



International Civil Aviation Organization

WORKING PAPER

AN-Conf/14-WP/95

28/6/24

(Information Paper)

English only

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

TRAFFIC MANAGEMENT OF ELECTRIC VERTICAL TAKE-OFF AND LANDING (EVTOL) AT EXPO

(Presented by Japan)

EXECUTIVE SUMMARY

The purpose of this paper is to share traffic management rules for the safe introduction of electric Vertical Take-Off and Landing (eVTOL) without affecting existing aircraft and to identify best practices for the safe introduction of eVTOL in other states.

Action: The Conference is invited to agree on the recommendation set out in paragraph 3.2.

1. INTRODUCTION

1.1 In Japan, the public and private sectors are working together to promote the implementation of electric Vertical Take-Off and Landing (eVTOL). To show the world how eVTOL can be used in an attractive way at the Expo 2025 Osaka, Kansai, JCAB aim to realize the safe operation of eVTOL for scenic flights and point-to-point flights at the Expo.

1.2 At the Expo, it will be the world's first attempt to have four types of eVTOLs with different performance and constraints take off and land the same vertiport.

1.3 To adapt to this new environment, JCAB had made issues be sorted out under the current rules and, compiled the "Traffic Management Rules for eVTOL at the Expo", agreed upon by stakeholders after conducting demonstration experiments.

2. DISCUSSION

2.1 The range of conditions to be considered in traffic management is as follows:

- a) *Vertiport and flight route:* Vertiports will be set up at inside and outside the Expo site. In addition to excursion flights taking off from and landing at the vertiport inside the

Expo site, point-to-point flights connecting vertiports inside and outside the Expo site will be operated.

- b) *Type of aircraft*: Four types of eVTOLs consist of two multi-rotor types and two vectored thrust types, and different types of eVTOLs will operate in the same area.
- c) *Characteristics of aircraft*: Battery capacity limitations make it difficult to hold in the air for a long time. Short-periods, short-distance operations.
- d) *Flight rule*: VFR operation
- e) *Flight information services*: air navigation services provider (ANSP) provides eVTOL with necessary information for operation with very high frequency (VHF) communication, and eVTOL makes a position report during flight.

2.2 Perspectives of the consideration to reach a consensus with stakeholders are as follows:

- a) based on existing rules and it apply only during the Expo period;
- b) for aiming to develop future eVTOL and improve social acceptability for it, and also to lead to the consideration of integrated and efficient air traffic of advance air mobility and existing air mobility;
- c) regarding information sharing among stakeholders, the scope is divided into common areas (information sharing) and competitive areas (information management). In addition, issues and needs are clarified based on a common understanding of the tense (phase) among stakeholders; and
- d) consensus building among stakeholders in a coordinated manner through consideration based on three baselines (Concept of Operations (CONOPS), international situations, and research studies), with issues related to eVTOL operation and traffic management at the time of the Expo as common areas of concern.

2.3 Details of the baselines are as follows:

- a) Concept of Operations for Advanced Air Mobility (CONOPS for AAM)

Based on the “Concept of Operations for Advanced Air Mobility (1st edition)” (established in March 2023) compiled by the Public-Private Committee for Advanced Air Mobility.

- b) International Situations

To ensure that State-specific rules do not harm the introduction of eVTOL, the Federal Aviation Administration (FAA) and EURO standards are also referenced for functions and requirements such as services and system architecture. Currently, the ICAO AAM SG is working to formulate an implementation guidance through document compilation and gap analysis in each State, and JCAB would like to introduce an actual example from Japan as a Best Practice.

- c) Research and Development

In the future, eVTOL is also envisioned to operate automatically and autonomously by remote control and without a pilot, and there is a need to develop an ecosystem that can operate with as little human intervention as possible.

2.4 The study of eVTOL operations and architecture will also make use of the “Realization of Advanced Air Mobility Project (ReAMo)” sponsored by the Ministry of Economy, Trade and Industry (METI) and New Energy and Industrial Technology Development Organization (NEDO), as well as technological development and research studies conducted by Electronic Navigation Research Institute (ENRI) and other organizations.

2.5 As a result of the consideration, the stakeholders (ANSP, Regulator/JCAB, eVTOL Operator, Vertiport Operator, Operators' Organization, and Research and Development (R&D)) reached a consensus on the following five points in a coordinated manner and established the "Traffic Management Rules for eVTOL at the Expo."

a) Notification of airspace and routes

- The air space around Expo site is surrounded by four airport, Kansai, Kobe, Osaka and Yao, there are fair amount of VFR traffic, so we decide to publish the air space as eVTOL routes by AIP-SUP.

b) Coordination of flight plans (Strategic Deconflict)

- Coordinate flight plans during the pre-departure planning phase to prevent congestion at vertiport use among multiple operators and develop a guidance on how to coordinate operations.

c) Conformance Monitoring

- Monitor whether the flight is being operated according to the flight plan by position information, etc. by automatic dependent surveillance — broadcast (ADS-B). In cases of approaching surrounding controlled airspace or situations differing from the flight plan, ANSP will alert the operator, support to handle irregularities, in addition, take actions such as coordinating flight plans with other operators.

d) Information service

- Provide necessary information for operation to eVTOL taking off from and landing at the Expo site vertiport through VHF communication. Upon agreement among stakeholders, develop a guidance for the use of existing air traffic services (ATS) phraseology.

e) Information exchange

- Exchange operational, aeronautical, and meteorological information, etc. among stakeholders utilizing system-wide information management (SWIM) to enhance situational awareness.

2.6 ANSP (JCAB) will provide these services to eVTOL operators as an initial UATM service. JCAB will carry out the necessary infrastructure development before the Expo: improve communication facilities, install meteorological and ITV equipment, and deploy ADS-B display equipment to air traffic control and other facilities.

3. CONCLUSION

3.1 In Japan, the public and private sectors are working together to achieve an early start of eVTOL operations, with the aim of realizing eVTOL operations at the Expo 2025 Osaka, Kansai. JCAB have compiled the "Traffic Management Rules for eVTOL at the Expo" as a consensus document among stakeholders, based on the five aspects of notification of airspace and routes, coordination of flight plans (Strategic Deconflict), conformance monitoring, information service, and information exchange.

3.2 In light of the above, the Conference is invited to agree on the following recommendation:

That the Conference:

- a) note as a best practice the approach for traffic management of eVTOL at the Expo 2025 Osaka, Kansai in Japan.
- b) have the AAM SG gather experiences of Japan and guidance at the Expo as well as experiences of other states and make use of them to improve the knowledge and capacity of stakeholders related to eVTOL; and
- c) recommend to ICAO to accelerate the activities of the AAM SG.

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