



WORKING PAPER

FOURTEENTH AIR NAVIGATION CONFERENCE

Montréal, Canada, 26 August to 6 September 2024

Agenda Item 2: Timely and safe use of new technologies
2.1: Evolving aircraft technologies contributing to LTAG

STRATEGIC INTEGRATION OF ELECTRIC-POWERED ADVANCED AIR MOBILITY

(Presented by the United Arab Emirates)

EXECUTIVE SUMMARY

This paper explores the integration of electric-powered advanced air mobility (AAM) as a strategic move to enhance urban mobility and environmental sustainability, aligning with ICAO's Long-term Aspirational Goal (LTAG) of net-zero carbon emissions by 2050. It highlights the crucial roles of the air navigation services provider (ANSP) and the State regulator in managing airspace and ensuring regulatory compliance, thereby fostering an environment for sustainable aviation practices.

Action: The Conference is invited to:

- a) encourage Member States to create regulatory sandboxes that allow controlled testing of AAM technologies. These sandboxes should facilitate real-world data collection and analysis, supporting the development of robust regulatory frameworks that harmonize with ICAO guidelines while fostering innovation and ensuring safety; and
- b) recommend the development and implementation of comprehensive public awareness and engagement programs by Member States. These programmes should educate the public on the benefits, safety, and environmental advantages of electric-powered AAM, and involve community stakeholders in the transition process through regular updates, workshops and consultations.

1. INTRODUCTION

1.1 The adoption of electric Vertical Take-off and Landing (eVTOL) aircraft within AAM addresses urban congestion and environmental challenges. This initiative necessitates new aerodrome infrastructure and operations, reflecting a strong commitment to sustainable development principles. The State regulator establishes the regulatory framework for AAM, ensuring safety, security and environmental standards are met. The ANSP collaborates with operators and stakeholders on airspace design, infrastructure development and public awareness campaigns, ensuring compliance with local and international regulations. The national roads and transport authority is also key in integrating AAM into transportation infrastructure, developing vertiports and ensuring seamless integration with public transport.

1.2 The implementation of unmanned traffic management (UTM) systems is critical for the safe integration of drones and eVTOLs into the airspace. UTM systems manage potential conflicts and rationalize air traffic control for unmanned vehicles, supporting the scalability of AAM operations.

1.3 Together, the efforts of the ANSP, State regulator, the national roads and transport authority, and UTM systems create a sustainable air mobility model, aligning with global environmental

goals and paving the way for a more sustainable future in aviation. The environmental benefits of electric AAM, such as reduced carbon emissions and noise pollution, directly support ICAO's goals for sustainable aviation and contribute to broader industry transformations.

2. DISCUSSION

2.1 Integrating AAM requires navigating complex regulatory landscapes. The State regulator harmonizes local regulations with international Standards to facilitate safe eVTOL operations, updating frameworks to comply with ICAO guidelines while encouraging innovation. The ANSP develops advanced air traffic management solutions, including real-time monitoring and risk assessments, to safely integrate eVTOLs into existing airspace, while collaborating with operators and manufacturers to ensure aircraft meet safety standards. The national roads and transport authority leads infrastructure development for AAM, constructing vertiports, requesting air routes for the ANSP to assess and implement, and is responsible for installing eVTOL charging facilities to create robust infrastructure. Gaining public trust is essential, necessitating outreach and education campaigns by all stakeholders to highlight the safe benefits and advantages of eVTOLs. Implementing UTM systems is crucial for managing interactions between manned and unmanned aircraft, supporting automated flight planning and real-time monitoring to enable high-density AAM operations.

2.2 AAM enhances operational efficiency by reducing fossil fuel dependency, lowering costs and increasing sustainability. Simplified maintenance and operations boost aviation efficiency and urban productivity. AAM alleviates urban congestion by providing alternative routes, reducing commute times, and improving air quality, which benefits public health. AAM supports smart city infrastructure, balancing economic development with social well-being and environmental health. It improves quality of life by shortening travel times, allowing more personal and community activities, and enhancing social inclusion and equity. AAM stimulates economic growth through job creation in technology, aircraft manufacturing and services.

2.3 AAM implementation relies on collaboration among the State regulator, ANSP, national roads and transport authority, industry and international partners. This collaboration addresses safety risks of evolving aviation technologies and ensures a globally harmonized AAM introduction. Overcoming AAM integration complexities requires creating an innovation-friendly environment, gaining public acceptance and turning challenges into opportunities for sustainable aviation development.

2.4 A strategic roadmap is needed for transitioning to a fully integrated AAM system, leveraging efforts of the State regulator, ANSP and national roads and transport authority, aligned with ICAO's global plans. The roadmap includes advancing technology, initiating pilot projects and engaging with the community.

2.5 **Advancing Technology:**

- a) Establish AAM Research and Development (R&D) centres to foster innovation and collaboration.
- b) Implement regulatory sandboxes for controlled AAM technology testing.
- c) Form partnerships with tech firms and startups to accelerate AAM component development.

2.6 **Pilot Projects:**

- a) Conduct UAM trials in urban areas to test eVTOL integration into transport networks, focusing on safety, noise and public acceptance.
- b) Develop pilot vertiports and eVTOL charging stations to gather data on AAM infrastructure requirements.
- c) Perform simulation exercises to model AAM scenarios and refine air traffic management protocols.

2.7 **Community Engagement:**

- a) Launch public awareness campaigns about the safe benefits and environmental advantages of AAM.
- b) Organize stakeholder workshops to gather feedback and address concerns.
- c) Maintain transparency by regularly updating the public on AAM progress and addressing issues promptly.

2.8 **Ongoing Evaluation and Enhancement:**

- a) Implement continuous monitoring systems for AAM operations, collecting data on safety incidents, efficiency and environmental impact.
- b) Develop feedback mechanisms from pilots, operators, and the public to improve AAM regulations and operations.
- c) Conduct periodic reviews of the AAM strategy, involving all stakeholders to assess progress and adjust as required, to align with ICAO's safety and performance plans.

3. **CONCLUSION**

3.1 The initiative to integrate electric-powered AAM marks a significant milestone in the journey towards sustainable aviation, reflecting the priorities of ICAO's evolving aircraft technologies and strategic objectives for global environmental sustainability. This working paper advocates for a global consensus on performance improvement initiatives that drive sustainability, reflecting a pioneering role and alignment with global environmental objectives. The collaborative efforts of the State regulator, ANSP and the national roads and transport authority are instrumental in shaping this initiative, ensuring that it meets current needs while being scalable and adaptable for future advancements.

3.2 As outlined in the Action Items a) and b), Member States are encouraged to create regulatory sandboxes that allow controlled testing of AAM technologies. Furthermore, it is essential for Member States to develop and implement a comprehensive public awareness and engagement programme.

3.3 By adopting the collaborative model demonstrated, other cities and nations can accelerate their own journeys towards sustainable aviation, enhancing global connectivity while supporting the preservation of the planet for future generations.

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