



International Civil Aviation Organization

**SEVENTH MEETING OF THE ASIA PACIFIC REGIONAL AVIATION SAFETY TEAM
(APRAST/7)**

(Bangkok, Thailand, 31 August to 4 September 2015)

Agenda Item 6: Presentations – State / Industry / ICAO

**REGULATORY AND PERMIT FRAMEWORK FOR
UNMANNED AIRCRAFT OPERATIONS IN SINGAPORE**

(Presented by Singapore)

SUMMARY

Unmanned aircraft can be used for many purposes, such as delivery of goods, aerial filming, inspection and search and rescue. The operation of unmanned aircraft is becoming increasingly popular, including in Singapore. Singapore enhanced its regulatory and permit framework in early 2015 to regulate the use of unmanned aircraft operations in Singapore with a view to mitigating the associated aviation and public safety risks. This paper shares Singapore's experience in the development and implementation of this framework, as encouraged by the 51st Asia-Pacific DGCA Conference (ref Action Item 51/18).

1. INTRODUCTION

1.1 Unmanned aircraft, or more commonly referred to as drones, have become affordable and accessible to the general public. Recreational flying of unmanned aircraft is fast gaining popularity. In Singapore, unmanned aircraft are used for purposes such as aerial filming and photography, inspection of infrastructure and facilities. Many more uses are also currently being considered by both the private and public sectors. If not carried out properly however, the operation of such aircraft poses a risk to aviation and public safety, especially in Singapore's densely populated urban environment and busy airspace.

2. ENHANCED REGULATORY AND PERMIT FRAMEWORK

2.1 To facilitate the operation of unmanned aircraft, clear rules on the safe and responsible use of such aircraft had to be quickly developed in order to mitigate the risks to aviation and public safety. Moreover, the general public, businesses and organisations, and recreational users of unmanned aircraft expect the Civil Aviation Authority of Singapore (CAAS), as the aviation safety regulator, to stipulate the safety requirements and provide guidance for the safety of their operations. Those who engage commercial services likewise expect a reasonable level of regulatory control on unmanned aircraft operators.

2.2 In this regard, CAAS worked closely with other relevant government agencies such as the Ministry of Transport, Ministry of Home Affairs, Singapore Police Force and Republic of Singapore Air Force to enhance existing regulations for unmanned aircraft operations in Singapore. With the Unmanned Aircraft (Public Safety and Security) Act 2015 and subsequent amendments to the Air Navigation Order coming into effect in early June this year, an enhanced regulatory and permit framework was put in place as an interim measure.

2.3 Under this framework, a permit regime has been introduced to regulate the operation of unmanned aircraft weighing more than 7kg, for business purposes, in the vicinity of aerodromes/military airbases or involving discharge of items/substances. The key considerations to address the safety risks posed by unmanned aircraft operations are as follows:

- (a) Injury to persons and damage to property – Unmanned aircraft that are heavy are likely to pose a higher risk to aviation and public safety in cases of collision due to its mass and speed. Similarly, those which are used for commercial purposes are likely to pose higher risks as they operate more frequently, involve complex and difficult manoeuvres (e.g. carriage of load), and flown over crowded areas. Discharge of items/substances from an unmanned aircraft likewise can also pose safety risks to populace and property on the ground.
- (b) Safety hazards to manned aircraft operations – Permits are also required if the unmanned aircraft operates within 5km from any aerodrome/military airbase, or above 200ft when beyond 5km. This is to ensure that unmanned aircraft operations are adequately separated from manned aircraft operations.
- (e) Spectrum management – A permit is also needed for the use of non-approved frequency spectrum as defined by the Infocomm Development Authority of Singapore¹, due to the potential hazard of frequency interference.

2.4 Two types of permits are issued by CAAS for the conduct of unmanned aircraft operations – the Operator Permit (OP) and the Activity Permit (AP). An OP is granted if the applicant is able to ensure safe operation of the unmanned aircraft, taking into account the applicant's organisational set-up; competency of the personnel especially those flying the unmanned aircraft; procedures to manage safety (including the conduct of safety risk assessments); and the airworthiness of the aircraft. An AP is granted for activities at a specific area of operation, which are of specific operational profiles and conditions. Permits (e.g. for flying over security-sensitive locations) from other government agencies may also be required, depending on the activity to be carried out. **Annex A** provides more details of the Enhanced Regulatory and Permit Framework.

3. IMPLEMENTATION

3.1 Recognising the need for public outreach, awareness and education, CAAS distributed to all households an advisory (in the form of Dos and Don'ts) on the safe and responsible use of unmanned aircraft for recreation and private uses (see **Annex B**). Additionally, posters were distributed to all educational institutions and hobbyist clubs. A series of briefings for key stakeholders, such as operators of unmanned aircraft, hobbyists, recreational users and retailers, were also held to explain the new regulations and gather feedback pertaining to the new regime. Information on unmanned aircraft flying can also be found on the CAAS website. To facilitate the application for the required permits, CAAS acts as the one-stop agency for the application of all permits related to unmanned aircraft operations in Singapore. CAAS will process and coordinate with other relevant agencies on the evaluation of applications for any permit, and respond to the applicants on the outcome of their application.

¹ This is the government agency responsible for regulation of the information technology and telecommunications sector in Singapore.

4. CONCLUSION

4.1 The enhancements to the regulatory and permit framework and the guidelines are interim steps that help to address immediate aviation and public safety issues, pending Singapore's ongoing study of an appropriate framework to facilitate and promote the use of unmanned aircraft for public and commercial purposes, and which will also be able to adequately address safety, security and privacy concerns.

5. ACTION BY THE MEETING

5.1 The Meeting is invited to:

- (a) Note Singapore's experience in regulating unmanned aircraft operations in Singapore; and
- (b) Encourage States/Administrations to share their experiences in the development of regulatory frameworks for unmanned aircraft operations.

Enhanced Regulatory and Permit Framework for Unmanned Aircraft Operations in Singapore

1. An Operator Permit and/or Activity Permit will be required under the following circumstances:

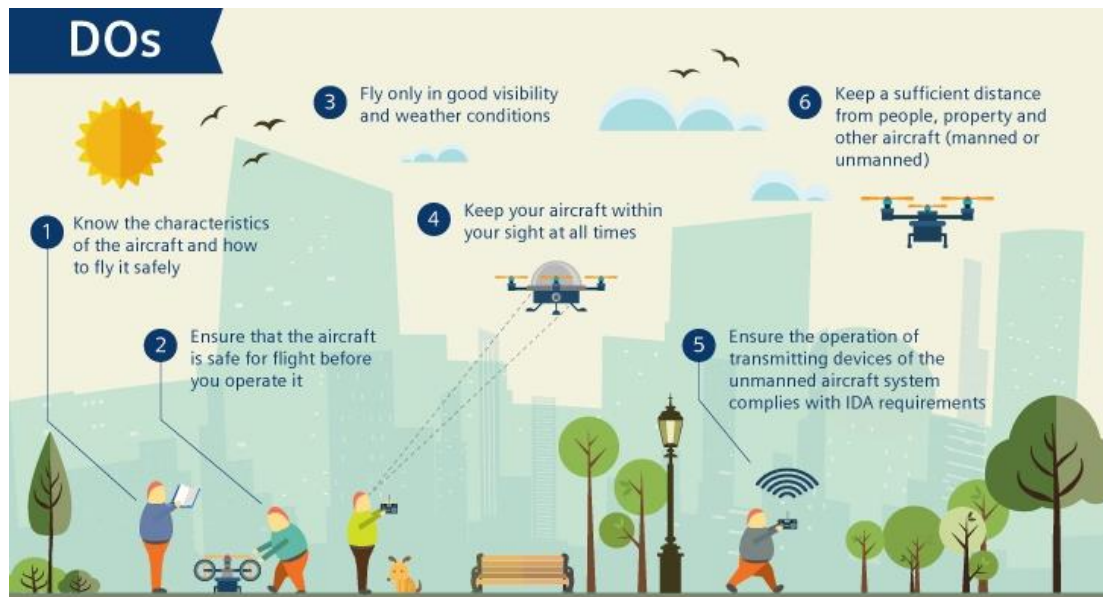
	Purpose	Weight of Unmanned Aircraft	Permit Required
(A)	For any purpose	More than 7kg in total weight	Operator and Activity Permits
(B)	For any business purpose (i.e. Commercial activities or Specialised services) including if not Recreation or Research in nature	Any weight	Operator and Activity Permits
(C)	For Recreation or Research	Not more than 7kg	No permit required. However, an Activity Permit (only) is required if the unmanned aircraft is flown outdoors: <ul style="list-style-type: none"> • in a Restricted or Danger Area; or • within 5km of an aerodrome/military airbase regardless of operating height, or above 200 feet beyond 5km of an aerodrome/military airbase

Note: In all the above operational scenarios, if the unmanned aircraft is flown indoors at a private residence, or indoor area used for the purpose of constructing or testing unmanned aircraft and accessible only to the persons involved, and the flying does not affect at all the general public, no permits are required.

2. Additional permits will be required if:

- (a) There is discharging or dropping of substances/items from the unmanned aircraft.
- (b) The radio frequencies and power limits used for operating the unmanned aircraft do not comply with IDA’s guidelines on radio frequencies and power limits for short range devices.
- (c) The unmanned aircraft is flown over Protected Areas [i.e. security-sensitive locations gazetted as such and their immediate vicinity] or flown in Special Event Areas as declared by the Ministry of Home Affairs under the Public Order Act.
- (d) Photographs (including videoing and live-streaming) of a Protected Area are taken using the unmanned aircraft.

Advisory on the Safe and Responsible Operation of Unmanned Aircraft



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