



**ADVANCED AIR
MOBILITY
DISCUSSION PAPER 2**

**Ground
operations and
passenger
experience.**

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Challenges for Vertiport Operations

Advanced Air Mobility is becoming reality following a rapid acceleration in technological development and strong interest from the aviation industry. In the coming years, electric aircraft, mainly electrical vertical take-off and landing (eVTOL), will allow new modes of transport of people, goods and medical supplies, enabling new types of services.

This accelerated innovation will create operational challenges for airports and other operational stakeholders. **Thus far, much of the discussion about AAM has centered on aircraft design, manufacturing, certification and vertiport design. Yet ground processes and operations could be a limiting factor to the industry's growth,** and all stakeholders and authorities must overcome hurdles in the following main areas:

- **Ground operations.** Even though the vehicles are smaller than large airliners, they will still require activities such as cleaning, baggage handling, and recharging or battery swapping between landing and the next departure. Even with increased automation, manual labour will still be required, even at small vertiports to ensure safety standards and a passenger experience typical of commercial air transport – bearing in mind the much shorter turnaround times compared with traditional commercial aviation.
- **Ground movement and turnaround process.** There will probably be a need for taxi equipment. The docking of such equipment will take up some time. Predictability in turnaround management will be important for AAM operations considering the criticality of energy management.
- **Passenger experience.** Because the flights are short, passengers will want to spend less time in terminals and to reach their destination, while basic processing and check-in still needs to take place. For that reason, terminals need to support a streamlined passenger journey, including access to additional and last-mile modes of transit, and efficient security.
- **Maintenance repair and overhaul.** Despite being less mechanically complex than conventional fuel powered aircraft, eVTOLs will still need both routine and unscheduled maintenance. Operators will have to identify network locations suitable for servicing their fleet—for larger vertiports or existing airport hangars—and may need some level of service at all network nodes.

The implications on airport operations of ground operations at vertiports away from the airport – in the city for example – also merit consideration. A **key element and thus success factor** for the entry into service of eVTOL operations is a **full regulatory framework on vertiport organisation and operations (IR, AMC, GM, including the possible use of industry standards for compliance).**

Need for regulations and standards

eVTOL and AAM operations start from the ground infrastructure and the maintenance of high safety standards in vertiport operations.

To date, there is no dedicated regulatory framework for the management of vertiports and the current regulatory reference is ICAO Doc. 9137 Airport Service Manual and Regulation (EU) No 139/2014. Both standards and regulations are aimed at the management of infrastructures which, if on the one hand are more extensive and complex (airports), on the other hand are not widespread in densely urbanized areas, at ground or elevated level (vertiports). Minimum standards on the qualifications and safety standards of ground handling staff for AAM operations are also required.

A first guideline dedicated to vertiports has been published by EUROCAE Working Group 112, namely **ED-299 “Guidance for vertiport operators and operations”**, which provides indications for designers and operators for developing vertiport operations and serves as a template for the preparation of a vertiport manual. The CONOPS in ED278 and ED293 also assist in this regard. **This is a good start, but more is needed in order to keep pace with industrial and international developments.**

Airports and potential vertiport operators are therefore calling for **regulations and standards to plan and execute safe vertiport operations across the systems, processes, procedures, equipment and facilities that should be provided** by the vertiport operator who manages a single vertiport or a network of vertiports. EASA Rule Making Task (RMT).0230 **should prioritize the drafting of regulations for the management of vertiports**, allowing Member States and CAA to adopt them at national level guaranteeing the principle of European harmonization.

Vertiport procedures and ground operations

The rapid growth of Advanced Air Mobility requires a simultaneous speed of adaptation relating to the regulations that characterize ground operations.

In this sense, **the challenge is represented by being able to draw up new regulations that are in step with the needs of this innovative mode of air transport**, while simultaneously maintaining the safety standards currently in place.

The novelty regarding vertiport operations is highlighted by EUROCAE document ED299, which provides guidance for planning and executing safe Visual Flight Rules (VFR) vertiport operations.

Among the various challenges that must be faced by the regulatory framework is that of **publishing documents capable of satisfying all the requirements needed by AAM**, taking inspiration from the legislation currently in place, while avoiding overly detailed regulation through replication of existing legislation.

In this sense, regulatory bodies in charge of drafting the new regulations for ground operations will have to address already known issues such as:

- a) Vertiport Access
- b) Inspection, assessment and reporting;
- c) Maintenance;
- d) VTOL aircraft stand management;

- e) FOD management;
- f) Wildlife hazard management;
- g) Obstacle control and monitoring and vertiport safeguarding;
- h) Vertiport Emergency Plan;
- i) Vertiport Contingency Plan;
- j) Rescue and Fire Fighting Service;
- k) Removal of disabled VTOL aircraft;
- l) Procedures for winter operations.

The new regulations will naturally have to consider the innovations introduced by this new mode of air transport, including for example refueling which may be electric, through recharging or battery swap, which entails modifications both on the structural components of the vertiports with respect to the existing infrastructures, and of the operations and associated safety procedures.

The regulatory documents should also be drawn up considering further development of technical standards and regulations governing vertiport operations, which could change suddenly in short periods of time.

Accessibility and fast services

Considering the shorter duration of AAM flights, **passengers will want to spend much less time in terminals**. For this reason, terminals must support streamlined passenger travel, including access to additional transit modes, and efficient security. This may vary depending on the size and scale of operations (e.g. simple point-to-point operations requiring basic security and verification checks, as well as larger hub-style operations with airside connections).

The regulations and related manuals must therefore consider the very short passenger processing times expected inside a vertiport before the flight, in order to shorten the travel time as much as possible.

Particular attention must be paid to security aspects to avoid creating “bottlenecks” during the passenger experience, both for intracity travel and for any connections with conventional air traffic. This need, depending on the position of the origin/destination vertiport (airport airside/landside or urban area), will have to be explored.