal of revolutionising urban transportation. Electric Vertical Take-Off and Landing (eVTOL) aircraft promise to reduce travel times significantly, particularly in congested urban areas. For example, a journey from an airport like JFK to downtown Manhattan, which could take two hours by car, could be completed in just five to six minutes by eVTOL. This innovation also aims to utilise airspace between 500 and 3,000 feet (~150-900m).

2. How Will Urban Air Mobility (UAM) Transform City Transportation?

The eVTOL market is divided into two primary segments where vertiports will be used as central hubs for UAM operations, offering rapid passenger processing through biometric systems and seamless integration with local transportation networks:

- **Urban Air Mobility:** Focused on providing aerial transportation solutions in densely populated urban areas. These aircraft aim to outperform helicopters in terms of noise reduction and operational costs.
- **Regional Air Mobility:** Concentrates on enhancing commuter services using slightly larger aircraft for longer flights that can leverage existing routes and infrastructure.

3. What Infrastructure Is Needed to Support eVTOL Growth?

The successful deployment of eVTOL solutions will require substantial investment in infrastructure for take-offs, landings, charging, and maintenance where seamless integration with existing transportation networks is critical for success. Modular vertiports capable of handling six to eight stands per site with rapid charging capabilities will require 3+ MW per facility. Companies operating vertiport sites will need to collaborate across the energy ecosystem, especially for energy storage solutions for sites that lack sufficient power infrastructure. In dense urban areas where land is scarce, innovative solutions such as floating platforms or elevated facilities on top of parking structures are being explored, each of which are advantageous for the trajectory needed for landings and take-offs. In addition, it's likely that a new dedicated air traffic control system will be needed to manage the airspace.

4. Can eVTOLs Overcome Public Scepticism About Noise and Safety?

Public acceptance will be vital for eVTOL adoption, particularly as noise concerns have historically been a barrier for high volume helicopter operations in urban areas. To address this, eVTOL manufacturers are conducting acoustic testing to optimize blade designs that produce lower noise levels than traditional helicopters. Vertiports are strategically located near high-value destinations such as shopping centres or business districts, but careful planning is needed to ensure clear approach trajectories over water or low-risk areas to minimize noise impact.

Certifying eVTOL aircraft has unique challenges due to their novel designs and operational profiles. Regulatory authorities such as the FAA (US) and EASA (Europe) require certification processes that are one thousand times more rigorous than helicopters, and are expected to take 7+ years. Resulting in some OEMs adopting incremental strategies to accelerate progress (and funding). Vehicle-agnostic vertiport operators are building regulatory teams to work closely with aviation authorities to ensure infrastructure aligns with evolving safety standards.

5. Are eVTOL Financial Models Sustainable?

Vertiport operators will generate revenue through landing fees and recharging services but will also rely on advertising for a larger part of their revenue. With a captive audience, London Heathrow Airport generate 50% of their revenue from advertising and commercial centres (e.g., outlet leases), this opportunity is limited for vertiports operators due to the operating model of moving people efficiently. The current financial models for eVTOL OEMs are challenging, with a number of players having recently exited the segment.

- **Startups** focus on direct-to-consumer applications such as urban air taxis or business-to-business applications like air medivac services, with increasing value coming through defence contracts (especially for US-based companies).
- **Traditional airlines** explore shuttle services designed to retain business-class customers by offering cost-effective alternatives to helicopters.

Analysts expect the market to reach a valuation of $40 trillion by 2040, however ensuring affordability for passengers whilst maintaining returns is a key challenge. Operating costs need to be at $3-5 per mile to compete against helicopter costs of ~$12 per mile.

6. Will Battery Technology Unlock New Horizons for eVTOL Aircraft?

eVTOL aircraft rely on current battery technology, which restricts operational ranges to approximately 150 kilometres (~90miles). Current battery designs are based on automotive technology, but with lifetime battery degradation for eVTOL limited to 5% it presents challenges for sustainability, supply and costs. Advancements in battery capacity and efficiency are crucial for extending these ranges and enabling more flexible operational models with some longer-range aircraft already integrating gas-turbine range extenders.

Conclusion: Who Will Win The eVOTL Mobility Race?

The sector is highly fragmented, but with industry consensus indicating a successful programme will cost at least $1 billion, only a few are expected to succeed. Startups leverage agility and innovation whilst legacy aerospace manufacturers adopt a cautious "wait-and-see" approach. Automotive OEMs bring scalable manufacturing expertise but must navigate significant regulatory hurdles. Vertiport operators are already acquiring prime locations to generate interim revenue and test new technologies. The segment is being driven by both the Defence sector, and city initiatives with Dubai currently leading the way. To be successful, companies vying for dominance must ask themselves; **“What specific value do we provide to the end customer, and can it be delivered with a sustainable and scalable model?”**

Further Reading:

- Market Entry Strategy for eVTOL OEM
- Understanding eVTOL Operations
- eVTOL market dynamics
- Scaling Advanced Air Mobility in the UK

Guests:

Skyports	Rolls-Royce	Bicester Motion
Skyports designs, operates and owns infrastructure and modular vertiports for eVTOL aircraft. https://skyports.net/	Rolls-Royce develop power and propulsion solutions for safety-critical applications in the air, at sea and on land. https://www.rolls-royce.com/	Bicester Motion is a 444-acre hub, for businesses and visitors to explore past, present, and future mobility technologies. https://bicestermotion.com/