

**58th CONFERENCE OF
DIRECTORS GENERAL OF CIVIL AVIATION
ASIA AND PACIFIC REGIONS**

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AGENDA ITEM 3: AVIATION SAFETY

COOPERATION ON INNOVATIVE AERIAL SERVICES

(Presented by EASA)

SUMMARY

This Discussion Paper presents the proposed European regulatory framework for the introduction and deployment in Europe of Innovative Aerial Services and Innovative Air Mobility, together with the initiatives established by the European Union Aviation Safety Agency (EASA) to address the safety, security, environmental aspects and the acceptance and adoption by citizens of this new form of air mobility and services.

The Conference is invited to note this and discuss means of collaboration by which to address the challenges posed by these new entrants into the aviation ecosystem.

COOPERATION ON INNOVATIVE AERIAL SERVICES

1. INTRODUCTION

1.1 The European aviation industry has been developing new operational concepts based on innovative technologies, such as unmanned aircraft systems (UAS) and aircraft with vertical take-off and landing (VTOL) capability, along with their enabling ecosystems. These developments, driven by a global wave of digitalization and automation, have reinforced the momentum towards the creation of new air mobility concepts, in line with the European Commission's "Sustainable and Smart Mobility Strategy"¹ and its "smart, green and digital" cities initiative.

1.2 Regulators worldwide face a common challenge in both enabling the opportunities presented by UAS and VTOL in a timely manner and, at the same time, addressing safety, security and sustainability concerns, as well as their social acceptance and adoption by citizens. Cooperation frameworks between regulators may facilitate early engagement to share understanding, help get ahead of the technology curve, and foster harmonization for the benefit of industry.

2. DISCUSSION

2.1 New European Union (EU) regulations for UAS and VTOL aircraft are being developed in a stepwise approach, progressively covering market segments, designs, and operations to ensure safe integration and operation into the aviation system.

2.2 The European Union Aviation Safety Agency (EASA) is introducing the following concepts and definitions for the purpose of standardizing the communication on the matter at European Union level and to be used for the development of future requirements (regulations and rules):

- **Innovative² aerial services (IAS)**: the set of operations and/or services that are of benefit to the citizens and to the aviation market and that are enabled by new airborne technologies; the operations and/or services include both the transportation of passengers and/or cargo and aerial operations (e.g. surveillance, inspections, mapping, telecommunications networking, etc.).
- **Innovative air mobility (IAM)**: the safe, secure and sustainable air mobility of passengers and cargo enabled by new-generation technologies integrated into a multimodal transportation system.
- **Urban air mobility (UAM)**: the subset of IAM operations conducted in, to, within or out of urban environments.

Although the term 'innovative' may seem applicable to a certain point in time, the regulatory framework remains operation-centric and performance-based. Certification and operational requirements are proportionate to the type of operation and of the environment in which the operation is performed. In the certification domain, more stringent requirements are imposed on aircraft that carry passengers or operate over congested areas. The same approach applies in the operational domain where the driving factor remains the type of operation and where the operation is performed (congested versus non-congested area).

1 https://transport.ec.europa.eu/transport-themes/mobility-strategy_en

2 While the notion of UAS and electrical or hybrid engines may be immediately associated to 'innovative' aspects, the aircraft design or the propulsion systems do not necessarily play a role in the classification of an aircraft as 'innovative' (an example may be a conventionally propelled aeroplane or helicopter with a C2 link enabling the remote-piloting capability).

2.3 The already existing regulatory framework includes:

- Commission Delegated Regulation (EU) 2019/945 of 12 March 2019 on unmanned aircraft systems and on third-country operators of unmanned aircraft systems³
- Commission Implementing Regulation (EU) 2019/947 of 24 May 2019 on the rules and procedures for the operation of unmanned aircraft⁴
- Commission Implementing Regulation (EU) 2021/664 of 22 April 2021 on a regulatory framework for the U-space⁵

The Regulations (EU) 2019/945 and (EU) 2019/947 implement an operation-centric, proportionate, risk- and performance-based regulatory framework for all UAS operations where the measures to mitigate the risk of operations are defined in the:

- 'open' category, through a combination of limitations, operational rules, requirements for the competency of the remote pilot, as well as technical requirements for UAS, such that the UAS operator may conduct the operation without prior authorisation by the competent authority or without submitting a declaration; and
- 'specific' category, through a system that includes a risk assessment being conducted by the UAS operator before starting an operation, or an operator complying with a standard scenario, or an operator holding a certificate with privileges; and
- 'certified' category, through the certification of the UAS, the certification of the operator and the licencing of the remote pilot.

The Regulation (EU) 2021/664 establishes the conditions for manned and unmanned aircraft operations to operate safely in the airspace where U-space services are provided using an appropriate common information service that will enable the exchange of essential information between the U-space service providers, the aircraft operators and all other actors participating to the U-space. In addition, the framework is complemented by the Regulations (EU) 2021/665 and (EU) 2021/666, amending the ATM/ANS and Standardised European Rules of the Air (SERA) to introduce safety mitigation means for U-space airspace designated respectively in controlled and uncontrolled airspace.

EASA has also recently released through the Opinion 03/2023 a draft regulatory proposal to address new operational and mobility concepts that are based on innovative technologies - such as unmanned aircraft systems (UAS) and aircraft with vertical take-off and landing (VTOL) capability - to foster and promote their acceptance and adoption by European citizens.

The Opinion proposes amendments to existing EU aviation regulations and the creation of new ones to address:

- the initial airworthiness of UAS subject to certification.
- the continuing airworthiness of UAS subject to certification and operated in the 'specific' category; and
- the operational requirements applicable to manned VTOL-capable aircraft.

³ http://data.europa.eu/eli/reg_del/2019/945/2020-08-09

⁴ http://data.europa.eu/eli/reg_impl/2019/947/oj

⁵ http://data.europa.eu/eli/reg_impl/2021/664/oj

2.4 To support the implementation of the regulatory framework under development, EASA has also established additional initiatives, including:

- publication of the Prototype Technical Design Specifications for the design of vertiports⁶;
- publication of Acceptable Means of Compliance and Guidance Material applicable to UAS regulations and U-space regulation⁷;
- publication of the Means of Compliance for the Special Condition for VTOL⁸ and the Special Condition for Light UAS⁹;
- publication of a methodology for the measurement of UAS noise¹⁰ and launch of research activities for establishing noise limits applicable to VTOL-capable aircraft;
- publication of guidelines for the management of drones incidents at airports¹¹;
- support to industry standardisation processes in EUROCAE Technical Work Programme¹²;
- support to research and demonstration activities led by SESAR Joint Undertaking¹³ or national research centres;
- publication of a consultation paper on Environmental Protection Technical Specification (EPTS) applicable to eVTOL powered by multiple, vertical, non-tilting, evenly distributed rotors¹⁴.

2.5 EASA was awarded by the European Commission with the mandate to develop a "Sustainable IAM Hub", an online platform, in order to better define and communicate on IAS opportunities, ensure collaboration between European, national, regional and local authorities, foster broader acceptance and manage societal and environmental impacts of operations of UAS and VTOL-capable aircraft.

2.6 The EASA *Study on the societal acceptance of Urban Air Mobility in Europe*¹⁵ highlighted that, in addition to safety, security and privacy concerns, as well as wildlife protection are main concerns of the European citizens when considering the potential large number of aircraft flying in the lower levels of the atmosphere. EASA is liaising with the European Commission and support it in developing appropriate measures, either systemic or technical (e.g. establishment of wildlife protection areas implementation of bird avoidance systems on the ground or on aircraft) to ensure

6 <https://www.easa.europa.eu/en/document-library/general-publications/prototype-technical-design-specifications-vertiports>

7 <https://www.easa.europa.eu/en/document-library/acceptable-means-of-compliance-and-guidance-materials/amc-and-gm-implementing>

8 <https://www.easa.europa.eu/en/document-library/product-certification-consultations/special-condition-vtol>

9 <https://www.easa.europa.eu/en/document-library/product-certification-consultations/special-condition-light-uas>

10 <https://www.easa.europa.eu/en/document-library/product-certification-consultations/guidelines-noise-measurement-unmanned-aircraft>

11 <https://www.easa.europa.eu/en/newsroom-and-events/press-releases/easa-issues-guidelines-management-drone-incidents-airports>

12 <https://eurocae.net/about-us/working-groups/>

13 SESAR Joint Undertaking has launched and is launching multiple projects involving drones and IAM aircraft to demonstrate several solutions for airspace integration of these traffic at different level of technical readiness (<https://www.sesarju.eu/U-space>)

14 <https://www.easa.europa.eu/en/document-library/product-certification-consultations/consultation-paper-environmental-protection>

15 <https://www.easa.europa.eu/sites/default/files/dfu/uam-full-report.pdf>

environmental and wildlife protection while rendering the IAS system sustainable.

2.7 In accordance with the *EASA Artificial Intelligence (AI) Roadmap 2.0*¹⁶, the EASA has published a concept paper¹⁷ to present a first set of objectives for *Level 1 Artificial Intelligence* ('assistance to human') and *Level 2 Artificial Intelligence* ('human-machine collaboration') in order to anticipate future EASA guidance and requirements for safety-related machine learning (ML) applications. Such document aims at guiding applicants when introducing AI/ML technologies into systems intended for use in safety-related or environment-related applications in all domains covered by the EASA Basic Regulation (Regulation (EU) 2018/1139), including the entire ecosystem applicable to UAS and VTOL-capable aircraft.

2.8 EASA has recognized that for this innovation to happen in a safe and timely manner, the early involvement of regulators and innovative approaches are needed to de-risk technology uptake. These may include developing new approaches to early testing in operational environments (innovative test environments, commonly referred to as regulatory sandboxes) before regulations can be promulgated. Early and continuous dialogue and a total system approach is needed across both the aviation and municipal ecosystems.

2.9 Similarly, early engagement between regulators can help share understanding, support each other in getting ahead of the technology curve, and foster harmonization for the benefit of industry. ICAO Asia Pacific Office has created the Asia/Pacific Unmanned Aircraft Systems Task Force (APUAS/TF). EASA is also enhancing its international cooperation in the Asia Pacific and has signed Memorandums of Understanding on UAS/UAM with different partners in the region.

2.10 In this spirit, the Civil Aviation Authority of Singapore (CAAS) and EASA put forward a first joint EU-Asia symposium on UAS/UAM on 18-21 October 2022. This helped provide an insight into the challenges and fostered cooperation between regulators in sharing solutions. The next iteration of the symposium will be run again in Singapore on 7-10 November 2023.

3. ACTION BY THE CONFERENCE

3.1 The Conference is invited to;

- a) note the proposed regulatory framework for the introduction and deployment in Europe of Innovative Aerial Services and Innovative Air Mobility, together with the initiatives established by EASA to address the safety, security, environmental aspects and the acceptance and adoption by citizens of this new form of air mobility and services.
- b) discuss means of collaboration by which to address the challenges posed by the introduction and deployment of Innovative Aerial Services and Innovative Air Mobility into the aviation and municipal ecosystems.
- c) note the EU-Asia symposium on UAS/UAM to be held in Singapore on 7-10 November 2023. States are welcome to contact EASA at david.waller@easa.europa.eu and/or CAAS at CAAS_UTEP@caas.gov.sg for queries on this.

— END —

16 <https://www.easa.europa.eu/en/newsroom-and-events/news/easa-artificial-intelligence-roadmap-20-published>

17 <https://www.easa.europa.eu/en/newsroom-and-events/news/easa-artificial-intelligence-concept-paper-proposed-issue-2-open>