

# Advisory Circular

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## Permits for Unmanned Aircraft Operations

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1. **GENERAL.** Pursuant to paragraph 88B of the Air Navigation Order, the Director-General of Civil Aviation (DGCA) may, from time to time, issue advisory circulars (ACs) on any aspect of safety in civil aviation. This AC contains information about standards, practices and procedures acceptable to CAAS. The revision number of the AC is indicated in parenthesis in the suffix of the AC number.
2. **PURPOSE.** This AC provides guidance on unmanned aircraft (UA) operations in Singapore that will require a permit.
3. **APPLICABILITY.** This AC applies to persons who want to, or are operating an UA in Singapore.
4. **CANCELLATION.** This AC is the first on the subject.
5. **EFFECTIVE DATE.** This AC is effective from 3 June 2015.
6. **REFERENCES.** Singapore Air Navigation Act (ANA), Public Order Act (POA) and Air Navigation Order (ANO).
7. **APPLICABILITY OF THE PERMITS.**
  - 7.1 From 2 June 2015, a person must obtain permit(s) from CAAS before operating a UA under certain circumstances in Singapore. This enhanced regulatory and permit framework aims to facilitate use of UA while mitigating risks to aviation safety, public safety and security.

7.2 According to Part XA of the ANO, a person is not allowed to operate a UA that weighs more than 7 kg in total, or in the course of a business (whether or not for profit or a fee), or for a purpose that is neither a recreation purpose nor a research purpose, unless he holds the following permits:

(a) A UA Operator Permit;

(b) A Class 1 Activity Permit for each activity, or a block of the same activity, conducted with one or more types of UA specified in the UA Operator Permit.

For convenience, definitions of “recreation purpose” and “research purpose” from the ANO are reproduced in **Appendix 1**.

7.3 The use of a small UA (i.e. total mass of not more than 7kg) for recreation purpose or research purposes will not require a UA Operator Permit and Class 1 Activity Permit, but will require a Class 2 Activity Permit if the UA is operated outdoors:

(a) Above 200 ft beyond 5 km of an aerodrome;

(b) Within 5 km from an aerodrome; or

(c) Within any restricted area or danger area.

7.4 No permits are required for UA operations indoors:

(a) At a private residence; or

(b) At an experimental site in connection with the construction or testing of that UA.

7.5 In addition, all UA operations are prohibited within a prohibited area.

7.6 The permits are applicable for operations within Singapore’s airspace only.

7.7 Operations of UA that do not require a permit should adhere to the guidelines in **Appendix 2**.

## **8. UNMANNED AIRCRAFT WEIGHING MORE THAN 7KG.**

8.1 A larger or heavier UA can pose greater safety risk. According to paragraph 72F(1) of the ANO, the use of a UA with a total mass of more than 7 kg is not allowed except in accordance with a UA Operator Permit and the applicable Class 1 Activity Permit. This is to ensure the safe conduct of operations involving large UA.

## **9. OPERATIONS IN THE COURSE OF A BUSINESS.**

9.1 Operations in the course of a business can be classified into “commercial purposes” and “specialised services”. Some illustrations are provided as follows:

### **Commercial purposes**

9.2 The objective of regulating operations carried out for commercial purposes is to ensure that commercial services are offered on a safe basis, in the interest of the paying consumer, and public and aviation safety.

9.3 Examples of commercial UA operations include cases in which a UA operator offers his UA for services such as delivery services, to perform aerial surveillance, to take aerial photographs in exchange for payment or benefits in return.

- 9.4 The conduct of training courses or classes on flying of UA for a fee is considered commercial in nature and therefore subject to the UA Operator Permit and Class 1 Activity Permit. The exception is where such classes are conducted by an educational institution that is not a private school under the Private Education Act (Cap. 247A).
- 9.5 While it is not the intent to regulate the retail selling of UA, UA operations carried out for demonstration or test flying will require the UA Operator Permit and Class 1 Activity Permit.

### **Specialised services**

- 9.6 Unmanned aircraft may be used to perform work, or carry out a task, in relation to a business, with no direct commercial gain per se. Operations of such activities may be referred to as 'specialised services'. Some examples include:
- (a) A government agency using its own UA to perform aerial surveillance or aerial fire-fighting, or as part of the provision of emergency or essential services.
  - (b) An energy utility company uses its UA to carry out inspections of its power plants.
  - (c) A farm (the business being agriculture) uses its UA to survey crops or spray pesticides.
  - (d) A factory (or any organisation) uses its UA to delivery small articles between various locations in its compound.
  - (e) A company's public communications department uses its UA to take event photographs for its publicity effort.

Note: A person using his UA to take aerial photographs or video for recreational or private use, is not considered to be operating for specialised services or commercial purposes.

- 9.7 While operations for specialised services may not have any direct commercial gain, the objective of regulating such operations is to ensure that the UA, being a tool of business or work, is used safely.

### **Flying Displays and Sporting Activities**

- 9.8 A flying display refers to the flying of UA for exhibition or entertainment purposes, at an organized event that is attended by more than 500 persons. Some examples include:
- (a) A performance involving UA at Chingay parade.
  - (b) UA used as part of a show staged in the Indoor Stadium.
- 9.9 A UA sporting activity includes racing or other forms of competition or tournaments using UA.
- 9.10 Due to the safety risks posed to the spectators and participants of UA flying displays and sporting events, an event organiser is required to obtain a UA Operator Permit. This is to ensure that the organiser of the event (the competition or tournament) has taken appropriate risk mitigating measures to ensure the safety of the participants and spectators.

### **Research & Development, Experimentation and Tests**

- 9.11 UA that are used for scientific research and development are considered as specialised services. One example is the use of a UA equipped with sensors to gather environmental data (airborne pollutants, temperature, humidity etc.).
- 9.12 However, an educational institution (school, polytechnic, or university etc.) may conduct R&D on designing or developing a UA, or conduct lessons about UA as part of its education curriculum, without having to apply for permits. "Research purpose" is defined in a manner to provide room for students in learning and exploring this technology. It is assumed that the

schools will be appropriately supervising the students as they experiment or test their creations, and ensure that the guidelines in **Appendix 2** are adhered to. A Class 2 Activity Permit may be required if the UA is flown in the areas described in paragraph 7.3.

## **10. UA OPERATOR PERMIT.**

10.1 The UA Operator Permit allows CAAS to assess that the operator, its equipment and its personnel flying specified types of UA are fit and capable of conducting operations safely. A UA Operator Permit can be applied up front and will remain valid for up to a year. If, during the validity period, there are changes to the types of UA or personnel flying it or types of activities, holder of the UA Operator Permit is required to submit an application to vary the scope of the approval granted in the Operator Permit.

10.2 The assessment of the UA Operator Permit consists of two main components with the respective scopes reflected below:

(a) Assessment of UA Operator.

- (i) Processes/systems to maintain operational control of the operations;
- (ii) Process and procedures to ensure competency of personnel operating the UA;
- (iii) Robustness of safety risk assessment contextual to the equipment used, competency of personnel, types of operations and the environment in which the operations would be conducted;
- (iv) Knowledge/awareness of safety considerations and airspace usage;
- (v) Procedures to handle emergencies; and
- (vi) Insurance coverage.

(b) Assessment for each type of UA to be operated.

For type of UA:

- (i) Airworthiness, or fitness to fly;
- (ii) Navigational and control reliability (particularly with respect to the communications/control link);
- (iii) Capabilities and performance limitations; and
- (iv) Maintenance regime.

For types of operations:

- (i) Flight profiles or manoeuvres that may be undertaken by the UA for that operation;
- (ii) Payloads;
- (iii) whether UA is discharging items (subject to further permit);
- (iv) Safety risk assessment of that type of operations;
- (v) Operation procedures; and
- (vi) Limitations in relation to the type of UA deployed.

For personnel:

- (i) Qualification and training acquired; and
- (ii) Experience and competency in operating the UA.

10.3 Application for the UA Operator Permit can be submitted together with, or in advance of any Class 1 Activity Permit. Users who have intention to use any UA for commercial purposes, specialised services or that weighs more than 7kg in total, are advised to submit their UA Operator Permit applications early.

- 10.4 The operator may only conduct an operation that is within the scope granted in the UA Operator Permit, i.e. using the specific type(s) of UA for the type(s) of operations with the remote pilot(s) listed in his UA Operator Permit. Should there be a need to change or increase the scope, the operator may seek variation to his UA Operator Permit within the period of validity.

Note: The person required to hold the UA Operator Permit is the operator, not the client who engages the operator and pays for the service. The operator is the service provider or contractor.

## 11. CLASS 1 ACTIVITY PERMIT.

- 11.1 The holder of a UA Operator Permit must not operate an UA unless he has a Class 1 Activity Permit for that activity. Unlike the UA Operator Permit, which assesses the capability of the operator including his UA, personnel and procedures, in assuring safe operation, the Class 1 Activity Permit is for assessment on the specific aspects of the activity, such as:

- (a) The location where the UA is intended to be operated;
- (b) The type(s) of operation to be conducted;
- (c) The date(s)/time(s) during which the above operation(s) will be performed at the above location;
- (d) The maximum operating altitude;
- (e) Mitigation measures proposed by the operator to address site-specific circumstances such as nearby buildings/obstacles, crowds, visibility etc. at the time of operations;
- (f) Activity applied for is within the capability of the operator as approved in the operator permit.

- 11.2 In the interest of safety, the operator is advised not to operate any UA outdoors within 5 km of an aerodrome/military airbase where UA may interfere with manned aircraft operation, or within a restricted/danger area. CAAS may not accede to an application for a permit to do so.

- 11.3 For convenience of the operator, CAAS may grant a single Class 1 Activity Permit that allows for the same activity to be carried out multiple times of extended period by the same type of UA at the same location. This may be known as a block permit. Examples of such activities include:

- (a) A wedding photographer (the operator) who takes aerial photographs (commercial purpose) at Hotel A (specific location) between 5pm to 11pm on 5 Jan, 6 Jan, 12 Feb, 14 Feb and 20 Feb (specific dates/times).
- (b) A shipbuilder (the operator) performing aerial inspection of ships (specialised service) at Y shipyard (specific location) every day between 12pm and 4pm from 1 Jan to 31 Mar (a block duration).

Under a block permit, the operating periods will be subject to coordination with relevant authorities to ensure that the unmanned aircraft flights can be safely conducted.

- 11.4 Should there be a change in the date(s)/time(s) of a Class 1 Activity Permit before the last date/time has passed, the operator may seek a variation to the permit without fee, at least one week prior to the affected date/time so that CAAS may be able to review the airspace usage and consult other agencies involved.

- 11.5 If the operator intends to conduct the same activity, i.e. same operation at same location albeit at later date(s), for which he had been granted a Class 1 Activity Permit previously, he may apply for a “**repeat**” **Class 1 Activity Permit**. Using the examples from paragraph 11.3(b), the shipbuilder may apply for a repeat Class 1 Activity Permit for the same aerial inspection at his Keppel docks for a new period from 1 May to 31 July.

## **12. CLASS 2 ACTIVITY PERMIT.**

- 12.1 The requirement for a Class 2 Activity Permit is described in paragraph 7.3.
- 12.2 In the interest of safety, the operator is advised not to operate any UA outdoors within 5 km of an aerodrome/military airbase where UA may interfere with manned aircraft operation, or within a restricted/danger area. CAAS may not accede to an application for a permit to do so.
- 12.3 For convenience of the operator, CAAS may grant a single Class 2 Activity Permit that allows for the same activity to be carried out multiple times of extended period by the same type of UA at the same location. This may be known as a block permit.
- Under a block permit, the operating periods will be subject to coordination with relevant authorities to ensure that the UA flights can be safely conducted.
- 12.4 Should there be a change in the date(s)/time(s) of a Class 2 Activity Permit before the last date/time has passed, the operator may seek a variation to the permit without fee, at least one week prior to the affected date/time so that CAAS may be able to review the airspace usage and consult other agencies involved.
- 12.5 If the operator intends to conduct the same activity, i.e. same type of UA at same location albeit at later date(s), for which he had been granted a Class 2 Activity Permit previously, he may apply for a **“repeat” Class 2 Activity Permit**.

## **13. OTHER PERMITS.**

- 13.1 Where necessary, the following permits may be issued together with the Class 1 Activity Permit:
- (a) A permit issued by the Singapore Police Force (SPF) pursuant to section 7 ANA for taking photographs of a protected area;
  - (b) A permit issued by SPF pursuant to section 7A ANA for overflying a protected area;
  - (c) A permit issued by CAAS pursuant to section 7C ANA for discharging a substance from a UA;
  - (d) A permit issued by SPF pursuant to section 26 Public Orders Act for using UA in special event area;
  - (e) A permit for use of radio frequencies and power limits that do not comply with the Infocomm Development Authority of Singapore (IDA) guidelines on radio frequencies and power limits for short range devices.
- 13.2 The applicant should therefore provide necessary details to identify the necessity for the grant of such permits.

## **14. TRANSITION.**

- 14.1 An operator might have a permit issued under paragraph 64C of the ANO valid for a UA operation scheduled after 2 June 2015 (effective date of these legislative amendments). With the amendments to the ANA, POA and ANO coming into effect, the permit issued under paragraph 64C of the ANO will be deemed to be a Class 1 or Class 2 Activity Permit (subject to the nature of unmanned aircraft operations). The operator would already have advised by CAAS to obtain a UA Operator Permit prior to 2 June 2015. The UA operation scheduled to take place from 2 June 2015 may therefore continue in accordance with the UA Operator Permit and Class 1 Activity Permit.

## **15. PERMIT APPLICATION.**

- 15.1 The applicant may visit the CAAS website to apply for the permits.
- 15.2 CAAS will review the application upon receipt of the duly completed application form and the fees payable. An application can be through the CAAS website:  
[http://www.caas.gov.sg/caas/en/eServices\\_Forms/Application\\_for\\_Aerial\\_Activities/?\\_locale=en](http://www.caas.gov.sg/caas/en/eServices_Forms/Application_for_Aerial_Activities/?_locale=en)
- 15.3 Operators are encouraged to submit their applications well in advance of their intended operations and factor processing time into their planning. The average processing time of an application is 2 weeks, but a longer processing time may be required for complex operations, which will entail a more in-depth evaluation by CAAS and/or other agencies, or further discussions with the applicant.

## **16. OPERATOR IS RESPONSIBLE FOR SAFETY.**

- 16.1 Despite having the permits, the operator remains responsible to ensure that the UA is operated in a safe manner and does not endanger the safety of any person, aircraft or property.
- 16.2 Queries relating to unmanned aircraft operations may be sent to [caas\\_atn\\_ansp@caas.gov.sg](mailto:caas_atn_ansp@caas.gov.sg) .

## APPENDIX 1 DEFINITIONS EXTRACTED FROM ANO

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As reproduced from Paragraph 72L of the ANO.

“recreation purpose” means any pursuit or activity engaged in for enjoyment, relaxation or leisure, but not —

- (a) a sporting activity that forms part of an organised group activity or organised competition or tournament (such as a flying display); or
- (b) a recreational activity provided by a business, or in the course of business;

“research purpose” means —

- (a) any lecture, tutorial, seminar, demonstration, class or similar activity on unmanned aircraft provided by an educational institution referred to in section 72 of the Private Education Act (Cap. 247A); or
- (b) any research and development activity carried on by an educational institution referred to in section 72 of the Private Education Act with the object of acquiring knowledge that may be of use for the purpose of devising or developing a new or substantially improved product that is an unmanned aircraft;



## APPENDIX 2 GUIDELINES FOR SAFE AND RESPONSIBLE OPERATION OF UNMANNED AIRCRAFT

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- 1 When operating an unmanned aircraft, the operator should adhere to these guidelines (also referred to as operating guidelines). The operator should:
  - (a) Know the characteristics of the aircraft and how to fly is safely;
  - (b) Ensure than the aircraft is safe for flight before operating it;
  - (c) Fly only in good visibility and weather conditions;
  - (d) Keep the aircraft within visual sight at all times;
  - (e) Ensure the operation of transmitting devices of the unmanned aircraft system complies with IDA requirements;
  - (f) Keep sufficient distance from people, property and other aircraft (manned or unmanned);
  - (g) Not fly an unmanned aircraft over any crowd;
  - (h) Not suspend, carry or attach any item to the unmanned aircraft, unless it is manufactured to do so; and
  - (i) Not fly where the unmanned aircraft may interfere with emergency service providers; or over moving vehicles where it might endanger or distract drivers.
  
- 2 The operator should be aware of the situations during which a permit or permits may be required. The operator must therefore not operate an unmanned aircraft under those situations unless he has the necessary permits to do so. As a reminder, the operator must:
  - (a) Not fly an unmanned aircraft that weighs more than 7 kg in total, unless he has a permit allowing him to do so;
  - (b) Not fly the unmanned aircraft at any altitude in areas within 5km of any aerodrome (including military airbases) or higher than 200 ft AMSL outside of such areas, unless he has a permit allowing him to do so.
  - (c) Not fly the unmanned aircraft over or within restricted or danger or protected areas, unless he has a permit allowing him to do so; and
  - (d) Not drop or discharge any item or substance from the unmanned aircraft, unless he has a permit allowing him to do so.
  
- 3 The operator is prohibited from conducting unmanned aircraft operations involving the:
  - (a) Carriage of any hazardous substances using an unmanned aircraft; or
  - (b) Flight over or within a prohibited area.