



WORKING PAPER

THIRTEENTH AIR NAVIGATION CONFERENCE

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COMMITTEE A

Agenda Item 5: Emerging issues

5.2: Operations below 1000 feet

**COLLABORATION OF UAS TRAFFIC MANAGEMENT (UTM) AND
AIR TRAFFIC MANAGEMENT (ATM)**

(Presented by the Civil Air Navigation Services Organisation (CANSO))

EXECUTIVE SUMMARY

This paper highlights the importance of ensuring interoperability of unmanned aircraft systems (UAS) traffic management (UTM) with existing air traffic management (ATM). The potential for possible interaction problems between controlled aircraft and UAS around airports and close to boundaries of controlled airspace may lead to decisions that impact the efficiency of the ATM system.

Action: The Conference is invited to advise States to make sure that approved UTM systems are interoperable with existing ATM systems, and can be demonstrated to be at an equivalent level of safety and compliant with the rules of the airspace.

1. INTRODUCTION

1.1 Demand for the use of unmanned aircraft systems (UAS) for public and commercial operations has been increasing rapidly and regulators around the world are beginning to permit small scale, local operations while researching opportunities to expand use in both uncontrolled and controlled airspace. ICAO's mandate is focused on international civil aviation which, to a great extent, does not encompass smaller UAS or what has been termed drones. However, due to the rapid growth of the drone industry across the globe, member States requested ICAO bring its expertise in facilitating harmonisation to this domestic activity. ICAO considers any aircraft flown without a pilot on board as an unmanned aircraft (UA) and all the components that enable that operation as part of a UAS. ICAO is developing standards and guidance for various unique operational needs of UAS, to include small UAS (sUAS) or drones and larger, more complex certified systems, commonly referred to as remotely piloted aircraft systems (RPAS), all while staying within their remit.

1.2 UAS come in a variety of shapes and sizes, and fulfil many diverse capabilities. Ranging in weight from a few grams to several tonnes, UAS are operating at altitudes from near the surface to the edge of space. Some UAS fly at slow speeds, while others are capable of very high speeds and some can remain airborne for several days. Drones are being considered separately from those capable of flight in controlled airspace on an instrument flight rules (IFR) flight plan.

1.3 Aircraft capable of interacting with air navigation services providers (ANSPs) in a manner similar to traditional manned aircraft (i.e. on an IFR flight plan), which are certified by a regulator and flown with a licensed pilot directly involved with flight operations are referred to as Remotely Piloted Aircraft System (RPAS). To date, RPAS are primarily used to support military and national security operations. Experience of RPAS operations and their interaction with the ATM system indicates that currently, RPAS are unable to comply with many standard, routine ATM procedures. This has not prevented RPAS operations, but has limited their integration due to special activity airspace, altitude reservations or other airspace separations. Thus, RPAS operators are now seeking greater freedom of access to airspace and this will increasingly interact with the wider ATM system.

1.4 Drones are smaller UAS that routinely operate at much lower altitudes than RPAS. Day-to-day presence of large numbers of drones operating within, or in the vicinity of, controlled airspace may pose challenges for ANSPs to ensure separation of UAS from both manned and other unmanned aircraft in non-segregated airspace. This will have the potential to impact the safety and efficiency of ATM. For instance, drone operations at low altitudes, near airports create safety concerns from local ANSPs. Speed, manoeuvrability, climb rate, performance characteristics and avionics system equipment may differ substantially from conventional aircraft and may necessitate changes in standards and procedures governing ATM in the future.

1.5 International regulations and standards require that any new system, procedure or operation that has an impact on the safety of ATM operations shall be subject to a risk assessment and mitigation process to support its safe introduction and operation.

1.6 The goal of safely integrating RPAS seamlessly into the ATM system with other airspace users is subject to standard safety management system (SMS) principles. UAS, to include drones, are classified as 'aircraft' and ultimately should demonstrate equivalence with all the rules and safety thresholds established for flying, certifying, and equipping aircraft.

1.7 A key factor in safely integrating unmanned technology in non-segregated airspace is the ability for a drone to perform in a predictable manner and that there shall always be a pilot in command of the operation. However it is assumed that, in the future, there will be a higher degree of automation. Should that be the case, the control of UAS, the interaction of UAS with other users of the airspace and the interaction of UAS with present or future air traffic management systems, by means of non-human entities should also demonstrate equivalence with all the rules and safety thresholds established for flying, certifying and equipping aircraft.

1.8 To address this challenge, UTM (or U-Space in Europe) is a set of new services and specific procedures designed to support safe, efficient and secure access to airspace for large numbers of drones at low altitude levels. U-space provides an enabling framework to support safe and efficient operation of drones and ensure a proper interface with manned aviation, ATC and relevant authorities.

2. DISCUSSION

2.1 There is an assumption that to increase the capability of low altitude drone operations and the capacity of low altitude controlled and uncontrolled airspace, a new airspace management system is needed. There are several projects being explored by regulatory and research bodies to explore the development of a UTM or U-Space system that will enable scheduling and de-confliction of UAS operations in all classes of airspace.

2.2 ANSPs already provide a wide range of air navigation services – i.e. ATM, communications, navigation, and surveillance (CNS), aeronautical information service (AIS)/

aeronautical information management (AIM), meteorological (MET) or search and rescue (SAR). Some of these services are directly applicable to the UTM context (e.g. AIS/AIM, see below), others provide a sound experience that should be considered when developing new dedicated UTM services. These new services, although conceptually different from present day air navigation services, serve the same purpose and should also be considered air navigation services since UTM or U-Space could, in the not too distant future and once it is demonstrated as workable, be gradually extended to today's conventional operations.

2.3 Yet, ANSPs are just one of the key stakeholders in UTM services: authorities, U-Space specific service providers, drone operators, airports, military and others. As shown in the manned aviation domain, a collaborative approach between the stakeholders is key to ensure efficient and effective services.

2.4 Operations with uncertified equipment using unlicensed communications frequencies will require airspace segregation from other aircraft, managed by air traffic control. Full integration within the ATM system can only come with equivalent equipage, performance capabilities, and operator competency required by the rules for that airspace.

2.5 Any UTM service interface must be designed to be compatible with the existing ATM data requirements and must only require the minimum of changes to the ATM service. The establishment of this interface and the provision of UTM information must be at no cost to the ATM service provider and must comply with all aspects of cyber security necessary to ensure the ongoing integrity of the ATM service.

2.6 It is important for ANSPs to collaborate in these efforts to ensure there is:

- a) compatibility and interoperability (when needed) with existing ATM infrastructure;
- b) an understanding of the interaction between a UTM system and air traffic control (ATC);
- c) an understanding of any changes to the responsibilities of an ANSP;
- d) no degradation to the safety of current operations; and
- e) regulatory and procedural guidance regarding the interaction of aircraft being controlled by ATC and those operating within a UTM system.

3. CONCLUSION

3.1 As States consider proposals to employ new air traffic management capabilities involving emerging airspace users and current operators, it is critical to remain consistent with the core, foundational pillars of safety and efficiency. CANSO is excited about the opportunity to embrace new technology provided there is a concerted effort to maintain the existing and well-established levels of safety enjoyed today. CANSO Members stand ready to assist in furthering the advent of this capability.

3.2 The Conference is invited to agree to the action in the executive summary.

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