



SECOND DRONE ENABLE, UNMANNED AIRCRAFT SYSTEMS (UAS) INDUSTRY (DRONE ENABLE/2) SYMPOSIUM

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

1. BACKGROUND

In April of 2017, after receiving requests from Member States that ICAO serve as the global civil aviation facilitator to assist with the challenge of unmanned aircraft systems (UAS), ICAO took a bold step into the world of UTM by issuing an RFI covering the core boundaries of UTM. The goal was to synthesize the best practices gleaned from the RFI submissions into a globally harmonized, common framework to support integration of unmanned aircraft into national airspace.

To ensure sound technical approaches were used for constructing such a framework, broad industry, academic and science community research and development initiatives were solicited as well as any national implementations from which lessons could be learned. States, industry and academia showed significant interest in the RFI, submitting a total of 76 responses that addressed UTM foundational components including registration systems that allowed remote identification and tracking; communications systems for control and management of the unmanned aircraft (UA) and tracking of all unmanned aircraft (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. On 22 to 23 September 2017, the top RFI responses, as judged by ICAO's UAS Advisory Group (UAS-AG) were presented at DRONE ENABLE, ICAO's UAS Industry Symposium. The UAS-AG was tasked with synthesizing the best practices from the submissions and presentations into a globally harmonized, common framework for UTM to support integration of unmanned aircraft into national airspace. However, during the review process of DRONE ENABLE presentations, critical gaps in the UTM solutions were identified. To address these issues, ICAO has decided to again request assistance of States, industry, academia and other interested stakeholders to collaborate on, and provide solutions for, a new UTM problem statement.

This activity is separate from 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 (IFRs).

2. PROBLEM STATEMENT

Unmanned aircraft are capable of operating in all types of airspace and at all altitudes/levels. The greatest density of unmanned aircraft operations is however, expected to be at low levels and in urban/suburban environments. Manned aircraft may also be operating in these same areas at a relatively low level, and in

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.

some cases may include landing or taking off (e.g. helicopters conducting police, news or medical flights).

In some cases, air traffic management (ATM²) may be provided above the local obstacle level (perhaps several hundred feet above ground level) while in some cases air traffic management is provided down to the surface (e.g. in the vicinity of an aerodromes). UTM would likely be implemented from the surface up to the base of the ATM system in some areas, whereas in others the UTM and ATM systems may overlap or coexist in the same airspace.

There will be scenarios where manned and unmanned aircraft will be required to cross the demarcation line between ATM and UTM; while in other situations they will only operate in close proximity to the line. In both scenarios, an aircraft being monitored by one system (UTM or ATM) may be at increased risk of becoming a hazard to another aircraft being monitored by the other system. Additional challenges are anticipated given that the ATM system is primarily a human-in-the-loop system while it is expected that most UTM systems will be largely automated.

In recognition of the hazards aircraft pose to each other when operating in the two separate systems, ATM and UTM, essential information must be exchanged and alerts provided to all parties (i.e. air traffic controllers (ATM system), pilots, remote pilots and the UTM system) on a real-time basis.

3. REQUEST FOR INFORMATION

As the development of UTM moves forward, there needs to be a focus on the next evolution of the ability for aircraft (both manned and unmanned) to safely and efficiently transition between any future UTM system and the concurrent ATM systems. The primary requirement is to ensure safe integration, without negatively impacting manned aviation and the safety of persons and property on the ground, taking into account security and equal accessibility for all airspace users.

Understanding the boundaries and the transition phases of these systems, how they interact and how best to exchange essential information will enable States, regulators and industry to continue to advance this global industry while preserving safety of all airspace users.

Submissions should propose practical solutions for describing **the ATM/UTM boundaries, transition between the boundaries, what constitutes “essential information” and the capabilities needed by each system to allow for secure and efficient operations**. The following are the types of question that should be considered in your submission:

- what sensors or equipment are required on board aircraft to provide the essential information and/or facilitate the exchange of such information;
- what functionality/capability is required in the UTM and ATM systems to facilitate real-time/near real-time decision making;
- how will alerts be provided to the persons or automation systems that will be required to take action to avoid collision? How to provide these alerts within such time as to allow the aircraft to remain well clear of each other (i.e. so that collision avoidance manoeuvres are not required); and

² Air traffic management (ATM): The dynamic, integrated management of air traffic and airspace (including air traffic services, airspace management and air traffic flow management) — safely, economically and efficiently — through the provision of facilities and seamless services in collaboration with all parties and involving airborne and ground-based functions.

- what is required in the UTM and ATM systems to ensure the solution to an initial traffic situation will not create a follow-on traffic situation?

Solutions to the RFI will serve to strengthen not only the UTM framework currently under development, but will also further the global discussion toward a common agreement on a path forward for the safe integration of UAS. Furthermore, this information will assist State regulators with developing the required regulatory framework and guidance material to ensure a safe, efficient and effective UTM system.

4. SUBMISSIONS

Submissions may address part or all of the above problem statement. **By submitting an RFI response, submitters represent that they are prepared to travel to Chengdu, China to deliver their presentation.** Submissions for additional topics will not be considered at this time.

Submissions must:

- describe at a high level a solution that can be implemented by all States;
- allow for flexible implementation (e.g. dimensions of airspace) on a national basis while adhering to a common framework;
- define infrastructure requirements 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 **30 April 2018**.

All submissions will be reviewed. Submitters of those proposals that are considered to best address the problem statement will be offered an opportunity to present their information at DRONE ENABLE/2, ICAO's UAS Industry Symposium to be held on 13 to 14 September 2018 in Chengdu, China. Costs associated with travel to, and accommodations in, China will be borne by the presenter. Extensive discussion of all presentations should be anticipated with the possibility that some aspects of several submissions could be supported by the Symposium audience and considered for incorporation into ICAO UAS guidance material.