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FOURTEENTH AIR NAVIGATION CONFERENCE

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

INTEGRATION OF UAS OPERATIONS INTO EXISTING AIR TRAFFIC MANAGEMENT SYSTEM

(Presented by the United Arab Emirates)

EXECUTIVE SUMMARY

This paper explores the integration of unmanned aircraft systems (UAS) operations into existing air traffic management (ATM) systems, focusing on police and patrolling applications. It addresses the challenges posed by very low-level (VLL) operations, typically below 500 feet, where conflicts with manned aircraft, particularly around helipads, are common. The solution proposed by the United Arab Emirates involves combining time-based and spatial separation to optimize airspace use and enhance safety.

The paper calls for collaboration between ICAO, Member States, and the United Arab Emirates to develop necessary Standards and regulations, offering the United Arab Emirates's experience as a resource.

Action: The Conference is invited to:
a) encourage Member States to collaborate and collectively define safeguarding areas for helipads to mitigate potential conflicts between manned and unmanned aircraft; and
b) encourage the development of comprehensive Standards and regulations required to integrate the proposed UAS management concept successfully.

1. INTRODUCTION

1.1 The recent rapid growth of UAS operations has significantly impacted various sectors, necessitating their integration into existing ATM systems. This paper addresses the safety risks and challenges posed by evolving aviation technologies, particularly the operation of UAS under beyond visual line-of-sight (BVLOS) conditions.

1.2 The use of unmanned aircraft for police patrolling is one of the most promising UAS applications, providing fast response times to be "on the scene", enhanced surveillance capabilities and real-time data collection. However, integrating these operations into existing airspace management systems requires careful consideration of safety risks, especially in densely populated urban areas and regions with high volumes of low-level, predominantly visual flight rules (VFR) traffic.

2. DISCUSSION

2.1 The current ATM system is primarily designed for manned aircraft, with limited provisions for integrating UAS. This has led to the introduction of very low-level (VLL) operations by the majority of countries to accommodate the growing number of drones. VLL operations refer to UAS activities conducted at altitudes typically below 500 feet.

2.2 To protect civil aviation from potential conflicts with drones, no-fly zones have been introduced, and detailed maps delineating these areas have been published. These measures have been effective in keeping UAS and other airspace users segregated. However, conflicts can still arise in scenarios where both unmanned and manned aircraft have an interest in the same airspace, particularly below 500 feet, this can have a particularly negative impact on helipad operations.

2.3 Considering a scenario where police patrolling is required in a high-density VFR flight area. Using conventional approaches would necessitate shutting down all helipads within the patrolling area, causing significant disruption to helipad operations, including those for tourism, priority flights, and emergency services. Such disruptions could lead to safety incidents and possibly business closures if not appropriately managed.

2.4 There is currently a lack of comprehensive regulations addressing these conflicts. Additionally, it is important to note that police UAS flights, as state aircraft, are not obliged to follow civil aviation regulations, further complicating the integration process.

2.5 The United Arab Emirates developed a concept to mitigate this negative impact on helipad operations by introducing defined procedures for activation during landings or departures to safeguard all airspace users. This approach leverages a combination of time-based and spatial separation to optimize the use of limited airspace.

2.6 The proposed concept defines a safeguarding area necessary for helicopter operations, allowing UAS operators to vacate this area either vertically or horizontally. The conventional safeguarding area is often too large, so this concept utilizes time-based separation to minimize the required area.

2.7 Helicopter pilots would transmit their landing or departure intentions on a designated frequency 2 minutes in advance. Upon receiving this message, patrolling UA must vacate the safeguarding area either vertically or horizontally. Once the helicopter leaves the area, the airspace becomes available for UAS use again.

2.8 Future unmanned traffic management (UTM) systems could improve the efficiency of this concept by using advanced communication methods beyond conventional frequencies. This would further enhance coordination between manned and unmanned aircraft, ensuring safe and efficient airspace use.

2.9 The proposed concept promotes a significant improvement in airspace utilization. By dynamically establishing a safeguarding zone based on time and distance, it allows manned and unmanned aircraft to operate more efficiently while maintaining critical safety margins. This innovative approach unlocks the potential for maximized efficiency, ensuring all users can share the airspace safely and effectively.

3. CONCLUSION

3.1 The Conference is invited to acknowledge and consider the proposed concept. ICAO and Member States are encouraged to define the necessary temporary safeguarding areas for helipads to prevent

conflicts between manned and unmanned aircraft. It is recommended to develop and implement comprehensive standards and regulations to operationalize this concept.

3.2 The United Arab Emirates is willing to share its valuable experience and best practices in UAS management with other States and organizations. This collaboration can accelerate the global adoption of effective UAS integration strategies, benefiting the broader aviation community.

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