**Sample Operations Manual for Conducting Small Unmanned Aircraft Operations under Advanced Operations Permission**

**Notes to Readers:**

1. This template of Operations Manual (“OM”) serves as a guidance for SUA Operator who intends to conduct SUA operations under Advanced Operations Permission. The manual is not intended to be exhaustive or prescriptive. The SUA Operator is required to put in place appropriate policies, procedures, safety precautions and risk mitigating measures to ensure the safe conduct of all envisaged SUA operation and compliance with all applicable regulatory requirements.
2. The SUA Operator may amend any text in this manual to suit the technical capabilities and functions of the SUA, operational need and safety measures, as long as all essential requirements are addressed and fulfilled, and the SUA operation can be conducted in a safe manner.
3. Texts in blue are guidance/ reminder on the completion of this Operations Manual. The SUA Operator shall read carefully and replace with appropriate policies/ procedures/ information before submission.
4. Reference in this document to male gender should be understood to include both male and female genders.

|  |
| --- |
|  |

|  |
| --- |
| [SUA OPERATOR Name & logo] |
| **Operations Manual** |
| For Conducting Small Unmanned Aircraft (“SUA”) Operations under Advanced Operations Permission |
|  |
|  |
|  |

### Revision History

Any amendments made to this document should be recorded in the table below and sent to the CAD. The latest version of the Operations Manual should be used for all SUA operations.

|  |  |  |  |
| --- | --- | --- | --- |
| Issue Number | Amendment Date | Amendments Incorporated | Amended By |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

### Compliance Statement

To ensure safe operations of SUA, [SUA Operator Name]will comply with the SUA Order (Cap. 448G) and all applicable regulations in Hong Kong, and operate in accordance with the requirements and conditions set out in the relevant CAD Advisory Circular(s) and permission. The instructions, procedures and information detailed in this document will be adhered to by all personnel involved in the concerned SUA operations.

|  |  |
| --- | --- |
| Signature: |  |
| Accountable Manager: | [See Section 2.3 and 3.2] |
| Position: | [e.g. Managing Director] |

For and on behalf of [SUA Operator Name]

Organisation Registration Document.: [e.g. Business Registration Certificate no.]

Address: [add details here]
Phone: [add details here]

### Acronyms and Abbreviations

|  |  |
| --- | --- |
| **Abbreviation** | **Description** |
| AGL | Above ground level |
| CAD | Civil Aviation Department |
| ft | Feet |
| GPS | Global Positioning System |
| kg | Kilogram |
| km/hr | Kilometre per hour |
| m | Metre |
| SUA | Small Unmanned Aircraft |
| VLOS | Visual line of sight |
|  |  |
|  |  |
| … | [Insert or delete as appropriate] |

### Table of Contents

[Revision History i](#_Toc96960995)

[Compliance Statement ii](#_Toc96960996)

[Acronyms and Abbreviations ii](#_Toc96960997)

[Table of Contents iii](#_Toc96960998)

[Applicability 1](#_Toc96960999)

[1 Operations Manual 1](#_Toc96961000)

[1.1 Compliance 1](#_Toc96961001)

[1.2 Amendment 1](#_Toc96961002)

[2 Scope of Operation 1](#_Toc96961003)

[2.1 Types of Operation 1](#_Toc96961004)

[2.2 SUA 1](#_Toc96961005)

[2.3 Personnel 2](#_Toc96961006)

[Organisational Procedures 3](#_Toc96961007)

[3 Structure 3](#_Toc96961008)

[3.1 Personnel Composition 3](#_Toc96961009)

[3.2 Responsibilities and Duties 3](#_Toc96961010)

[3.3 Qualification Requirements 5](#_Toc96961011)

[4 Supervision and Control 6](#_Toc96961012)

[4.1 Supervision 6](#_Toc96961013)

[4.2 Area of Operations 6](#_Toc96961014)

[4.3 Regulatory Requirements 6](#_Toc96961015)

[5 Report and Handling of Occurrence 8](#_Toc96961016)

[5.1 Internal Report 8](#_Toc96961017)

[5.2 Handling of Occurrence 8](#_Toc96961018)

[5.3 Report to Authority 8](#_Toc96961019)

[6 Safety Assurance and Quality Assurance 9](#_Toc96961020)

[6.1 Safety Assurance 9](#_Toc96961021)

[6.2 Quality Assurance 9](#_Toc96961022)

[6.3 Oversight Activities by the CAD 9](#_Toc96961023)

[7 Documentation and Records 10](#_Toc96961024)

[7.1 SUA 10](#_Toc96961025)

[7.2 Nominated Personnel 10](#_Toc96961026)

[7.3 SUA Operation 10](#_Toc96961027)

[7.4 Permission maintenance 11](#_Toc96961028)

[7.5 Retention Period 11](#_Toc96961029)

[8 Change of Information 12](#_Toc96961030)

[8.1 Prior Acceptance by CAD 12](#_Toc96961031)

[8.2 Prior Notification to CAD 12](#_Toc96961032)

[8.3 Variation of Permission 12](#_Toc96961033)

[Operational Procedures 13](#_Toc96961034)

[9 Flight Planning 13](#_Toc96961035)

[9.1 Site Safety Assessment 13](#_Toc96961036)

[9.2 Flight Plan 13](#_Toc96961037)

[9.3 Risk Management 14](#_Toc96961038)

[9.4 Permission 14](#_Toc96961039)

[9.5 Means of Communications 14](#_Toc96961040)

[10 On-site Procedures and Pre-flight Checks 15](#_Toc96961041)

[10.1 Site Safety Assessment 15](#_Toc96961042)

[10.2 Selection of Operating Area and Alternative 15](#_Toc96961043)

[10.3 Cordon Procedure 15](#_Toc96961044)

[10.4 Communications 15](#_Toc96961045)

[10.5 Crew Health 16](#_Toc96961046)

[10.6 Weather Checks 16](#_Toc96961047)

[10.7 Preparation and Serviceability of Equipment and SUA 16](#_Toc96961048)

[10.8 Battery Management / Refuelling 17](#_Toc96961049)

[10.9 Assembly and Loading of SUA 17](#_Toc96961050)

[10.10 Pre-Flight Checks of SUA and Equipment 17](#_Toc96961051)

[11 Flight Procedures 19](#_Toc96961052)

[11.1 Start 19](#_Toc96961053)

[11.2 Take-off 19](#_Toc96961054)

[11.3 In-flight 19](#_Toc96961055)

[11.4 Landing 20](#_Toc96961056)

[11.5 Shutdown 20](#_Toc96961057)

[11.6 Post-flight 20](#_Toc96961058)

[12 Emergency Procedures 21](#_Toc96961059)

[12.1 Motor / Propeller Failure 21](#_Toc96961060)

[12.2 Fire 21](#_Toc96961061)

[12.3 Loss of Command and Control Data Link 21](#_Toc96961062)

[12.4 Loss of GPS Signal 22](#_Toc96961063)

[12.5 Low Battery 22](#_Toc96961064)

[12.6 Flyaway 22](#_Toc96961065)

[12.7 Public Encroachment 22](#_Toc96961066)

[12.8 Aircraft Encroachment 23](#_Toc96961067)

[13 Operational Procedures for Specified Type(s) of Operation 24](#_Toc96961068)

[Training 25](#_Toc96961069)

[14 Training Requirements 25](#_Toc96961070)

[14.1 Training Programme 25](#_Toc96961071)

[Forms 26](#_Toc96961072)

# Applicability

## Operations Manual

### Compliance

* + 1. This Operations Manual contains policies, procedures and information for the [SUA Operator Name]’s operations of small unmanned aircraft (“SUA”) under Advanced Operations Permission granted pursuant to section 37 of the Small Unmanned Aircraft Order (Cap. 448G).
		2. All personnel involved in the SUA operation under the authority of the permission shall comply with policies, procedures and information set out in this manual.

### Amendment

* + 1. [SUA Operator Name] will periodically review this manual to ensure that it remains relevant and appropriate. Amendment(s) will be indicated by a revision bar, submitted to the CAD for prior acceptance and recorded in the Revision History.
		2. [SUA Operator Name] will ensure each person engaged in an operational capacity at [SUA Operator Name] is given access to a copy of this Operations Manual and is timely advised of any accepted amendments to the manual.

## Scope of Operation

### Types of Operation

* + 1. This manual describes policies, procedures and information for the following type(s) of SUA advanced operations in accordance with the relevant CAD Advisory Circular(s) and permission(s):
1. [Type(s) of Advanced Operations] – Detailed procedures are in Chapter X.

Note: Please refer to the relevant AC(s) for the types of advanced operations.

* + 1. Unless otherwise specified by the CAD in the permission concerned, in any one flight, only one type of the above advanced operations shall be involved.

### SUA

* + 1. All SUA that will be used by [SUA Operator Name]for conducting any advanced SUA operations under permission are registered and labelled properly in accordance with Cap. 448G and the Safety Requirement Documents. [SUA Operator Name] shall maintain a list of SUA and their information as stipulated in section 7.1.
		2. The list shall be updated in a timely manner to ensure all SUA used for SUA operations under permission are properly recorded.

### Personnel

* + 1. An Accountable Manager shall be appointed to take overall responsibility for ensuring that [SUA Operator Name] will comply with the requirements and conditions set out by the CAD, as well as carrying out other responsibilities and duties prescribed in section 3.2.
		2. [SUA Operator Name] shall have an Accountable Manager at all times during period of permission. No SUA operation under permission shall be carried out should the post of the Accountable Manager becomes vacant. The CAD shall be notified of the change in Accountable Manager appointment within seven calendar days from the date on which the new nomination takes effect.
		3. Other persons involved in intended SUA operations shall also be nominated. All nominated personnel shall carry out their responsibilities and duties set out in Section 3.2 and fulfil the qualification requirements in section 3.3. The Accountable Manager should keep a list of the nominated personnel and their information as stipulated in section 7.2.
		4. The nomination list shall be updated in a timely manner to ensure all personnel involved for the operations under permission are properly recorded.

# Organisational Procedures

## Structure

### Personnel Composition

* + 1. The following organogram illustrates the persons involved in SUA operations carried out by [SUA Operator Name]. A Remote Pilot shall conduct an SUA operation at least with the assistance of a Visual Observer and/or a supporting crew member during the entire flight.

### Responsibilities and Duties

* + 1. [Position of the Accountable Manager](hereafter referred to as “Accountable Manager”) is accountable for the overall safety and compliance of any SUA operations conducted by [SUA Operator Name]. His duties include the following:
* Handle all matters relating to the permission as well as the coordination with the CAD when needed;
* Ensure the competency of personnel, including remote pilot and other personnel;
* Ensure all advanced operations are conducted under a valid permission and in accordance with the conditions set out in the permission and the requirements as detailed in the relevant Advisory Circulars;
* Ensure that the SUA operations are conducted in accordance with the Operations Manual, flight plan and any other related documents;
* Ensure that the Operational Manual, the list of SUA and personnel are complete and up-to-date;
* Ensure that all logs, records and documents are properly kept as stated in section 7 of this manual;
* Report any compliance or safety issues to the CAD;
* Ensure any amendments made in the OM are recorded and sent to the CAD for prior acceptance; and
* Implement safety assurance and quality assurance measures including the regular self-assessment.
	+ 1. **Remote Pilot** is responsible for supervising and issuing command for SUA operations on-site. His duties include the following:
* Conduct SUA flight in accordance with the procedures set out in this manual;
* Ensure the overall safety of the SUA operation on-site;
* Maintain direct, unaided (other than corrective lenses) visual contact with the SUA to know the SUA location, determine the SUA’s attitude, altitude and direction of flight, observe the airspace for other air traffic or hazards and determine if the SUA become a hazard to any other aircraft, person or property;
* Confirm that all members of the flight team maintain currency of their training (if applicable) and are physically fit to carry out their duties
* Brief and debrief all members of the flight team and associated staff and ensure they are aware of their responsibilities for the particular SUA operation;
* Prepare the required documents for the applications for permission for conducting SUA operations in Hong Kong;
* Conduct risk assessment to identify any hazard for the operation and determine risk mitigating measures to be implemented;
* Conduct site survey and flight safety assessment to determine if the prevailing conditions are suitable for SUA operations and complete the associated forms;
* Work out the flight details including flight time, flight duration, take-off and landing area, flight path, position of other crew members, etc. and execute accordingly;
* Perform pre-flight check to ensure the SUA is in good condition and functioning properly prior to take-off or launching;
* Halt or cancel SUA operation if, at any time, the safety of persons or property on ground or in the air is in jeopardy, or if there is a failure to comply with the provisions of permission issued by the CAD; and
* Ensure that all logs and records in relation to the operations are properly completed and signed.

Note: VLOS shall be maintained either by the Remote Pilot or the Visual Observer. The applicant shall allocate the essential duties and responsibilities according to the flight team composition.

* + 1. **Visual Observer** is responsible for maintaining VLOS with the SUA and providing collision avoidance information to the Remote Pilot. His duties include the following:
* Maintain direct, unaided (other than corrective lenses) visual contact with the SUA to know the SUA location, determine the SUA’s attitude, altitude and direction of flight, observe the airspace for other air traffic or hazards and determine if the SUA become a hazard to any other aircraft, person or property;
* Communicate continuously and effectively with the Remote Pilot and provide sufficient collision avoidance information to the Remote Pilot; and
* Inform the Remote Pilot when the SUA is approaching its maximum operating range limits.

Note 1: A Visual Observer shall not take up other duties which may distract him from maintaining VLOS and providing sufficient collision avoidance information to the Remote Pilot during the flight. If there are duties that are out of Remote Pilot’s capacity, the SUA Operator shall consider deploying Supporting Crew as described in the following paragraph.

Note 2: VLOS shall be maintained either by the Remote Pilot or the Visual Observer. The SUA Operator shall allocate the essential duties and responsibilities according to the flight team composition.

* + 1. Dependent on the scale and complexity of the operation, [SUA Operator Name] may deploy other **Supporting Crew** to perform the following duties:
* Assist in the completion of all checks such as pre-flight and post-flight checks, and logs and records such as flight log and battery log;
* Keep the Remote Pilot updated constantly on an independent monitor on flight parameters of the SUA including battery level and satellites tracked;
* Assist in ensuring the operation is executed according to plan such as flight path followed and image captured;
* Maintain constant visual lookout for any uninvolved people, vehicles, vessels or structures within or getting close to the minimum lateral separation required; and
* Alert the Remote Pilot in case of any emergencies such as battery level and satellites tracked reaching the minimum level for safe operations;

Note: If the supporting crew holds equivalent qualifications as the Remote Pilot, i.e. a registered remote pilot assigned with Advanced Rating, with appropriate procedures and equipment prescribed in this manual, he may take over control of the SUA in case of incapacitation of the Remote Pilot. After the taking over of control, this “supporting crew” is considered as the Remote Pilot for the flight.

### Qualification Requirements

* + 1. All Remote Pilot under the [SUA Operator Name] must hold a valid remote pilot certificate and be assigned with an Advanced Rating to conduct advanced SUA operation under the permission.
		2. All nominated personnel shall get themselves familiar with the regulations in Hong Kong, CAD Advisory Circulars, conditions of the Permission and procedures detailed in this document.
		3. All flight crew members shall be competent for the type(s) of SUA operations to be conducted. They are required to complete satisfactorily the required training and assessment in accordance with the training programme as detailed in Chapter 14 of this document.

## Supervision and Control

### Supervision

* + 1. The Accountable Manager shall monitor the overall compliance of SUA operations conducted by the flight team with the relevant permission and procedures prescribed in this document.
		2. The Remote Pilot shall be responsible for supervising SUA operations on-site and the overall safety of the SUA operation.

### Area of Operations

* + 1. The SUA operation shall not be conducted within a Restricted Flying Zone (RFZ) unless a separate permission has been obtained or the operation is wholly within an enclosed area. Remote pilot should check for updates on the CAD Electronic Portal for Small Unmanned Aircraft (“eSUA”) or CAD website prior to each flight for the latest RFZ designation.
		2. [Accountable Manager/ Remote Pilot] shall conduct comprehensive pre-flight planning (including site safety assessment, risk assessment, flight plan etc.) and, if deemed necessary, obtain consent from the relevant land or property owner, management, authority or agency for all intended operations.

### Regulatory Requirements

* + 1. All operations conducted under permission shall comply with the relevant regulatory requirements set out in Cap. 448G, including but not limited to:
1. SUA is registered and labelled;
2. Remote Pilot is registered and assigned with Advanced Rating;
3. SUA is equipped with flight log and geo-awareness, and any other equipment as required for the specific advanced operation; and
4. A policy of insurance is in force to insure against third-party liability (for bodily injury and/or death) arising out of or caused by the operation of the SUA in Hong Kong, with minimum coverage of HKD 10 million.
	* 1. Unless otherwise specified in a relevant permission, all SUA operations conducted under Advanced Operations Permission shall comply with the following regulatory requirements set out in Cap. 448G:
5. The weight of SUA does not exceed 7kg;
6. The SUA is not operated within an RFZ;
7. The SUA does not carry any dangerous goods;
8. The SUA is not operated at hours other than daylight hours;
9. A visual line of sight is maintained with the SUA by the remote pilot and/ or a visual observer;
10. The flying altitude of the SUA is not higher than 300 ft AGL;
11. The flying speed of the SUA does not exceed 50 km/hr.
12. The distance between the SUA and any person who is not involved in the flight operation, measured horizontally and at any altitude, is not less than 10m (if the flying speed of the aircraft not exceeding 20 km/hr) or 30m (if with the flying speed of the aircraft exceeding 20 km/hr but not exceeding 50 km/hr);
13. The distance between the SUA and any vehicle, vessel or structure that is not under the control of the remote pilot, measured horizontally and at any altitude, is not less than 10m (if the flying speed of the aircraft not exceeding 20 km/hr) or 30m (if with the flying speed of the aircraft exceeding 20 km/hr but not exceeding 50 km/hr);
14. The SUA does not carry any person or animal during the flight;
15. Nothing is dropped from the SUA during the flight;
16. The remote pilot of the SUA operates no more than one SUA at the same time; and
17. The dimension of the aircraft (including everything installed in, carried by or attached to the aircraft) at all times during the flight does not exceed 1 m, except that the longest distance between any two rotor blade tips may be up to 1.2 m.
	* 1. It should be noted that, as a condition of permission, unless otherwise specified by the CAD in the permission concerned, in any one flight, only one type of specified advanced operations shall be involved.
		2. Requirements governed by other pieces of legislation in Hong Kong may also be applicable to the SUA operation. [SUA Operator Name]shall ensure compliance with such requirements, e.g. the Telecommunications Ordinance and Personal Data (Privacy) Ordinance, etc.

## Report and Handling of Occurrence

### Internal Report

* + 1. The Remote Pilot shall record any accident or incident regarding any SUA operations and report to the Accountable Manager in a timely manner. The events that shall be recorded and reported to the Accountable Manager are as follows:

* Loss of control datalink (where the loss resulted in an event that endangers the safety of any person or property);
* Navigation failures;
* Structural damage incurred that adversely affects the performance or flight characteristics of the SUA;
* Any collision with or loss of separation from another aircraft;
* Unintended contact between the SUA and persons, structures, vehicles, vessels, etc.; or
* Any incident that injured a third party.

### Handling of Occurrence

* + 1. Every accident or incident recorded shall be investigated to find out the root cause of the event. Preventive measures such as additional training, more stringent conditions, etc. where necessary shall be implemented for future SUA operations. All nominated personnel, whether directly involved in the event or not, should be briefed about the case and any lessons learnt.

### Report to Authority

* + 1. In case of accident or incident, the Accountable Manager shall immediately report the case to the Police, followed by an email notification to the CAD Unmanned Aircraft Office at sua@cad.gov.hk, if the operation has caused any damage to property of injury to person.
		2. Within 24 hours of any incident or accident (whether or not there was damage to third party property or injury), the Accountable Manager shall provide full details of the circumstances in writing to the CAD Unmanned Aircraft Office at sua@cad.gov.hk.
		3. Upon request from the CAD, the Accountable Manager shall provide additional details and/or investigation findings within three calendar days, in writing by email to sua@cad.gov.hk. A log of all incidents, accidents and occurrences shall be properly maintained by the AOP holder and shall be made available upon the request by the CAD.

## Safety Assurance and Quality Assurance

### Safety Assurance

* + 1. The Accountable Manager shall ensure that all SUA operations are conducted in a safe manner through effective management of safety risks. Risk assessment shall be conducted prior to each flight for continuously ensuring and improving safety by identifying hazards, ensuring the implementation of necessary mitigating measures and remedial actions.
		2. The Accountable Manager shall ensure that the assessments are properly conducted by competent persons of [SUA Operator Name] and shall properly review and document the assessment results.

### Quality Assurance

* + 1. The Accountable Manager shall perform appropriate quality assurance actions for ensuring continuous compliance of applicable regulatory requirements stipulated in the SUA Order, Safety Requirements Document, various Advisory Circulars, conditions of the permission and other documents published by the CAD.
		2. As one of the quality assurance activities, Accountable Manager shall conduct a self-assessment covering all aspects of operations at least once every six months to identify any internal deficiencies and procedures that are not being properly implemented or that require further enhancement. A sample of self-assessment checklist is attached in the Appendix (Form G).
		3. The Accountable Manager should perform regular on-site supervision to ensure compliance of the advanced operations, if the Accountable Manager did not operate such flights.
		4. All quality assurance records shall be properly kept and updated by the Accountable Manager in accordance with section 7 of this document.

### Oversight Activities by the CAD

* + 1. The Accountable Manager shall provide all necessary support for the oversight activities conducted by the CAD, including but not limited to announced and unannounced inspection, audit, document check and any other appropriate activities.
		2. Should a finding be issued by the CAD indicating non-compliance of the applicable regulatory requirements and conditions of the permission, the Accountable Manager shall propose and implement a corrective action plan to the satisfaction of CAD within a period designated by the CAD, which should detail the identification of the root cause leading to the non-compliance, as well as concrete and feasible measures for preventing reoccurrence of such deficiencies.

## Documentation and Records

### SUA

* + 1. The Accountable Manager shall maintain a list of all SUA used for any advanced SUA operations under permission. The list shall contain the following information:
1. SUA registration number
2. Manufacturer name (if applicable)
3. Model name or model number (if applicable)
4. Type of SUA (e.g. multi-copter, fixed-wing, helicopter, etc.)
5. Serial number of aircraft body or flight controller (if any)
6. Weight of SUA
7. Wind speed limitation of SUA

### Nominated Personnel

* + 1. The Accountable Manager shall maintain a list of nominated personnel for operations in accordance with this document under permission. The following details of each nominated person shall also be recorded
1. Period of nomination
2. Title/ post
3. Qualifications (e.g. the reference number and validity of the remote pilot certificate)
4. Training records (e.g. date and content of the initial and any recurrent training received by the crew members)

### SUA Operation

* + 1. Apart from the electronic flight log which records basic flight parameters in the SUA, the following information relevant to an SUA operation shall also be recorded in details:

* Flight Record (Form A)
* Battery Log (Form B)
* Maintenance Log (Form C)
* Site Survey Assessment (Form D)
* Risk Assessment (Form E)
* Operation Checklist (Form F)
* Flight Plan
* Applicable insurance policy in force during the operation
* Consent from the relevant land or property owner, management, authority or agency (if any)
* Occurrence report and follow-up actions (if any)
	+ 1. The Remote Pilot shall ensure that all logs and records in relation to the operations are properly completed and signed.

### Permission maintenance

* + 1. The Accountable Manager shall keep documents in relation to the maintenance of permission, which include but are not limited to:
* Permission application form
* The required documents for permission application
* List of advanced operation conducted
* Record of safety and quality assurance activities, e.g. self-assessment checklist and corrective actions performed

### Retention Period

* + 1. The Accountable Manager shall ensure all of the above logs and records are maintained for at least two years. They may be kept in either paper form or in electronic format or a combination of both, and shall be made available to the CAD upon request.

## Change of Information

### Prior Acceptance by CAD

* + 1. The Accountable Manager shall seek prior approval from the CAD for any change about the following items:
1. Scope of intended Advanced Operations; and
2. Procedures in relation to SUA operations including the safety mitigation measures proposed for specified operations (i.e. the procedures written in this manual).

### Prior Notification to CAD

* + 1. The Accountable Manger shall notify the CAD of any intended changes about the following items at least seven calendar days prior to the commencement of changes.
1. Name of the permission holder given that the organisation registration number (i.e. Business Registration number) remains unchanged;
2. Models of SUA;
3. List of remote pilots; and
4. Other organisation details.
	* 1. The CAD shall be notified of the change in Accountable Manager appointment within seven calendar days from the date on which the new nomination takes effect.

### Variation of Permission

* + 1. Depending on the nature and extent of the material change, changes of information may necessitate a variation of the permission. The Accountable Manager shall notify the CAD as soon as a change is planned or required.
		2. Application for variation to a permission may be made to the CAD by email to sua@cad.gov.hk. The application must be accompanied with relevant supporting documents, such as the revised OM (for Paragraph 8.1), Notice of Change of Company Name (for Paragraph 8.2.1a), or any other related documents as appropriate.

# Operational Procedures

## Flight Planning

### Site Safety Assessment

* + 1. Before an SUA operation, [Accountable Manager/ Remote Pilot] shall conduct a site survey and work out the flight details. During the operation site assessment, the following aspects shall be considered:
1. Boundary of the area of operations (including likely take-off / landing area and alternative site);
2. Location and height of obstructions (e.g. buildings, trees, etc.);
3. Proximity of other aircraft operations;
4. Flight restrictions related to the area of operations (e.g. Restricted Flying Zones established, local by-laws at country parks, etc.);
5. Hazards / possible radio interference associated with industrial sites or activities such as live firing, fuel tank, high tension cables, high-intensity radio transmission, etc.;
6. Habitation and recreational activities nearby;
7. Security measures required to limit public access to the area of operations (if necessary);
8. Altitudes and routes to be used on the approach to and departure from the area of operations;
9. Permission from the land owner / property manager concerned (if deemed necessary); and
10. Weather conditions for the planned event (e.g. ground visibility, cloud base, wind speed, precipitation, etc.).
	* 1. After conducting the operating site assessment, [Accountable Manager/ Remote Pilot] shall complete and sign the Site Survey Assessment Form (Form D).

### Flight Plan

* + 1. With the information gathered from the site assessment, [Accountable Manager/ Remote Pilot] shall work out a flight plan using a map or floor plan (e.g. Google satellite map at the appropriate scale) for the intended operation, which illustrates at least the following information:
1. Take-off/ landing point;
2. Flight path;
3. Geo-fenced area (if applicable);
4. Altitude;
5. Speed;
6. How VLOS is maintained;
7. Position of Remote Pilot and other crew;
8. Distance(s) from nearby uninvolved structures (buildings, bridge, etc); and
9. The method to maintain the minimum lateral separation from any uninvolved person and any vehicle, vessel or structure not under the control of Remote Pilot.

### Risk Management

* + 1. During flight preparation, [Accountable Manager/ Remote Pilot] shall conduct a risk assessment using the Risk Assessment form (Form E) to identify any hazard and determine risk mitigating measures to be implemented specific to that operation.
		2. Due diligence should be exercised in identifying reasonably foreseeable hazards related to the operation. Open and clear communication should be maintained with stakeholders who may be affected.
		3. SUA operations shall only be conducted when all the risks have been mitigated down to an acceptable level.

### Permission

* + 1. [Accountable Manager/ Remote Pilot] shall ensure a relevant Permission is in force for the intended operation, and that all terms and conditions stipulated therein can be fulfilled throughout the operation.
		2. If deemed necessary, [Accountable Manager/ Remote Pilot] shall ensure that permission from the land or property owner, management, authority or agency concerned has been obtained prior to conducting the SUA operations.

### Means of Communications

* + 1. [Accountable Manager/ Remote Pilot] shall determine an effective means of audio communication within the flight team during the SUA operations. Depending on the size and environment of the area of operations, the use of walkie-talkie or direct verbal communications may be considered.
		2. In case of an emergency which may affect the safety of other airspace users (e.g. a flyaway), the flight team shall notify the Aerodrome Supervisor of the Air Traffic Control unit (Tel: 2910 6822) with the following information as soon as possible:
* Time of the incident;
* Heading of the SUA;
* Remaining battery life of the SUA; and
* Brief description of the SUA (e.g. brand, model, colour, size, number of rotors, etc.)
	+ 1. The flight team shall also report to the Hong Kong Police Force immediately for necessary actions, as appropriate.

## On-site Procedures and Pre-flight Checks

### Site Safety Assessment

* + 1. Upon arrival at the area of operations, the flight team shall walk around the site to confirm the site safety assessment and risk assessment prepared at the flight planning stage are still valid.
		2. If there are any additional hazards identified, actions shall be taken to ensure the SUA operations can be safely conducted.

### Selection of Operating Area and Alternative

* + 1. The Remote Pilot shall identify a suitable area which is flat enough to enable safe take-off and landing. This area shall be kept clear for landing in case landing at such area is required during an emergency.
		2. The selected operating area shall be clear from obstructions and shall be of a size which allows the Remote Pilot and/or Visual Observer to maintain full-time VLOS with the SUA during the operations.
		3. An alternative area close to the operating area shall also be selected for emergency landing and shall be made known to the flight team.

### Cordon Procedure

* + 1. If necessary, the operating area (including the take-off and landing area) shall be cordoned off from uninvolved person and vehicle, vessel and structure not under the control of the Remote Pilot during the SUA operation, with minimum lateral separation as stated in section 4.3, unless otherwise specified in a permission.
		2. Clear warning signs, cones and/or safety tape may be used to indicate SUA operations in progress. Extra Supporting Crew may be required to advise the public of the dangers of entering the operating area for sites with potential public access.
		3. Should there be any public encroachment, the Remote Pilot shall land the SUA or shift the SUA to a safe position such that minimum lateral separation can be maintained.

### Communications

* + 1. Before the SUA operations, the Remote Pilot shall brief all members of the flight team to ensure they understand their duties and responsibilities, as well as the details of operation, including but not limited to the flight plan, safety risk involved, risk mitigation measures in place, emergency procedures, etc. The Remote Pilot shall also ensure all crew members are aware of the terms and conditions of the permission issued by the CAD, and will take all necessary measures to comply with such terms and conditions specified therein.
		2. The Remote Pilot shall also ensure the means of audio communication within the flight team is effective and all relevant parties (e.g. land or property owner, management, authority or agency etc.) have been informed of the operations if required.

### Crew Health

* + 1. All members of the flight team shall declare they are fit to fly during the briefing given by the Remote Pilot before any SUA operation is conducted.
		2. If a person is unfit to perform his duties as part of the flight team (e.g. suffering from fatigue), the SUA operation shall not be conducted unless another nominated person is able to take over his position.
		3. A person shall not be a member of the flight team if he is under the influence of alcohol or drugs, unless medical advice has been sought to ensure that the drugs will not impair his ability to perform his duties in relation to the SUA operation.

### Weather Checks

* + 1. Before the SUA operations, the Remote Pilot shall ensure that the prevailing weather conditions are suitable for the SUA operations with information from the Hong Kong Observatory. An SUA operation shall not be conducted unless the following weather criteria is fulfilled:
1. Ground visibility warrants the Remote Pilot and/or Visual Observer to maintain effective monitoring and control of the SUA operations;
2. SUA is kept clear of cloud for the planned flight (i.e. not operated in or out of cloud);
3. Wind speed does not exceed the limitation of the SUA;
4. Practical means are in place to monitor surface wind speed on site; and
5. There is no Rainstorm Warning, Tropical Cyclone Warning or Strong Monsoon Signal in force.

### Preparation and Serviceability of Equipment and SUA

* + 1. All SUA to be used for the intended operation and their associated components such as remote controller, rotor blades, batteries, camera, etc. shall be checked by the Remote Pilot prior to and after every SUA operation.
		2. Any findings and maintenance conducted on the equipment shall be recorded in a Maintenance Log (Form C). A test shall be conducted to confirm the serviceability of the equipment after any maintenance actions.
		3. The Remote Pilot shall ensure all equipment required for the intended operation are serviceable with software and firmware updated before the SUA operations.

### Battery Management / Refuelling

* + 1. The [Post of flight crew] shall be responsible for the charging, storage and record-logging of batteries.
		2. Batteries shall be handled according to the manufacturer’s safety guidelines. Swollen, leaky or damaged batteries shall never be used or charged.
		3. Batteries shall never be charged at a higher rate than recommended or left unattended during charging.
		4. Batteries shall be stored at around half of its charge remaining in specifically designed battery bags at cool temperatures.
		5. The date and time of charging for each battery shall be recorded in the Battery Log (Form B), and the maximum number of charge cycles shall be checked against the manufacturer’s guidelines.
		6. The Remote Pilot shall ensure that sufficient number of batteries are available for the SUA operations. The battery level of the flight battery, remote controller and mobile phone shall be **at least 85%** before the operations.

### Assembly and Loading of SUA

* + 1. The Remote Pilot shall ensure that the SUA are correctly assembled, and that all SUA components and payload are securely installed in, carried by or attached to the aircraft so that nothing would be dropped during flight.
		2. When all components and payload are secured, the Remote Pilot shall measure the weight of the SUA to ensure compliance with the applicable regulatory requirements and/ or the conditions specified in the relevant permission.

### Pre-Flight Checks of SUA and Equipment

* + 1. The Remote Pilot shall perform pre-flight check on the SUA equipment using Part I of the SUA Operation Checklist (Form F) and ensure that all items are ready for the SUA operations.
		2. The SUA should not be launched if the status of any item is “No” and fault report should be filed using Part III of Form F.
		3. The **minimum number of GPS satellites** **tracked** **shall be 7**, and the geofencing boundary and maximum altitude of operations shall be set if geo-fencing is used.
		4. The Remote Pilot is responsible for ensuring that no person and property would be endangered by the SUA, and shall not fly the SUA unless he has reasonably satisfied himself that the flight can be safely made.
		5. The Remote Pilot shall not fly the SUA unless before the flight he has satisfied himself that the fail-safe mechanism in the event of a failure of or disruption on any control systems, including the radio link, is in working order.

## Flight Procedures

### Start

* + 1. Prior to take-off, [Post of flight crew] shall check again that the take-off area is clear of uninvolved people or vehicles, vessels and structures not under control.
		2. The Remote Pilot shall notify the flight team that the SUA is about to take-off.

### Take-off

* + 1. The Remote Pilot shall start the motors. After take-off, the Remote Pilot shall perform hover check by pushing the control sticks gently and observing the aircraft’s response.
		2. [Post of flight crew] shall inform the Remote Pilot of the number of satellites being tracked and battery level of the SUA and remote controller.
		3. [Post of flight crew] shall check the surroundings and confirm if the SUA operations can proceed as planned.
		4. If geo-fencing is used, the Remote Pilot shall test the function by moving the aircraft towards the boundary of the geo-fence and observe its response.

### In-flight

* + 1. The Remote Pilot shall conduct the SUA operations according to the flight plan and conditions set out in the permission.
		2. [Post of flight crew] shall keep the Remote Pilot updated constantly on flight parameters of the SUA including battery level and satellites tracked.
		3. [Post of flight crew] shall maintain constant lookout for public and aircraft encroachment and alert the Remote Pilot in case of any emergencies.
		4. If the **GPS signal falls to** **6 satellites**, the Remote Pilot shall **terminate the flight** **immediately**. Manoeuvre the aircraft in “attitude mode” to the landing position for landing. “Return-to-home” function is not recommended.
		5. If the **battery level of the aircraft reaches 30%**, the Remote Pilot shall **terminate the operation immediately** and manoeuvre the aircraft to the landing position for landing. If the battery level of the aircraft reaches 15%, the aircraft will return to the “home” position and land automatically.

Note: The SUA Operator may designate a higher minimum battery level taking into account the risks of the intended operation.

### Landing

* + 1. Before landing the aircraft, the Remote Pilot shall alert the team of the intention to land.
		2. [Post of flight crew] shall check the landing area is clear for landing.

### Shutdown

* + 1. Upon touchdown, the Remote Pilot shall stop the motors. Switch off the aircraft and then the remote control device after landing.
		2. The Remote Pilot shall disassemble the SUA (e.g. remove the flight battery) in accordance with the manufacturer’s instructions where applicable.

### Post-flight

* + 1. The Remote Pilot shall perform post-flight check on the SUA equipment using Part II of the SUA Operation Checklist (Form F) and file a fault report using Part III of the form if needed.
		2. The Remote Pilot shall record the SUA operations in the Flight Record Form (Form A).
		3. The Remote Pilot shall report all accidents or incidents (e.g. crash, temporary incapacity of team members or any other persons interfering with the flight operations, etc.) in accordance with section 5.

## Emergency Procedures

### Motor / Rotor Blade Failure

* + 1. If any sign of motor / rotor blade failure is observed, the Remote Pilot shall notify the flight team by calling “Falling Drone” and try to stabilise the SUA as far as possible.
		2. If the aircraft is likely to pose danger to people in the vicinity, everyone in the flight team shall raise the awareness of the people by yelling “run away/散開, run away/散開, run away/散開”.
		3. The SUA shall be maintained within VLOS. [Post of flight crew] shall confirm the landing area, or the alternative area, and the flight path to the site is clear for landing, and inform the Remote Pilot accordingly.
		4. The Remote Pilot shall manoeuvre the aircraft to the landing position for landing as far as possible.

### Fire

* + 1. If any sign of fire is observed, the Remote Pilot shall notify the flight team by calling “Aircraft Fire”, maintain VLOS with the SUA and terminate the flight immediately.
		2. [Post of flight crew] shall confirm the landing area, or the alternative area, and the flight path to the site is clear for landing, and inform the Remote Pilot accordingly.
		3. The Remote Pilot shall manoeuvre the aircraft to the landing position for landing and shut down the motors as soon as possible.
		4. [Post of flight crew] shall call the Fire Services Department for assistance if necessary.

### Loss of Command and Control Data Link

* + 1. If the command and control data link is lost, the fail-safe mechanism of the SUA will be activated and the aircraft will return to the “home” position and land automatically.
		2. [Post of flight crew] shall confirm the landing area, or the alternative area, and the flight path to the site is clear for landing, and inform the Remote Pilot accordingly.
		3. The SUA shall be maintained within VLOS. If any abnormal behaviour is observed, the Remote Pilot operate the aircraft in “attitude mode” to try to regain control of the SUA and manoeuvre the aircraft to the landing position for landing as soon as possible.

### Loss of GPS Signal

* + 1. If the GPS signal falls to 6 satellites, [Post of flight crew] shall notify the flight team by calling “GPS Lost”.
		2. The Remote Pilot shall terminate the flight immediately. He shall operate the aircraft in “attitude mode” to regain control of the SUA and ensure VLOS is maintained.
		3. The [Post of flight crew] shall confirm the landing area, or the alternative area, and the flight path to the site is clear for landing, and inform the Remote Pilot accordingly.
		4. The Remote Pilot shall manoeuvre the aircraft to the landing position for landing as soon as possible.

### Low Battery

* + 1. If the battery level of the aircraft reaches 30%, [Post of flight crew] shall notify the flight team by calling “Low Battery”.
		2. The [Post of flight crew] shall confirm the landing area, or the alternative area, and the flight path to the site is clear for landing, and inform the Remote Pilot accordingly.
		3. The Remote Pilot shall terminate the flight immediately and manoeuvre the aircraft to the landing position for landing.
		4. If the battery level of the aircraft reaches 15%, the aircraft will return to the “home” position and land automatically.

### Flyaway

* + 1. If the SUA has no response to any control inputs, the Remote Pilot shall notify the flight team by calling “Flyaway” and ensure VLOS is maintained with the SUA as far as possible.
		2. [Post of flight crew] shall take note of the following and notify the Air Traffic Control unit (Tel: 2910 6822) as soon as possible:

* Time of the incident;
* Heading of the SUA;
* Remaining battery life of the SUA; and
* Brief description of the SUA (e.g. brand, model, colour, size, number of rotors, etc.)
	+ 1. [Post of flight crew] shall also report to the Hong Kong Police Force immediately for necessary actions, as appropriate.

### Public Encroachment

* + 1. Should there be any public encroachment within or getting close to the minimum lateral separation required, [Post of flight crew] shall inform the flight team by calling “Public” and advise the Remote Pilot of the position of the public spotted. The Remote Pilot shall hold position of the SUA immediately.
		2. [Post of flight crew] shall confirm the landing area, or the alternative area, and the flight path to the site is clear for landing, and inform the Remote Pilot accordingly.
		3. If the above is confirmed, the Remote Pilot shall land the SUA. Otherwise, he shall shift the SUA to a safe position such that minimum lateral separation can be maintained.

### Aircraft Encroachment

* + 1. Should there be any aircraft encroachment within or getting close to the minimum lateral separation required, [Post of flight crew] shall inform the flight team by calling “Aircraft” and advise the Remote Pilot of the position of the aircraft spotted. The Remote Pilot shall hold position of the SUA immediately.
		2. [Post of flight crew] shall confirm the area immediately beneath the SUA is clear and inform the Remote Pilot accordingly.
		3. If the above is confirmed, the Remote Pilot shall descend the SUA. Otherwise, he shall shift the SUA to a safe position to avoid collision.

## Operational Procedures for Specified Type(s) of Operation

Note: The SUA Operator shall put in detail here any specific operational procedures and safety measures for the type(s) of advanced operation indicated in section 2.1 of this manual. When writing the relevant procedures, the SUA Operator shall ensure the requirements set out in the relevant CAD Advisory Circular(s) are addressed and fulfilled.

This section details the specific operational procedures and safety measures for the type(s) of advanced operations specified in section 2.1 of this manual. While the policies and procedures provided in other sections of this manual shall be observed at all times, in case of any deviations or contradictions, the procedures specified in this section take precedence.

# Training

## Training Requirements

### Training Programme

* + 1. The Accountable Manager and all nominated personnel shall get themselves familiar with the regulations in Hong Kong, requirements in the relevant CAD Advisory Circular, conditions of permission, and the policies, procedures and information detailed in this document.
		2. The Remote Pilot shall be assigned with the rating permitting him to conduct the type of flight operation specified in section 2.1 of this manual. Additional training may be provided to the Remote Pilot considering the nature of the specific operation and the operational need.
		3. The Remote Pilot shall also maintain currency of his SUA operational experience by having at least two hours of total flight time logged within the last twelve months prior to the SUA operations. Such recurrent training requirement may be fulfilled with test flights, training flights, and/or actual SUA operations.
		4. All nominated personnel shall be competent for the type(s) of operation to be conducted. They are required to complete satisfactorily training and assessment relevant to the duties and responsibilities and maintain currency.
		5. All training records shall be properly kept and updated by the Accountable Manager in accordance with section 7 of this document.

# Forms

#### Flight Record

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Date** | **Registration No. and Model of the SUA Used** | **Time (LT)** | **Location**  | **Type of Operation and Ref. No. of Permission** | **Performed by** |
| **Start** | **End** | **Full Name**  | **Signature** |
|  |  |  |  |  |  | Remote pilot: |  |
| Visual observer: |  |
|  |  |  |  |  |  | Remote pilot: |  |
| Visual observer: |  |
|  |  |  |  |  |  | Remote pilot: |  |
| Visual observer: |  |
|  |  |  |  |  |  | Remote pilot: |  |
| Visual observer: |  |
|  |  |  |  |  |  | Remote pilot: |  |
| Visual observer: |  |
|  |  |  |  |  |  | Remote pilot: |  |
| Visual observer: |  |
|  |  |  |  |  |  | Remote pilot: |  |
| Visual observer: |  |
|  |  |  |  |  |  | Remote pilot: |  |
| Visual observer: |  |
|  |  |  |  |  |  | Remote pilot: |  |
| Visual observer: |  |

#### Battery Log

|  |  |  |  |
| --- | --- | --- | --- |
| **Charge Cycle** | **Battery 1** | **Battery 2** | **Battery 3** |
| **Date & Time** | **Signature** | **Date & Time** | **Signature** | **Date & Time** | **Signature** |
| 1 |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  |
| 7 |  |  |  |  |  |  |
| 8 |  |  |  |  |  |  |
| 9 |  |  |  |  |  |  |
| 10 |  |  |  |  |  |  |
| 11 |  |  |  |  |  |  |
| 12 |  |  |  |  |  |  |
| 13 |  |  |  |  |  |  |
| 14 |  |  |  |  |  |  |
| 15 |  |  |  |  |  |  |
| 16 |  |  |  |  |  |  |

#### Maintenance Log

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Date** | **SUA**  | **Component** | **Test before Return to Service (Y/N)** | **Remarks** | **Inspected by**  |
| **Full Name** | **Signature** |
|  |  | 🞏Airframe🞏Rotor blade🞏Battery🞏Remote Controller🞏Camera🞏Others |  |  |  |  |
|  |  | 🞏Airframe🞏Rotor blade🞏Battery🞏Remote Controller🞏Camera🞏Others |  |  |  |  |
|  |  | 🞏Airframe🞏Rotor blade🞏Battery🞏Remote Controller🞏Camera🞏Others |  |  |  |  |
|  |  | 🞏Airframe🞏Rotor blade🞏Battery🞏Remote Controller🞏Camera🞏Others |  |  |  |  |

#### Site Survey Assessment Form

|  |  |
| --- | --- |
| **Location** |  |
| **Tasks** |  |
| **Date & Time** |  | **SUA to be used** |   |

|  |
| --- |
|  |

|  |  |
| --- | --- |
| **Item** | **Findings / Actions Required** |
| Boundary of the area of operations (including likely take-off / landing area and alternative site) |  |
| Location and height of obstructions (e.g. buildings, trees, etc.) |  |
| Proximity to other aircraft operations |  |
| Flight restrictions related to the area of operations (e.g. Restricted Flying Zones established, local by-laws at country parks, etc.) |  |
| Hazards / possible radio interference associated with industrial sites or activities such as live firing, fuel tank, high tension cables, high-intensity radio transmission, etc. |  |
| Habitation and recreational activities nearby |  |
| Security measures required to limit public access to the area of operations (if required) |  |
| Altitudes and routes to be used on the approach to and departure from the area of operations |  |
| Permission from the land owner / property manager concerned (if required) |  |
| Weather conditions for the planned event (e.g. ground visibility, cloud base, wind speed, precipitation, etc.) |  |

**Conducted by:**

|  |  |
| --- | --- |
| Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_­\_\_\_ | Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
|  |  |
| Position:  | Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

#### Risk Assessment Form

1. This assessment must be an original work prepared and conducted by the [Accountable Manager/ Remote Pilot]. The Remote Pilot must take responsibility for the safety case of his own operation, whether the material originates from this template or otherwise. Any changes to the procedures and safety mitigation measure prescribed in the Operations Manual will require further assessment by the CAD prior to further operations being conducted.
2. The likelihood of occurrence (Table 1) and severity of consequences (Table 2) for each identified hazard shall be assessed to determine the risk rating (Table 3).

 Table 1 – Likelihood of occurrence

|  |  |  |
| --- | --- | --- |
| **Likelihood** | **Meaning** | **Value** |
| **Frequent** | Likely to occur many times/ has occurred frequently | 5 |
| **Occasional** | Likely to occur sometimes/ has occurred infrequently | 4 |
| **Remote** | Unlikely to occur, but possible/ has occurred rarely | 3 |
| **Improbable** | Very unlikely to occur/ not known to have occurred | 2 |
| **Extremely Improbable** | Almost inconceivable that the event will occur | 1 |

 Table 2 – Severity of consequences

|  |  |  |
| --- | --- | --- |
| **Severity** | **Meaning** | **Value** |
| **Catastrophic** | Failure conditions that could result in one or more fatalities | A |
| **Hazardous** | Failure conditions that would reduce the capability of the SUA or the ability of the Remote Pilot to cope with adverse operating conditions to the extent that there would be the following:1. Loss of the SUA where it can be reasonably expected that a fatality will not occur, though people on the ground will sustain severe injuries;
2. A large reduction in safety margins or functional capabilities; or
3. High workload such that the Remote Pilot cannot be relied upon to perform his/her tasks accurately or completely.
 | B |
| **Major** | Failure conditions that would reduce the capability of the SUA or the ability of the Remote Pilot to cope with adverse operating conditions to the extent that there would be a significant reduction in safety margins, functional capabilities or separation assurance. People on the ground may not sustain severe injuries. In addition, the failure condition has a significant increase in Remote Pilot’s workload or impairs Remote Pilot’s efficiency.  | C |
| **Minor** | Failure conditions that would not significantly reduce SUA safety and that involve crew actions that are within their capabilities. Minor failure conditions may include a slight reduction in safety margins or functional capabilities, a slight increase in Remote Pilot’s workload, such as flight plan changes. | D |
| **Negligible** | Failure conditions that would have no effect on safety. For example, failure conditions that would not affect the operational capability of the SUA or increase the Remote Pilot’s workload. | E |

Table 3 – Risk rating

|  |  |
| --- | --- |
| **Safety Risk** | **Severity** |
| **Probability** | **Catastrophic****A** | **Hazardous****B** | **Major****C** | **Minor****D** | **Negligible****E** |
| **Frequent** | **5** | 5A | 5B | 5C | 5D | 5E |
| **Occasional** | **4** | 4A | 4B | 4C | 4D | 4E |
| **Remote** | **3** | 3A | 3B | 3C | 3D | 3E |
| **Improbable** | **2** | 2A | 2B | 2C | 2D | 2E |
| **Extremely Improbable** | **1** | 1A | 1B | 1C | 1D | 1E |

1. With reference to the risk rating, an evaluation of each identified hazard shall be conducted to determine which is acceptable and which requires further mitigating measures according to the classification below. The results are to be recorded in the following Risk Assessment Form.

a) **Intolerable (red)** – Take immediate action to mitigate the risk or stop the activity. Perform priority risk mitigation to ensure additional or enhanced preventative controls are in place to bring down the risk rating to tolerable.

b) **Tolerable (yellow)** – The risk can be tolerated based on risk mitigation. For example, cones or security personnel could be placed for restricting people from the area of operations to prevent unauthorized access during the SUA operation. If in doubt, the Remote Pilot may seek advice from the Accountable Manager on whether the risk could be accepted.

c) **Acceptable (green)** – The risk can be acceptable as is. No further safety risk mitigation is required.

|  |  |  |  |
| --- | --- | --- | --- |
| **Location** |  | **Tasks** |   |
| **Date & Time** |  | **SUA to be used** |   |

|  |
| --- |
|  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Risk No.** | **Identified Hazard** | **Associated Risk (What & How)** | **Existing Mitigation** | **Current Risk Rating** | **Further Mitigation** | **Revised Risk Rating** |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

**Conducted by:**

|  |  |
| --- | --- |
| Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_­\_\_\_ | Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
|  |  |
| Position: Remote Pilot  | Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

#### SUA Operation Checklist

|  |  |  |  |
| --- | --- | --- | --- |
| **Date & Time**  |  | **Location** |   |
| **Remote Pilot Name**  |  | **SUA to be used** |   |

|  |
| --- |
| **Part I – Pre-Flight** |

|  |  |
| --- | --- |
| **Item** | **Status (Yes / No)** |
| Relevant permission for the intended operation is valid and the conditions of which can be fulfilled |  |
| SUA to be used are registered and labelled properly |  |
| Qualifications requirements of all operating crew are met and current |  |
| Safety system/ required equipment are in use and functioning properly |  |
| Third-party liability insurance with at least HKD 10 million coverage is in force  |  |
| Operating area (including the take-off and landing area) are clear of uninvolved people and vehicles, vessels and structures not under control of Remote Pilot |  |
| Prevailing weather conditions are suitable for the SUA operation |  |
| There is no flight restriction related to the area of operations based on the latest Restricted Flying Zone information |  |
| Remote control device, mobile device and flight battery are properly charged (at least 85%) |  |
| All SUA components (e.g. flight battery) and payload are secured and SD card has sufficient capacity |  |
| Rotor blade and rotor blade guards (if applicable) are in good condition and mounted correctly and firmly |  |
| There is nothing obstructing the motors and they are functioning normally |  |
| Camera lens and sensors for Vision Positioning System / Obstacle Sensing System are clean |  |
| Mobile application and the aircraft’s firmware have been updated to the latest versions |  |
| Mobile application is successfully connected to the aircraft and telemetry readings such as GPS signal (at least 7 satellites tracked), command and control data link, etc. are normal |  |
| If prompted, follow the on-screen instructions to calibrate the compass and/or Inertial Measurement Unit (IMU) |  |
| Gimbal and camera are functioning normally |  |
| Geofencing boundary and maximum altitude (if applicable) have been set, and return-to-home position and altitude have been recorded |  |

**Conducted by:**

|  |  |
| --- | --- |
| Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_­\_\_\_ | Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
|  |  |
| Position: \_\_\_\_\_\_\_\_\_\_\_  | Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
|  |  |

|  |
| --- |
| **Part II – Post-Flight** |

|  |  |
| --- | --- |
| **Item** | **Status (Yes / No)** |
| Motor is shut down normally |  |
| Aircraft and remote control device are off |  |
| Temperature of battery is normal with no swelling |  |
| Temperature of motor and remote control device are normal |  |
| Visual check on the aircraft is normal with no damage |  |
| Rotor blade(s) are checked with no cracks or damage |  |
| Relevant logs and records are completed |  |

**Conducted by:**

|  |  |
| --- | --- |
| Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_­\_\_\_ | Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
|  |  |
| Position: \_\_\_\_\_\_\_\_\_\_\_  | Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

|  |  |
| --- | --- |
|  |  |
|  |  |

|  |
| --- |
| **Part III – Fault Report** |
| **Fault Description** |
|  |
| **When was the fault found? (tick all that are applicable)**🞏 Pre-Flight 🞏 Take-off 🞏 Climb 🞏 Hover 🞏 In-flight 🞏 Landing 🞏 Accident 🞏 Maintenance  |
| **Likely cause of fault**🞏 Design 🞏 Manufacture 🞏 Fatigue 🞏 Corrosion 🞏 Maintenance 🞏 Human Factors 🞏 Operational 🞏 Others \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Severity**🞏 Minor (In-house repair / replacement by spares) 🞏 Major (Return to manufacturer) |
| **Reported by: Date:****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | **Acknowledged by: Date:****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |
| **Corrective Actions** |
|  |
| **Reviewed by: Date:****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | **Closed by: Date:****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |

#### Self-assessment Checklist

**HOLDER OF ADVANCED OPERATIONS PERMISSION–
SAMPLE CHECKLIST FOR REGULAR SELF-ASSESSMENT**

|  |  |  |
| --- | --- | --- |
| 1. This document serves as a sample checklist for holder of Advanced Operations Permission to conduct regular self-assessments as required under paragraph 7.2 of the Advisory Circular AC-002. 2. **The format of this sample checklist is not prescriptive. Holder of Permission may design their own checklist(s) in accordance with the requirements as specified in the Safety Requirements Document, AC-002 conditions of Permission and other ACs, as they see fit.**3. Regular self-assessment shall be conducted by the Accountable Manger at least once every six months. The results of each self-assessment shall be maintained for 2 calendar years for inspection by the Civil Aviation Department (“CAD”).3. Please tick () the appropriate boxes as you go through the checklist.

|  |  |
| --- | --- |
|  |  |

 |
|  |  |

**Part I – Basic Information**

Organisation Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Permission Number:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Validity: From\_\_\_\_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_\_

**Part II–Regular Self-Assessment Checklist**

1. Please tick () at the appropriate box(es) as you go through the checklist.

2. **If you answer “No” to any of the items, please write your corrective actions in Part G of this checklist.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **A) General Information** | **Yes** | **No** | **N/A** | **Remarks** |
| 1 | Is my Application Documents up-to-date? ***[Please notify the CAD or seek CAD’s approval as appropriate if “No” has been answered to any of the following items (Ref. AC-002)]*** |  |  |  |  |
|  | * Company Particulars

(Company Name, Address, Contact Details) |  |  |  |
|  | * Account Manager
 |  |  |  |
|  | * Scope of Advanced Operations
 |  |  |  |
|  | * Operations Manual
 |  |  |  |
|  | * List of SUA to be used
 |  |  |  |
|  | * List and Particulars of Remote Pilot
 |  |  |  |
|  | * List and Roles of Nominated Personnel
 |  |  |  |
| 2 | Organisation Registration Document, e.g. Business Registration Certificate (BRC)  |  |  |  |
|  | * The organisation holds a valid Registration Document.
 |  |  |  |
| **B) Personnel and Training** | **Yes** | **No** | **N/A** | **Remarks** |
| 1 | All remote pilots hold a valid “Advanced Rating” and a “Remote Pilot Certificate”. *[Section 11(1)(g) of the SUA Order]*  |  |  |  |  |
| 2 | Appropriate training has been provided to visual observer and flight crew. *[Paragraph 5.2.1 of the AC-002]*  |  |  |  |
|  | * Frequency of internal training: \_\_\_\_\_\_\_\_\_\_\_\_
 |  |  |  |
|  | * Training records are properly maintained.
 |  |  |  |
| **C) Regulatory Requirements of Advanced Operations**  | **Yes** | **No** | **N/A** | **Remarks** |
| 1 | SUA Registration and Labelling  |  |  |  |  |
|  | * All SUAs, including Category A1 SUA, are properly registered and labelled*. [Section 11(1) (a) &(b) of the SUA Order]*
 |  |  |  |
| 2 | Equipment  |  |  |  |
|  | * All SUAs, including Category A1 SUA, has equipped with a safety system (function of flight log and geo-awareness). *[Section 11(1)(d) of the SUA Order]*
 |  |  |  |
|  | * Appropriate equipment required for the type of advanced operations conducted is in place if applicable.

  |  |  |  |
| 3 | Insurance *[Section 11(1)(c) and 12 of the SUA Order]*  |  |  |  |
|  | * A valid insurance policy for third-party liability (bodily injury and/or death) is in place for flight of advanced operations.
 |  |  |  |
|  | * The minimum coverage of the insurance is at least HK $10 million.
 |  |  |  |
| 4 | Permission for Advanced Operations  |  |  |  |
|  | Only specified operations approved in the Permission were conducted.  |  |  |  |
|  | A separate permission has been arranged for flight in restricted flying zone and/or involve the carriage of Dangerous Goods. *[Section 18(1) & 20(1) of the SUA Order, and paragraph 2.7 of AC-002]*  |  |  |  |
| **D) Compliance with Operations Manual**  | **Yes** | **No** | **N/A** | **Remarks** |
| 1 | Flight planning  |  |  |  |  |
|  | * Site safety assessment was duly performed during the flight planning stage.
 |  |  |  |
|  | * A flight plan is prepared for each flight
 |  |  |  |
|  | * Necessary permission from the land owner and authorities concerned has been arranged for
 |  |  |  |
| 2 | On-Site Procedures and Pre-flight Checks  |  |  |  |
|  | * The flight team has confirmed the site safety assessment and risk assessment previously prepared are valid prior to the flight.
 |  |  |  |
|  | * The Remote Pilot has sufficiently briefed other crew members information about the flight, related safety measures and their respective duties prior to the flight
 |  |  |  |
|  | * Cordon procedures stipulated in the Operations Manual were implemented.
 |  |  |  |
|  | * Flight procedures stipulated in the Operations Manual were implemented
 |  |  |  |
| 3 | * Emergency Procedures
 |  |  |  |
|  | * If an emergency situation was encountered during a flight, the emergency procedures were properly implemented in accordance with the Operations Manual
 |  |  |  |
| 4 | Handling and Report of Occurrence  |  |  |  |
|  | Accidents or incidents have been investigated with cause identified.  |  |  |  |
|  | The CAD has been properly notified about the occurrence. |  |  |  |
| **E)** |  **Records**  | **Yes** | **No** | **N/A** | **Remarks** |
|  | The following documents have been properly for two calendar years. *[Paragraph 9 of AC-002]* |  |  |  |  |
| 1 | Records relating to Individual flights:  |  |  |  |
|  | * Flight log, battery log and maintenance record
 |  |  |  |
|  | * Safety and Risk assessment
 |  |  |  |
|  | * Flight plan
 |  |  |  |
|  | * Permission from land owners and authorities
 |  |  |  |
|  | * Insurance Policy
 |  |  |  |
|  | * Occurrence report of individual flight
 |  |  |  |
| 2 | Records relating to the maintenance of permission  |  |  |  |
|  | * Summary of flight of advanced operation conducted
 |  |  |  |
|  | * Quality assurance documents such as the self-assessment report
 |  |  |  |
|  | * List of SUA

***[The record of SUA under permission, whether current or not, shall be retained made available upon CAD’s request.]*** |  |  |  |
|  | * List and particulars of Remote Pilots and other nominated personnel

***[The record of Remote Pilots under permission, whether current or not, shall be retained made available upon CAD’s request.]*** |  |  |  |
|  | * Summary of Occurrences and the follow-up actions taken

***[If there is no occurrence in the previous permission period, a declaration signed by the Accountable Manager should be maintained.]*** |  |  |  |
| **F)** |  **Safety Assurance and Quality Assurance**  | **Yes** | **No** | **N/A** | **Remarks** |
| 1 | Safety Assurance *[Paragraph 7.1 of AC-002]* |  |  |  |  |
|  | * Safety risk assessment are conducted by competent persons prior to each flight
 |  |  |  |
|  | * The assessment results have been properly documented, reviewed and followed-up.
 |  |  |  |
| 2 | Quality Assurance *[Paragraph 7.2 of AC-002]* |  |  |  |
|  | * The self-assessment was conducted at least once every 6 months.
 |  |  |  |
|  | * The corrective actions proposed in the last self-assessment have been properly followed-up.
 |  |  |  |  |
|  | * If the flight was not conducted by the Accountable Manager, the Accountable Manager has performed on-site supervision to ensure the compliance of SUA operations. Frequency: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
 |  |  |  |  |

|  |
| --- |
| **G) Corrective Action Plan**  |
| **If you have answered “No” to any of the item(s) on the checklist, please write your proposed corrective action(s) below, together with the corresponding follow-up date(s) and action party/ies.** |
|  I, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (Name of the Accountable Manager), declare that the above assessment conducted on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (Date) truly reflects the circumstances of the organisation to the best of my knowledge. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(Signature) |

**END**