

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

1. BACKGROUND

For the past two 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 unmanned aircraft systems (UAS), ICAO has hosted global UAS symposia (DRONE ENABLEs) to solicit 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 the Requests for Information (RFI) that were released each year, and utilize this information to provide a globally harmonized, common framework to support integration of unmanned aircraft (UA) into national airspace.

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

At the first DRONE ENABLE, held in Montréal in 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, 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.

As work progresses, critical gaps in the UTM solutions continue to be identified by the ICAO UAS Advisory Group (UAS-AG). To address these issues, ICAO is again requesting assistance of 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 complimentary to ICAO's ongoing work to build a full regulatory framework for the integration of remotely piloted aircraft systems (RPAS) in accordance with instrument flight rules (IFR).

2. PROBLEM STATEMENT

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

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 such, like their manned aircraft and ATM counterparts, UAS and UTM systems will soon need to address problems such as: methodologies and processes to ensure that UTM Service Suppliers² (USS) are duly authorized; identifying and mitigating risks attached to UAS operations in a structured and comprehensive manner; considering system failures or degradations and establishing planned responses for such events before they actually occur. Each of these problems brings numerous issues and concerns to the forefront.

Additionally, the issue of what constitutes safe separation will need to be resolved. This includes not only separation amongst unmanned aircraft but also between unmanned and manned aircraft, when manned aircraft operate within airspace where UTM services are provided. However, what would be considered safe separation between the various participants? As with manned aviation, specific equipment or reliability levels may need to be considered to ensure safe separation can be safely maintained.

3. **REQUEST FOR INFORMATION**

As the development of UTM continues to advance, there remains a need to focus on the next evolution of the ability for aircraft, both manned and unmanned, to safely integrate into a finite airspace structure. The primary requirement remains to ensure 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 following must be developed: an effective means of assessing risk for a proposed UTM system; approval/certification process of potential USSs according to the criticality of services provided and means to assure that contingency operations will not result in greater levels of risks would be required.

Submissions should propose practical solutions, successful research and development activities and/or best practices, existing or proposed, for addressing one of the problems identified below. Additionally, the types of questions that should be considered in your submission are provided with each problem area:

a) Development of a UTM Safety Risk Assessment Model

- What types of risks should be addressed by such a model (e.g. mid-air collisions, risk to third parties, etc.)?
- What would be the key elements of such a risk assessment (RA) and what should the risks be based on (e.g. capability, weight, kinetics, operational area, etc.)?
- Do current RA models support UTM use cases (e.g. urban air mobility/air taxi, etc.) and/or should UTM RA models be aligned with other UAS operational risk assessments (e.g. Specific Operations Risk Assessment (SORA))?
- Are there any other UA RA models that could be adapted to address UTM? If so, provide experiences/lessons learned from their implementation.
- Are there any existing ATM safety risk assessment models that could be adapted to address UTM RA requirements? If so, provide lessons learned/experiences.

² USS refers to any provider of UTM services

b) Contingency Operations

- What would be considered a contingency or emergency situation within the UTM system?
- How should failures, emergencies or degradation of services in the UTM system, or with an airspace user in the system, unmanned or manned, be addressed so as to not negatively impact safety?
- How would such mitigations address both system-wide UTM and UAS-specific capabilities/services?
- What standard operating procedures (SOPs)/checklists/action plans need to be developed for the USS, and potentially the UA, for when contingency operations occur? How would such processes be carried out and who or what would be responsible for completing the actions?
- Do such processes already exist, and if so, what environments or scenarios are addressed (e.g. rural, urban, low risk, high risk operations)? Provide lessons learned/experiences.

c) Deconfliction and Separation Management

- Separation standards currently exist for manned aircraft. Should these same standards be applied between unmanned and manned aircraft or do they need to be amended? Additionally, what separation standards should be applied between two unmanned aircraft operations in the UTM? What should those standards be and who should develop them?
- Current ATM communications, navigation, and surveillance (CNS) equipment must go through rigorous certification processes to achieve a given separation standard. Assuming similar minimum equipment and performance standards will be needed to support safe separation under UTM, what would these standards be and who should develop them? Additionally, would manned aircraft need to comply with these equipment standards in order to access the UTM domain?
- Describe the processes, procedures and associated tools or capabilities that would support deconfliction at strategic level; identify related services and their potential requirements.
- Describe the processes, procedures and associated tools or capabilities that would support tactical separation management; identify related services and their potential requirements.
- What modelling and simulations are being conducted to support the validation of a proposed separation standard?

d) UTM Service Suppliers' (USS) organizational construct and approval processes

- Should or could a USS be considered to be an air navigation services provider (ANSP)? ANSPs, airlines, and aerodrome operators have significant requirements that must be met to become certified. Is it necessary to have similar requirements for USSs and other similar service providers?
- Should standards be developed to promote interoperability, a harmonized construct and/or approval process for USSs? If so, who should develop such standards?
- What would be the key issues that need to be addressed when certifying a USS?
- Are any standards already being developed? If so, provide lessons learned/experiences.

ICAO is soliciting information from States, industry, academia, key stakeholders or individuals that will assist in **advancing the ICAO UTM framework, to include effectiveness, safety and efficiency**. This will serve to continue the global discussion leading toward a common agreement on a path forward.

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

Submissions should address one of the above problem statements. If the intent is to address more than one problem statement, individual RFIs must be submitted, addressing each proposal separately. **By submitting an RFI response, submitters represent that they are prepared to travel at their own expense to Montréal, Canada 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 a recommendation on how these can be achieved;
- take into consideration the operational environment within which the proposed solution would operate;
- not exceed 2000 words, 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 **15 June 2019**.

All submissions 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/3, ICAO's UAS Industry Symposium to be held on 12 to 14 November 2019 in Montréal, Canada. Extensive discussion of all presentations should be anticipated with the possibility that aspects of several submissions would be supported by the Symposium audience. ICAO, supported by the UAS-AG, is relying on RFI and DRONE ENABLE/3 contributions from stakeholders to help shape the continued development of guidance material and best practices as part of the global framework for UTM. DRONE ENABLE/3 will also provide a venue for submissions and presentations to be heard by world leaders in the development of UTM capabilities.

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