



**WORKING PAPER**

**ASSEMBLY — 42ND SESSION**

**TECHNICAL COMMISSION**

**Agenda Item 24: Aviation Safety and Air Navigation Priority Initiatives**

**INTEGRATING SAFETY STANDARDS FOR UNMANNED AIRCRAFT SYSTEMS (UAS) —  
OMAN’S REGULATORY FRAMEWORK FOR ENSURING THE SAFE INTEGRATION OF  
DRONES INTO ITS AIRSPACE**

(Presented by Oman)

**EXECUTIVE SUMMARY**

This paper describes the significant importance to safely integrate unmanned aircraft systems (UAS) into airspace, without negatively impacting the safety or efficiency of manned aviation operations or the safety of persons and property on the ground. Additionally, this paper presents the Oman’s regulatory framework for ensuring the safe integration of drones into its airspace. Furthermore, Oman provides the experience of the digital platform to register and manage drones.

**Action:** The Assembly is invited to:

- a) request ICAO to continue working on the development of the regulatory framework for UAS as part of the Advanced Air Mobility Study Group (AAM SG) activities, and consider:
  - 1) harmonizing UAS safety regulations globally;
  - 2) exploring the feasibility to leverage the Specific Operations Risk Assessment developed by Joint Authorities for Rulemaking on Unmanned Systems - (JARUS-SORA); and
  - 3) developing Standards and Recommended Practices (SARPs) for ensuring the safe integration of UAS into the airspace for “Open” and “Specific” and non-RPAS “Certified” categories.

<i>Strategic Goals:</i>	This working paper relates to the Strategic Goal <i>Aviation Delivers Seamless, Accessible and Reliable Mobility for all</i> .
<i>Financial implications:</i>	The activities referred to in this paper will be undertaken subject to the resources available in the 2022-2025 Regular Programme Budget and/or from extra-budgetary contributions.
<i>References:</i>	<a href="#">UTM - A Common Framework with Core Principles for Global Harmonization, Edition 4 ICAO RPAS concept of operations (CONOPS)</a> Doc 10019, <i>Manual on Remotely Piloted Aircraft Systems (RPAS)</i> Doc 10209, <i>Report of the Fourteenth Air Navigation Conference (AN-Conf/14)</i>

**1. INTRODUCTION**

1.1 The rapid growth of unmanned aviation in the last two decades was made possible by the significant technological developments made across many industries. These changes are leading to what is referred to as advanced air mobility (AAM) which is aiming to transform the mobility scheme in cities,

other urban/semi urban areas and between such areas. AAM relies on electric vertical take-off and landing (eVTOL) aircraft carrying passengers, cargo and mail initially for short and medium distances. It raises questions on the role of the pilot/remote pilot in the context of increasing levels of automation and autonomy, as well as how to achieve integration of unmanned and manned aviation in that respect.

1.2 As unmanned aircraft system traffic management (UTM) systems continue to mature and more systems are being developed and deployed, it is important to capture lessons learned and best practices relating to various aspects of these capabilities. Collecting and recording this type of information will assist in the continued improvement of systems and processes as well as ensuring the harmonized, safe and effective implementation of UTM systems globally.

1.3 The ability for unmanned aircraft (UA) to safely integrate into a finite airspace structure is a crucial issue. The primary requirement remains the ability to facilitate such integration without negatively impacting the safety or efficiency of manned aviation operations or the safety of persons and property on the ground, taking into account security, environmental impacts and equitable access for all airspace users.

1.4 The further development of drones and their integration in non-segregated airspace will pose new challenges and a significant amount of further research needs to be performed. The air traffic management/air navigation services (ATM/ANS) aspect of the concept of operation will need to be further developed.

## 2. DISCUSSION

### 2.1 Current status in Oman

2.1.1 Oman Civil Aviation Authority (CAA) has published an Executive Regulation No. 1412/2023 of the Civil Aviation Law in 2023 which replaced the Executive Regulation No. 417/2020 regarding the framework for drones' activities in Oman.

2.1.2 Additionally, Civil Aviation Regulations CAR 102, Revision 2, regrading Remote Piloted Aircraft (Drones) has been published. This regulation prescribes rules governing the operation of unmanned aircraft system (UAS) (Drone) utilized for civilian operations conducted within Oman, which affects or may affect the safety of air navigation.

2.1.3 Recently, the CAA of Oman has granted a license to "Tahleeq Drone Services" (LLC) to utilize a digital platform called "Serb" for the registration and management of drone air traffic in Oman. This initiative aims to enhance air navigation safety and regulate drone operations within Omani airspace.

**Note:** The Effective launch of the digital platform "Serb" announced during the (ICAO) Security Week and the High-Level Ministerial Meeting from December 9th to 12th 2024.

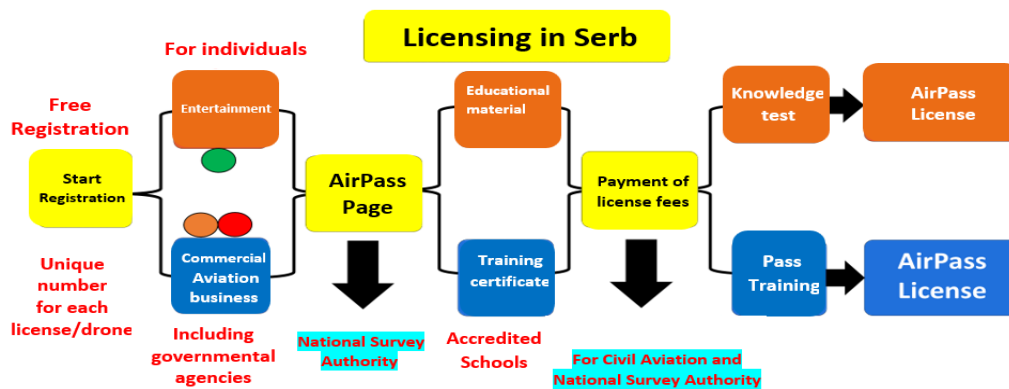
2.1.4 The digital platform service addresses the significant increase in drone usage by expediting permit issuance and streamlining registration procedures. Additionally, as an advanced phase, the platform monitors and tracks drone operations, ensuring high security and protection against deliberate deviation/violation or cyber threats. All data is stored on local servers, utilizing locally developed algorithms and software.

2.1.5 The decision to license LLC for drone air traffic management is based on the Civil Aviation Law promulgated by Royal Decree No. 76/2019, its Executive Resolution No. 116/2023 and the Drone Executive Resolution No. 1412/2023. Through this regulation, the CAA aims to enhance the safety and

security of drone operations and provide a regulatory environment that keeps pace with technological advancements in the field.

2.1.6 The drone air traffic registration and management service that is provided by the Serb digital platform includes a cutting-edge digital system. In its initial phase, the platform focuses on registering amateur drone operators. The platform offers a mechanism to record operator data, grant licenses upon successful completion of a simple knowledge test and allow drone flights in designated safe areas in collaboration with military and security agencies.

*The following figure illustrates the workflow of licensing in Serb<sup>1</sup>.*



## 2.2 Regulatory reform and other challenges

2.2.1 The main requirements for UAS - ATM integration are:

- a) the integration of UAS shall not imply any safety or security significant impact on current users of the airspace;
- b) UAS shall comply with the existing and future regulations and procedures laid out for manned aircraft (MA);
- c) UAS integration shall not compromise existing aviation safety levels; and
- d) UAS operations shall be conducted in the same way as those of MA and shall be seen as equivalent by air traffic control (ATC) and other airspace users.

2.2.2 Current Standards and Recommended Practices (SARPs) do not totally cover these requirements; therefore, Oman activities are organized as follows:

### a) Regulatory Activities and Harmonization

- 1) Oman supporting the decision of the Fourteenth Air Navigation Conference (AN-Conf/14) of the development of UTM guidance material, the harmonized

<sup>1</sup> Figure is available in English only.

regional regulatory frameworks and interoperable systems to ensure effective integration of UAS;

- 2) proposing to ICAO to develop regulatory frameworks for the certification and validation of UAS providers;

*Note: the new Part IV to Annex 6 is intended to introduce provisions related to international operations of remotely piloted aircraft systems (RPAS), certificated in accordance with Annex 8, in controlled airspace and at aerodromes. Meaning, the "Open" and "Specific" Drone category has no SARPs.*

- 3) Oman CAA and air navigation service providers (ANSPs) under oversight supporting the apply for safety management principles and analyzing the integration of RPAS operations. These principles and analyses should reflect on-going developments in RPAS capabilities;
- 4) the Joint Authorities for Rulemaking on Unmanned Systems (JARUS) developed the Specific Operations Risk Assessment (SORA) methodology to provide a structured, risk-based approach for assessing the safety of UAS operations. Recognizing its effectiveness, the European Union Aviation Safety Agency (EASA) adopted JARUS-SORA within the EU Regulation (EU) 2019/947, Article 11, which governs the operation of UAS under the Specific Category; and
- 5) given that ICAO has already adopted EASA's RPAS categorization, it would be appropriate for ICAO to consider JARUS-SORA into its regulatory framework to ensure a globally harmonized risk-based assessment approach for UAS operations.

**b) Coordination activities**

- In the field UAS integration in non-segregated airspace, Oman is proposing to conduct coordination activities with states aiming to ensure an efficient cooperation, harmonization and safe integration with civil/military authorities, ANSPs, UAS Operator and UAS Training Organization.

**c) The development of new interfaces**

- Oman is proposing the development and the implementation of new interfaces, and potentially new ways of working such as the system-wide information management (SWIM) to ensure the efficiency of the integration.

**3. CONCLUSION**

3.1 The integration of UAS in non-segregated airspace will be a gradual process that builds upon technological advances and development of associated procedures. The process begins with limited access to airspace, and while some UAS may eventually be able to seamlessly integrate with manned flights, many may not.