

International Civil Aviation Organization
Unmanned Aircraft System Traffic Management (UTM)
Request for Information¹

1. BACKGROUND

For the past three years, after receiving requests from Member States that the International Civil Aviation Organization (ICAO) serve as the global civil aviation facilitator to assist with the challenge of integrating unmanned aircraft systems (UAS) into the aviation regulatory framework, ICAO has hosted global UAS symposia (DRONE ENABLEs) to solicit the most up-to-date information on the topic of UAS traffic management (UTM). The aim of these activities has been to synthesize relevant information gleaned from an annual Request for Information (RFI), and utilize this information to provide a globally harmonized, common framework to support the development and deployment of UTM systems and facilitate the increased integration of unmanned aircraft (UA).

To ensure sound technical approaches were used for drafting the framework, broad industry, academic and scientific community research and development initiatives were solicited as well as any national implementation activities from which lessons could be learned.

At the inaugural DRONE ENABLE, held in Montréal in September 2017, States, industry and academia submitted responses which addressed UTM foundational components including registration systems that supported remote identification and tracking; communications systems for control and management of the UA and tracking of all UA within the UTM area; as well as geofencing-like systems to prevent UA operation in sensitive/security areas and restricted/danger areas such as near aerodromes.

DRONE ENABLE/2, held in Chengdu, China in September 2018, had a theme of “*UTM to ATM – Transitioning from Segregation to Integration*” and focused on solutions for enabling the integration of UTM and air traffic management (ATM) systems. This included the challenges of defining the boundaries between ATM and UTM systems and examining the key information that needs to be exchanged between UTM and ATM systems to facilitate the transition between these two systems.

DRONE ENABLE/3, held in Montréal, Canada in November 2019, had a theme of “*Facilitating Future Innovation*” and focused on specific challenges of developing a UTM system. These included an effective means of assessing risks for a proposed UTM system; and an approval/certification process of potential UTM Service Providers (USS) based on the criticality of services provided, addressing separation and deconfliction requirements within the UTM system as well as a means to assure that contingency/emergency situations would not result in greater levels of risks.

As work progresses, critical gaps in the UTM solutions continue to be identified. To help address these gaps, ICAO is again engaging States, industry, academia and other interested stakeholders to collaborate on and provide solutions in support of the development of a safe and efficient UTM capability.

It should be noted that this activity is complementary to ICAO’s ongoing work to build a complete regulatory framework to support international instrument flight rules (IFR) operations for remotely piloted aircraft in controlled airspace and at controlled aerodromes.

2. PROBLEM STATEMENT

¹ This is a request for information (RFI) only and does not constitute a commitment, implied or otherwise, that ICAO will recommend any particular action on this matter. Further, ICAO will not be responsible for any cost incurred in furnishing this information.

As the concept of UTM matures, systems providing initial levels of capability start emerging, and the demand for airspace access continues to grow, it is important to address specific challenges that must be resolved in order to realize a harmonized, safe and effective UTM system implementation.

As such, like their manned aircraft and ATM counterparts, UAS and UTM systems will soon need to address problems such as determining: the performance requirements of the UTM system and the unmanned aircraft that are managed by such systems; how UTM systems will demonstrate and achieve a level of confidence normally associated with certified aviation systems; and how UTM will be effectively integrated into aerodrome environments and activities. Each of these problems brings numerous issues and concerns to the forefront and are addressed in more detail below.

3. **REQUEST FOR INFORMATION**

As the development of UTM advances, there remains a need to focus on the next evolution of the ability for UA to safely integrate into a finite airspace structure. The primary requirement remains to facilitate such integration without negatively impacting the safety of manned aviation operations or the safety of persons and property on the ground, taking into account security and equal accessibility for all airspace users.

To enable States, regulators and industry to continue to advance the development of UTM systems the issues below need to be considered. It is requested that submissions propose practical solutions, successful research and development activities and/or best practices, existing or proposed, for addressing one of the problem areas. The types of questions that should be considered in your submission are provided below with each associated problem statement. Submissions will be evaluated based on how well they have addressed a specific problem statement.

- a) **UA Performance Requirements in a UTM Environment** – Unmanned aircraft performance requirements should be derived from performance objectives, metrics and indicators in order to meet expectations regarding safety, security, access and equity, environmental protection, efficiency, interoperability and cost-effectiveness.
 - What are the performance requirements to be considered for UA in UTM?
 - Is standardization of such performance requirements needed in order to safely, effectively and efficiently manage UAS traffic in a UTM environment (e.g. relating to UA communication, navigation and surveillance (CNS) systems or other systems)?
 - Could there be different UA CNS-related performance requirements, based on airspace? For example, the specific airspace or UTM service volumes in which a UA is operating or in proximity to other airspace users. If so, which criteria should be used to apply the performance requirements? Such performance requirements could also be applicable to other systems, beyond purely CNS.
 - How would standardized common vertical position (altitude/height), lateral position and temporal reference be achieved? What would be the accuracy and latency requirements of such systems and how would these requirements be certified?
- b) **UTM System Certification Requirements** – Given the nature of the planned/projected initial capability of UTM, UTM systems may have to demonstrate and achieve a level of confidence normally found in certified aviation systems. However, it is not necessarily the case that this needs to be done using the existing, established industry standards which may be viewed as excessive or unnecessary for the intended function of UTM.

- Are industry standards on UTM system certification currently under development and, if so, who is developing them (e.g. ASTM, EUROCAE, ISO, RTCA, SAE, etc.)? What criteria or services are being addressed in these standards?
 - How will UTM system developers demonstrate compliance to standards? What, if any, artefacts/means of compliance will be required by State regulatory authorities?
 - To what extent will UTM system hardware/software be required to comply with certification requirements? If full compliance is not required, how will the system be shown to meet a target level of safety?
 - How would upgrades/modifications to UTM components or systems be implemented in order to maintain the certification basis?
 - If a UTM system is not required to be certified or does not rely on existing ATM standards for system development, and instead complies with a less rigorous standard, how would interoperability with ATM systems be accomplished?
- c) **UTM Integration into Aerodrome Environments/Activities** – UA may operate adjacent to or at aerodromes and blend with conventional aircraft operations. This includes controlled airports, uncontrolled airports and/or heliports and addresses air and land-side operations both on the ground and in the air. It is essential that the risks, issues and challenges of UTM/ATM interaction within the airport environment be clearly understood and addressed for the industry to move forward. With an increased need for airport connectivity (i.e. passenger, cargo, urban air mobility, etc.), it is important to identify and understand the roles of various stakeholders in the entire eco system. Please note that it is not the intent of this problem statement to address Counter-UAS initiatives or capabilities.
- Assuming that UTM operations will be integrated within some aerodrome environments (i.e. controlled or uncontrolled), what types of UTM related aerodromes operations and use cases are anticipated?
 - For UTM operations in and around aerodromes, how would such UTM operations be managed and what key areas/issues would need to be addressed when integrating UTM into an aerodrome environment?
 - Who are the key stakeholders to participate in UTM integration at the aerodrome and what will be their roles and responsibilities?
 - How would integration of UTM-managed traffic affect air-side/land-side operations at an aerodrome? How would UTM-managed traffic be integrated into the traffic flow, both in the air and on the ground?
 - In an airport or heliport context, how would the applicability of ATM and UTM services be determined (i.e. who would provide which services)? Would UA used by the airport or heliport stakeholders (e.g. perimeter security, aerodrome or aircraft inspections, navigation aid (NAVAID) calibration, etc.) be managed by the UTM or ATM system?

Solutions to the RFI will serve to strengthen the ICAO UTM framework, providing a path forward for the safe integration of UAS. Furthermore, this information will assist States with developing the required regulatory framework and guidance material to ensure a safe, efficient and effective UTM system.

4. SUBMISSIONS

Each submission should address only one of the above problem statements. If the intent is to address more than one problem statement, separate RFIs must be submitted, addressing each proposal separately. By submitting an RFI response, submitters represent that they are prepared to travel to Rio de Janeiro, Brazil to deliver their presentation. Submissions for additional topics will not be considered at this time.

Submissions must:

- describe, at a high-level, solutions that could be implemented by any State;
- allow for flexible implementation on a national basis while adhering to a common framework;
- define any infrastructure and technology requirements needed as part of the proposed solution and provide recommendations on how these can be achieved;
- take into consideration the operational environment within which the proposed solution would operate;
- not exceed 2000 words, mindful that the word count function of MS-Word will be used to determine the number of words in the document;
- be written in English;
- be provided as a readable/writable MS-Word document; and
- be received by ICAO at DRONEENABLE@icao.int not later than **17 April 2020**.

All submissions received by the due date will be reviewed. Submitters of those proposals that are considered to best address the various problem statements will be offered the opportunity to present their information at DRONE ENABLE/4. Extensive discussion of all presentations should be anticipated with the possibility that aspects of several submissions would be supported by the Symposium audience.

Please note that any costs associated with travel and accommodations will be borne by the presenter.

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