



**WORKING PAPER**

**ASSEMBLY — 39TH SESSION**

**TECHNICAL COMMISSION**

**Agenda Item 33: Aviation safety and air navigation monitoring and analysis**

**HARMONISED REGULATORY PRACTICES FOR SMALL UAS OPERATIONS**

(Presented by Singapore, Malaysia, Marshall Islands, New Zealand, Palau,  
Papua New Guinea and Solomon Islands)

**EXECUTIVE SUMMARY**

The use of small unmanned aircraft systems (UAS) continues to grow rapidly, and with it, the risk of unsafe encounters between domestic UAS and manned aviation operations. As the aviation community embarks on a diverse range of approaches to tackle the issue, it could result in a patchwork of vastly different regulatory and operating regimes, which would not only be challenging for users and manufacturers to operate in, but also affect the transition of domestic regimes to a set of broader international provisions.

Without coordination and alignment between ongoing international and regional efforts to develop policies and regulations for small UAS, the disparities between the domestic UAS regimes both within and between regions could potentially widen.

**Action:** The Assembly is invited to:

- a) lead and coordinate the harmonisation of key regulatory practices for small UAS operations, taking into account the three areas outlined in the paper;
- b) facilitate regular sharing of information and experience among States, industry, academia and research institutes on UAS operation and regulation; and
- c) expand the work of the Small UAS - Advisory Group (SUAS-AG) and other relevant expert groups as necessary, to achieve the above.

<i>Strategic Objectives:</i>	This working paper relates to the Safety Strategic Objective.
<i>Financial implications:</i>	
<i>References:</i>	

## 1. INTRODUCTION

1.1 The use of small unmanned aircraft systems (UAS) continues to grow rapidly, and with it, the risk of unsafe encounters between domestic UAS and manned aviation operations. Not only can UAS pose a threat to aircraft landing and taking off at aerodromes, they can also pose a danger in other environments, such as to low flying helicopters in urban areas. In the absence of guidance in this area, the aviation community particularly States have embarked on a diverse range of approaches to tackle the issue. This myriad of regulatory frameworks was evident at the recent Asia Pacific RPAS Symposium held in Singapore on 31 May – 1 June this year, where some 150 participants from over 50 CAAs, ANSPs and research institutes discussed details of their respective UAS regimes.

1.2 Noting the divergence, participants had emphasised the importance of avoiding a patchwork of vastly different regulatory and operating frameworks. The latter would not only be challenging for users and manufacturers to operate in, but also affect the eventual alignment of domestic regimes with a set of international provisions once established, and hence affect the safety of international operations as well.

1.3 There are currently a number of international and regional platforms where discussions on small UAS regulation and operation are being held. These include the Small UAS – Advisory Group (SUAS-AG), the Joint Authorities for Rulemaking on Unmanned Systems (JARUS) and the proposed plan for an Asia Pacific UAS Taskforce on ATM. Without coordination and alignment between these various groups, the disparities between the domestic UAS regimes both within and between regions could potentially widen.

## 2. DISCUSSION

2.1 To narrow the divergence in domestic UAS regulatory regimes, this paper calls on ICAO to lead efforts to harmonise key regulatory practices for small UAS operations. These harmonised practices could also then serve as guidance for the development of international provisions in the long-term.

2.2 Drawing lessons from the ongoing efforts by States to develop a more comprehensive regime for domestic UAS operations, this paper identifies three key regulatory areas which would benefit from harmonisation. These are: (a) classification by mass; (b) pilot training and licensing; and (c) UAS surveillance and traffic management.

### 2.3 **Classification by Mass**

2.3.1 One common issue faced by States is the challenge of regulating the wide range of UAS types currently in proliferation. UAS used for domestic operations can weigh anything from a few hundred grams to 25 kg and upwards. It is therefore difficult to regulate this group of UAS with a single set of rules. Instead, a risk-based approach needs to be employed to allow for differentiated regulatory treatments of UAS activities based on the operating environment and purposes, and the potential risks they pose to aviation and public safety.

2.3.2 A critical component of a risk-based approach is the establishment of mass classifications. However, there is today no common approach for this. Different UAS regulatory regimes have employed different mass classes, ranging from single-tier to multi-tiered systems with varying thresholds in each case. In addition, some States including Singapore have embarked on joint research studies, to better determine acceptable mass thresholds based on their impact to public and aviation safety. Although these are positive steps towards developing more effective UAS rules, differences in the scopes and methodologies of these studies could potentially lead to even greater divergence in

classification. More convergence in this area, with guidance from ICAO, would therefore be ideal to ensure that mass classifications set by various States are better harmonised. Early harmonisation of mass classifications would also reduce the complexity of developing provisions for cross-border UAS/RPAS operations in the future.

## 2.4 **Pilot Training and Licensing**

2.4.1 States are increasingly seeking to ensure that their UAS operators possess the necessary piloting knowledge and competencies, through the establishment of training and licensing requirements. However, there is similarly a significant divergence in the approaches taken. Some States currently require their UAS pilots to undergo online theory assessment, whilst others including Singapore require both theory and practical assessment by an authorised examiner. The means by which operators may be trained also differ, with some regimes opting for approved training organisations, and others allowing for non-supervised, self- training.

2.4.2 Harmonisation of training and licensing requirements would reduce these disparities, and help to ensure consistency in training and a minimum level of competency of licensed UAS operators, regardless of where they are based. In the longer term, harmonisation would also pave the way for the mutual recognition of UAS pilot licences issued by various authorities.

## 2.5 **UAS Surveillance and Traffic Management**

2.5.1 Another key regulatory priority for States is to be able to monitor and manage UAS activities, for the safe and seamless operation of both UAS and manned aviation activities. This is particularly crucial in environments, for example, near to aerodromes where unauthorised UAS operations may pose a safety risk to manned aircraft traffic. Some reported encounters of UAS at aerodromes have also resulted in disruption to normal flight operations there. States have thus developed policies and regulations to govern the operation of UAS near aerodromes.

2.5.2 In addition, some States have started to acquire or experiment surveillance and traffic management capabilities such as UAS traffic management systems which allow for common situational awareness amongst UAS operators, ANSPs and regulators as well as the detection of unauthorised UAS operations through the use of solutions such as dynamic geo-fencing. Singapore is developing a centralised UAS management system, which will leverage secondary surveillance technologies to provide a real-time air situation picture of UAS operations in urban areas. Other States have embarked on similar efforts, exploring and testing a range of different technologies including cloud systems and transponders to facilitate concepts of operation customised for their respective UAS community. Harmonisation of technical specifications to facilitate inter-operability of systems would be important. A further complication to this challenging task is the need to ensure compatibility of these technologies with the myriad of small UAS models available in the market.

2.5.3 Harmonisation in the development of policies and regulations related to UAS activities, including the monitoring and tracking technologies used, would support the development of industry performance standards, and encourage UAS manufacturers to integrate positioning reporting tools that could be interfaced with UAS management systems worldwide. Such surveillance and traffic management tools can also be used to facilitate compliance with policies and regulations. More importantly, a harmonised regulatory practice on the operation of UAS, for example, in the vicinity of aerodromes would provide safety assurance between manned aircraft flights and unmanned aircraft activities.