



WORKING PAPER

FOURTEENTH AIR NAVIGATION CONFERENCE

Montréal, Canada, 26 August to 6 September 2024

- Agenda Item 2: Timely and safe use of new technologies**
2.2: Addressing safety risks related to evolving aviation technologies

**INTEGRATING UNMANNED AIRCRAFT SYSTEMS INTO THE
AIR NAVIGATION SYSTEMS**

(Presented by 54 Contracting States², Members of the African Civil Aviation
Commission (AFCAC))

EXECUTIVE SUMMARY

Integrating unmanned aircraft systems (UAS) into the air navigation systems presents significant opportunities for enhancing aviation capabilities and economic development across the continent. As various industries experience exponential growth, such as agriculture, health, tourism, logistics, infrastructure monitoring, and disaster response, the integration of UAS into the air navigation systems could revolutionise operations and drive economic development. Nevertheless, there are regulatory challenges, training gaps, infrastructural needs, keeping up with this highly dynamic technology, collaboration initiatives and stakeholder sensitization that need to be addressed. By addressing these challenges, States can harness the unique benefits of UAS technology while ensuring safety, security, and efficiency in airspace operations.

Action: The Conference is invited to:

- a) request ICAO to enhance UAS training, capacity building and skill enhancement of safety oversight personnel;
- b) request the international community to fund initiatives for infrastructural development to support the integration of UAS into the air navigation systems;
- c) urge international organizations, to spearhead collaboration among relevant government agencies, aviation authorities, industry partners, and international organisations to facilitate information sharing, standardisation efforts, and the development of interoperable systems; and
- d) encourage Member States to establish harmonized regional UAS regulatory frameworks to ensure effective integration of new technologies for Unmanned Aircraft Systems (UAS).

¹ English and French, versions provided by AFCAC.

² Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cabo Verde, Cameroon, Central African Republic, Chad, Comoros, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Djibouti, Egypt, Equatorial Guinea, Eritrea, Eswatini, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, South Sudan, Sudan, Togo, Tunisia, Uganda, United Republic of Tanzania, Zambia, Zimbabwe.

1. INTRODUCTION

1.1 Integration of unmanned aircraft systems (UAS) into the air navigation systems can improve efficiency and cost-effectiveness in various sectors. Several Member States have realized these benefits across various sectors, such as effective use in precision agriculture, aerial survey, healthcare logistics, cargo delivery, human-wildlife conflict mitigation, surveillance, search and rescue missions, and environmental monitoring. Integrating UAS into air navigation systems holds immense potential to drive innovation, economic growth, and social development across the continent. By harnessing the benefits of UAS technology, Member States can overcome traditional barriers and leapfrog into a more connected and sustainable future.

2. DISCUSSION

2.1 Despite the potential advantages, Member States continue to encounter several challenges while integrating UAS into the air navigation systems. Some of these bottlenecks include regulatory challenges, training gaps, infrastructural needs, collaboration initiatives and Stakeholder sensitization.

2.2 As we recognize the efforts by ICAO in coming up with Model UAS Regulations and making provisions for international operation of remotely piloted aircraft system (RPAS) within the amended ICAO Annexes, Member States continue to experience challenges in establishing clear regulations and guidelines for UAS operations. Further, inconsistencies in regulations across different States or regions hinder the seamless integration of UAS into existing air navigation systems. Harmonising regulations across States, establishing licensing requirements, and implementing safety standards are essential steps in this process. Developing a robust, harmonised regulatory framework for Member States is crucial for ensuring the safe and lawful integration of UAS within the air navigation systems.

2.3 Training programs for UAS operators and air navigation services providers (ANSPs) is vital in ensuring proficiency and compliance. Operating UAS within air navigation systems requires specialised skills and training for pilots, ground operators, ANSPs and maintenance personnel. Building local capacity and expertise in UAS operations may be challenging in some regions and therefore, support is needed in those regions to ensure that training gaps are effectively addressed. Training specifically tailored towards oversight of UAS for civil aviation authority (CAA) personnel should also be given priority.

2.4 Successful integration of UAS into the air navigation systems requires adequate infrastructure. This includes dedicated airspace, communication systems, take-off and landing facilities, UAS traffic management systems, geofencing systems, UAS corridors and routes among others. However, many States struggle to invest in the infrastructure needed to accommodate UAS effectively.

2.5 UAS have rapidly transformed to versatile tools with widespread applications across various sectors. This rapidly evolving technology poses a challenge for regulators to establish a legal framework that addresses their multifaceted implications by striking a balance between fostering technological innovation and addressing safety, privacy, security, and environmental concerns. Their integration brings about more utilization of the airspace, that will require strategic and tactical deconfliction mechanisms.

2.6 Collaboration among various stakeholders, including government agencies, aviation authorities, industry players, and local communities, is critical for successfully integrating UAS. Collaboration will ensure alignment of efforts to ultimately achieve routine safe UAS operations. In addition, coordination amongst the relevant stakeholders will ensure prioritization of technical, procedural,

regulatory and policy solutions needed to deliver incremental capabilities and resolution of any conflicts related to integration of UAS into the airspace.

2.7 Unmanned aircraft have become increasingly affordable and available. Unlike the traditional model aircraft user community, people with little or no aviation experience or knowledge are beginning to fly UAS. An “education first” approach to integrating this growing community of unmanned aircraft users, including dedicated outreach and public campaigns, trade shows, conference participation, and collaboration with industry partners to ensure the safety message reaches the user community, will enhance UAS safety awareness and integration.

2.8 In addition to harmonizing the regulations, having a standard and common unmanned aircraft systems traffic management (UTM) system that is the foundation for UAS operations is central to safety as it provides assurance to all stakeholders that UAS can share the skies safely. Many institutions and organizations have developed UTM concepts. The technology exists, and public parties show a willingness to invest – but an enabling environment is required to demonstrate these systems in real-world scenarios. CAAs may develop UTM systems that safely permit or integrate UAS into the airspace and the wider air traffic management network. To be scaled, it will require capacity building by the CAAs and other government agencies in exploring and designing appropriate regulatory framework, permit regime and technical requirements.

3. CONCLUSION

3.1 To address the above concerns, robust and harmonised regulations and policies governing UAS activities are essential. This includes implementing effective registration and licensing requirements, establishing designated no-fly zones, strengthening the advancement of anti-UAS technologies, and promoting public awareness about the responsible use of UAS. For airspace management to scale with the growth of manned aviation alongside the exponential increase in unmanned operations, enabling a technology that aids in the registration, identification, authorization and de-confliction of all traffic will be a necessity for the operationalization of UAS. UTM can play an important role in minimizing ground risk, as well as ensuring the appropriate level of involvement of all stakeholders.

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