香港特別行政區政府
民航處
Civil Aviation Department
The Government of the Hong Kong Special Administrative Region

Small Unmanned Aircraft Advisory Circular No. AC-003

Date: 31 May 2022

Permission for Small Unmanned Aircraft Night Operations

1. Background

1.1 The Small Unmanned Aircraft Order ("SUA Order"), Chapter 448G of the Laws of Hong Kong, comes into operation on 1 June 2022. Under the SUA Order, small unmanned aircraft ("SUA") operations are regulated under a risk-based approach and be classified according to the weight of the SUA and the operational risk level.

1.2 Due to reduced visibility, SUA operations outside daylight hours or at night would be subject to a higher level of risk. Such operations are categorised as "**Advanced Operations**" for which a permission under section 37 of the SUA Order is required from the Civil Aviation Department ("CAD") prior to operation.

1.3 This Advisory Circular ("AC") sets out the requirements for permission to operate an SUA outside daylight hours or at night.

2. Applicability

2.1 To ensure aviation and public safety, remote pilots of SUA should endeavour to operate in compliance with all operating requirements applicable to the SUA as specified under section 15 of the SUA Order at all times during the flight. This includes operating an SUA in daylight hours only. This notwithstanding, the CAD notes that there are SUA practical uses and operational circumstances whereby an SUA may be required to operate outside daylight hours.

2.2 For the purposes of the SUA Order, "**Daylight hours**" means *the time from half an hour before sunrise until half an hour after sunset (both points of time exclusive), where sunrise and sunset are determined at surface level.*

Note:
Information of sunrise and sunset time may be obtained from the Hong Kong Observatory ("HKO"), e.g. through HKO's Mobile App under the "Astro & Tide Info" section or the HKO Almanac.

2.3 This AC applies to applicants who wish to apply for a permission from the CAD to conduct SUA operations outside daylight hours. For easy reference and application by the SUA community, **SUA operations outside daylight hours** are interchangeably referred to as **SUA night operations** or **SUA operations at night** in this document.

2.4 Remote pilots/ operators are required to conduct safety risk assessment and mitigation strategy prior to operating an SUA at night. Appropriate safety measures shall be in place to mitigate the risks of reduced visibility in determining the directional movement of the aircraft, such that the remote pilot is able to clearly see the SUA and the surrounding airspace while it is airborne, monitor the aircraft's flight path and so manoeuvre it clear of anything that it might collide with.

3. Equipment Requirements

3.1 The SUA shall be equipped with the necessary safety system capable of performing the functions specified in section 13 of the SUA Order, i.e. flight log and geo-awareness functions.

3.2 In addition to the above requirement, SUA to be used for night operations shall be equipped **with appropriate navigation lighting**[1]. The lighting must be **visible** to the remote pilot at all times during the flight and it must be **sufficient for the remote pilots to determine the orientation and direction of the SUA visually**.

3.3 Strobe or anti-collision light system is also recommended for use in night operations.

3.4 Appropriate ground station or remote controller software shall also be in place to assist the remote pilot in identifying the SUA's position in real time.

3.5 SUA equipped with obstacle avoidance function is recommended to be used for night operations to provide an enhanced level of safety.

3.6 All personnel and crew members involved in the SUA night operations including the remote pilot are recommended to be provided with appropriate high visibility personal protective equipment (e.g. reflective apparel, safety vests, etc.) so that they can be more prominently seen and located in dark conditions.

[1] Usually red lights on forward rotor arms and green lights on rear rotor arms, or red lights on left wing and green lights on right wing

4. Personnel Requirements

4.1 The remote pilot for the flight shall hold a valid remote pilot registration and be assigned with an Advanced Rating.

4.2 The remote pilot shall choose a visual observer ("VO") whom the remote pilot is satisfied that the VO is competent for the night operations to be conducted. If considered necessary, the remote pilot should be assisted by additional supporting crew to monitor the remote controller and/or assess the SUA's position.

4.3 Effective audio communication must be maintained between the VO and the remote pilot at all times during the flight.

5. Operating Requirements

5.1 The remote pilot shall be satisfied that the airspace in which the operation will take place will be visible at all times by the remote pilot and/or the chosen VO during the flight.

5.2 During night operation, the remote pilot shall maintain direct and effective communication with the VO to continuously know and determine the position, altitude, attitude (orientation, deck angle, pitch, bank) and movement of his/ her SUA, as well as the collision avoidance information for safe operation of the SUA.

5.3 During night operation, the VO shall not maintain VLOS with more than one SUA or for more than one remote pilot at any one time. The VO should not be assigned other duties.

5.4 As part of the risk assessment process, a **thorough site and flight safety assessment** covering the take-off and landing points, and areas along and surrounding the SUA flight paths shall be conducted in **daylight hours** prior to the intended SUA night operations, to identify, record and address any hazards, restrictions and obstacles in the associated areas that might affect the night operations. Circumstances permitting, the arrangement of a recce flight(s) in daylight hours should be considered to assist in the site and flight safety assessment process.

5.5 The take-off and landing (including recovery landing) points shall be equipped with adequate lighting to provide clear visual reference, and also allow the remote pilot and/or VO to visually see and avoid hazards and obstacles on the ground to facilitate safe take-off and landing of the SUA. A mechanism shall be established to prevent public access to the take-off/ landing points during use.

5.6 Prior to operations, the VO and any other crew shall be adequately briefed on the details of operations, including but not limited to the flight plan, safety risk involved, risk mitigation measures in place, emergency procedures, etc. They shall also be made aware of the terms and conditions of the permission issued by the CAD under section 37 of the SUA Order, and take all necessary measures to comply with such terms and conditions specified therein.

5.7 The remote pilot shall obtain relevant information (e.g. ground visibility, cloud base, wind speed and precipitation) from on-site measurement or the Hong Kong Observatory to ensure the following weather conditions are met:

a) Ground visibility warrants the remote pilot, VO and supporting crew (if available) to maintain effective monitoring and control of the SUA operations;
b) SUA is kept clear of cloud for the planned flight (i.e. not operated in or out of cloud);
c) Wind does not exceed the wind speed limitation specified by the manufacturer;
d) The remote pilot shall have practical means to monitor surface wind speed on site; and
e) The remote pilot must not launch the SUA when Rainstorm Warning, Tropical Cyclone Warning or Strong Monsoon Signal is in force.

5.8 The SUA shall not be operated within a restricted flying zone or carry any dangerous goods during flight, unless a relevant permission has been separately obtained.

5.9 The remote pilot shall comply with all other applicable operating requirements to the SUA, i.e. maintaining visual line of sight, maintaining the flying altitude at 300 ft Above Ground Level or below, maintaining lateral separation with any uninvolved person and vehicle, vessel or structure not under the control of the remote pilot according to the speed of the aircraft, maintaining the specified distance between the aircraft and the remote pilot, not carrying any person or animal during flight, nothing being dropped from the aircraft, the remote pilot operating no more than one SUA at the same time and the dimension of SUA not exceeding 1m during flight (except that longest distance between any two rotor blade tips can be up to 1.2 m). More information about the requirements is available in the Safety Requirements Document ("SRD") published by the CAD.

5.10 Applications may be made for any one or more than one specific type of advanced operations; but in any one flight, only one type of advanced operations should be involved, unless otherwise specified by the CAD in the permission concerned.

6. Emergency Procedures

6.1 The remote pilot shall determine suitable responses and fail-safe mechanism for emergency during operation, e.g. loss of command and control link, or navigational lighting.

7. Insurance Requirements

7.1 A policy of insurance will be in force during advanced SUA operation for the third-party liability (for bodily injury and/or death) arising out of or caused by the SUA operation. The minimum coverage is HKD 10 million.

8. Others

8.1 The remote pilot, responsible person of SUA or any other person who knowingly causes or permits the aircraft to be operated for the flight should take note that apart from the SUA Order, other regulations, bylaws, requirements, etc. may also govern the usage of SUA. Applicable rules shall be observed and consent from relevant land or property owner, management, authority or agency shall be obtained if deemed necessary or appropriate for the intended operations.

9. Application

9.1 Permission for SUA night operations may be granted per each specific operation, or on a longer-term basis. Application shall be made accordingly to the following paragraphs accompanied by relevant application fee.[2]

9.2 Permission per each Specific Operation

9.2.1 Applicant may make an application for SUA Night Operations Permission for a specific operation using the application form in **Appendix A** and submit the completed form to the CAD by email to sua@cad.gov.hk. Applicant shall read and make a declaration on understanding the requirements prescribed therein and ensuring compliance. This application mechanism is designed to facilitate and cater for one-off specific operation. If the applicant intends to conduct multiple operations at night for a cumulative total of more than five nights within a calendar month, please refer to the application procedures in paragraph 9.3.

9.3 Permission on a Longer-term Basis

9.3.1 Applicants may apply to the CAD for permission to conduct night operations on a longer-term basis following the requirements set out in AC-002.

[2] The application fee relating to the permission will be waived until further notice.

9.3.2 Apart from the requirements prescribed in the AC-002, an applicant shall also include the following information/ document specific to night operation as part of the application:

a) An Operations Manual including (See **Appendix B** for details):
   - Duties and responsibilities all crew member(s) including remote pilot, VO and/or supporting crew;
   - Description of the night operations and the procedures to ensure safe operation;
   - General and emergency procedure to conduct the night operations safely, including flight checks to be carried out and communication protocols between the remote pilot, VO and/or supporting crew;
   - Description of qualifications requirements to ensure competency and currency for all personnel involved in the intended operations, including the supporting crew; and

b) A risk assessment identifying hazards specific to night operations and the corresponding risk mitigation measures (See **Appendix C** for details)

9.4 Dependent on the risks and complexity of the proposed operation, the CAD may require a flight demonstration to be performed to assess the applicant's capabilities and safety of the proposed operation.

10. Incident and Accident Reporting

10.1 In case of accident or incident, after reporting to the Police, the permission holder shall notify the CAD Unmanned Aircraft Office at sua@cad.gov.hk as soon as possible, **if the operation has caused any damage to third party property or injury to person**.

10.2 **Within 24 hours of any incident or accident (whether or not there was damage to third party property or injury to person)**, permission holder shall provide full details of the circumstances in writing to the CAD Unmanned Aircraft Office by email.

10.3 Upon request from the CAD, the permission holder shall provide additional details and/or investigation findings within **three (3) 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 permission holder and shall be made available upon the request by the CAD.

11. Enquiries

11.1 This AC will be subject to review and update from time to time in the light of the advancement of technology and increasing popular use of SUA in different professional applications. It should also be noted that the safety requirements provided above are not meant to be exhaustive. It shall be the responsibility of the SUA responsible person and remote pilots to comply with all applicable regulatory requirements, put in place appropriate safety precautions and risk mitigating measures for the subject SUA operation, as well as to follow the requirements and guidelines set out by any property owner and/or manager to ensure the safe operations of SUA at all times.

11.2 This AC should be read in conjunction with the SUA Order, SRD and other SUA related documents published by the CAD.

11.3 For enquiries, please contact the Unmanned Aircraft Office of the CAD at sua@cad.gov.hk.

12 Notes

12.1 This AC supersedes the version dated 18 March 2022.

Appendix A – Application Form for Permission for Small Unmanned Aircraft Night Operations

香港特別行政區政府
民航處
Civil Aviation Department
The Government of the Hong Kong Special Administrative Region

Application for
Permission for Small Unmanned Aircraft Night Operations
(*For Specific Operations Only*)

1. ***Please read the Safety Requirements Document and Small Unmanned Aircraft Advisory Circular No. AC-003 to learn about the detailed requirements before completing this application form.***
2. ***The completed form shall be submitted to the CAD by email to sua@cad.gov.hk as application for permission.***

1. APPLICANT'S PARTICULARS

Name of Applicant (in full) :_____

Contact Tel. No.:_____ Fax No. (if any).:_____

Email Address:_____

If the applicant is an organisation, please also provide the following information:

Name of Contact Person (in full): _____

Post of Contact Person: _____

2. APPLICATION DETAILS

Model and Registration No. of the SUA to be used: _____

Remote Pilot Certificate Reference No. (with advanced rating): _____

Proposed date(s) of the specific night operations:

_____

* *Note* :

1. *This application mechanism allows the applicant to apply for permission to conduct night operations for a cumulative maximum of five nights only within any calendar month. If multiple or specific operations for more than five nights in a calendar month are required, please refer to paragraph 9.3 of the relevant AC.*
2. *If after the application is submitted and approved, the applicant needs to change the proposed operation date(s) due to unforeseen circumstances (e.g. adverse weather conditions), please inform CAD via sua@cad.gov.hk in advance.*

3. APPLICATION DETAILS & REQUIRED DOCUMENT(S)		
Required Document(s)	**Submitted? (Yes / No / N.A.)**	**Supplementary Information**
A. GENERAL		
(1) Proposed locations to carry out night operations: (Detail description of precise location or boundary of operation area shall be provided, which may be indicated in latitude and longitude coordinates of WGS 1984 format)		Please specify:
(2) Proposed dates and time to carry out night operations (maximum of five nights within one calendar month):		Please specify:
<u>Requirements Compliance</u>	Please tick all the boxes on the left to declare that the proposed night operation will comply with the respective requirements. For any unchecked boxes, applicant is required to detail alternative mitigation on the right column. Any supplementary information may also be provided.	
A. Equipment Requirements	Will be complied with?	Alternative mitigation and supplementary information
(1) SUA is equipped with the necessary safety system capable of performing the functions specified in section 13 of the SUA Order, i.e. flight log and geo-awareness functions.	☐	
(2) SUA is equipped with navigation or position lighting. Additional strobe or anti-collision lighting system is recommended.	☐	
(3) Ground station/ remote controller software is in place to assist the remote pilot in identifying the SUA's position in real time.	☐	
(4) SUA is equipped with obstacle avoidance function is recommended.	☐	
(5) All personnel and crew members involved in the SUA night operations are recommended to be provided with appropriate high visibility personal protective equipment (e.g. reflective apparel, safety vests, etc.)	☐	
B. Personnel Requirements	Will be complied with?	Alternative mitigation and supplementary information
(1) Remote pilot conducting night operations have advanced rating assigned. (Please attach copies of the remote pilots' certificates)	☐	
(2) Visual Observer (VO) is available.	☐	

(3) Effective audio communication is maintained between the VO and the remote pilot at all times during the flight.	☐	
C. Insurance Requirements	Will be complied with?	Alternative mitigation and supplementary information
(1) A policy of insurance is in force to insure for the third-party liability (for bodily injury and/or death).	☐	
(2) The minimum coverage is HKD 10 million. (Please attach the insurance policy if available upon submission)	☐	
D. Operating Requirements	Will be complied with?	Alternative mitigation and supplementary information
(1) The airspace is visible at all times by the remote pilot and/or the chosen VO during the flight.	☐	
(2) Remote pilot to maintain direct and effective communication with the VO to continuously know and determine the position, altitude, attitude (orientation, deck angle, pitch, bank) and movement of his/ her SUA , as well as the collision avoidance information for safe operation of the SUA.	☐	
(3) VO to maintain VLOS with one SUA or for one remote pilot at any one time only. VO should not be assigned other duties.	☐	
(4) Thorough site and flight safety assessment covering the take-off and landing points, and areas along and surrounding the SUA flight paths shall be conducted in daylight hours prior to the intended SUA night operations, to identify, record and address any hazards, restrictions and obstacles in the associated areas that might affect the night operations. Circumstances permitting, the arrangement of a recce flight(s) in daylight hours should be considered to assist in the site and flight safety assessment process.	☐	
(5) Take-off and landing (including recovery landing) points are equipped with adequate lighting to provide clear visual reference, and also allow the remote pilot, VO to visually see and avoid hazards and obstacles on the ground to facilitate safe take-off and landing of the SUA. A mechanism is established to prevent public access to the take-off/ landing points during use.	☐	

(6) The VO and any other crew are adequately briefed on the details of operations, including but not limited to the flight plan, safety risk involved, risk mitigation measures in place, emergency procedures, etc. They shall also be made aware of the terms and conditions of the permission issued by the CAD under section 37 of the SUA Order, and take all necessary measures to comply with such terms and conditions specified therein.		
(7) The remote pilot obtains relevant information (e.g. ground visibility, cloud base, wind speed and precipitation) from on-site measurement or the Hong Kong Observatory appropriate weather conditions are met.	☐	
(8) The SUA is not operated within a restricted flying zone or carry any dangerous goods during flight.	☐	
(9) All other applicable operating requirements to the SUA are to be complied with: i. maintaining visual line of sight, ii. maintaining the flying altitude at 300ft AGL or below iii. maintaining lateral separation with any uninvolved person and vehicle, vessel or structure not under the control of the remote pilot according to the speed of the aircraft iv. not carrying any person or animal during flight v. nothing being dropped from the aircraft vi. the remote pilot operating no more than one SUA at the same time vii. the dimension of SUA not exceeding 1m during flight, except that the longest distance between any two rotor blade tips can be up to 1.2 m.	☐	
E. Weather limitations	Will be complied with?	Alternative mitigation and supplementary information
(1) Night operations shall not be conducted if the following weather limitations cannot be met: i. Ground visibility warrants the remote pilot, VO and/or supporting crew to maintain effective monitoring and control of the SUA operations; ii. SUA is kept clear of cloud for the planned flight (i.e. not operated in or out of cloud); iii. Wind does not exceed the wind speed limitation specified by the manufacturer; iv. The remote pilot shall have practical means to monitor surface wind speed on site; and	☐	

v. The remote pilot must not launch the SUA when Rainstorm Warning, Tropical Cyclone Warning or Strong Monsoon Signal is in force.		
F. Emergency Procedures	Will be complied with?	Alternative mitigation and supplementary information
(1) The remote pilot shall determine suitable responses and fail-safe mechanism for emergency during operation, e.g. loss of command and control link, or navigational lighting.	☐	
G. Incident and Accident Reporting	Will be complied with?	Alternative mitigation and supplementary information
(1) In case of accident or incident, after reporting to the Police, the permission holder shall notify the CAD Unmanned Aircraft Office at sua@cad.gov.hk as soon as possible, if the operation has caused any damage to third party property or injury to person.	☐	
(2) Within 24 hours of any incident or accident (whether or not there was damage to third party property or injury to person), permission holder shall provide full details of the circumstances in writing to the CAD Unmanned Aircraft Office by email.	☐	
(3) Upon request from the CAD, the permission holder shall provide additional details and/or investigation findings within three (3) calendar days, in writing by email. A log of all incidents, accidents and occurrences shall be properly maintained by the permission holder and shall be made available upon the request by the CAD.	☐	
G. Pre-defined Safety Risk Assessment	Will be complied with?	Alternative mitigation and supplementary information
(1) Navigation or position lights shall be always be switched on during the flight to ensure the SUA can always be seen during night operations. If the intensity navigation or position lighting is not strong enough, additional strobe or anti-collision lighting system will be installed to ensure SUA can be seen during the whole flight.	☐	
(2) The night operations shall not proceed or shall halt immediately if the number of satellites acquired is less than 7 to reduce the operational risk in case of GPS loss.	☐	

(3) The remote pilot shall determine suitable responses and fail-safe mechanism for emergency during operation, e.g. loss of command and control link, or navigational lighting.	☐	
(4) Appropriate ground station or remote controller software shall be used to assist the remote pilot in identifying the SUA's position in real time.	☐	
(5) Operation conducted shall use Visual Observer.	☐	

Declaration and signature

I, as the applicant, declare that:

- The information given in this application is correct to the best of my knowledge and belief;
- I will ensure that the operations are compliant with CAD's requirements, conditions on the permission; and
- I am accountable for all matters relating to the application as well as coordination with CAD when needed.

_____ _____

Name of Applicant Signature of Applicant and Organisation Chop

_____

Date

Anyone, while having dealings of any kind with the Civil Aviation Department (CAD), should not offer advantage to the CAD officers, or else he may commit an offence under section 4(1) and/or section 8 of the Prevention of Bribery Ordinance (Chapter 201 of Laws of Hong Kong), and be liable to a maximum penalty of a fine of $500,000 and imprisonment for 7 years.

Personal Data Collection Statement

1. Purposes of Collection

The personal data provided by means of this form, including all the supporting documents included in the application, will be used by Civil Aviation Department for the following purposes:

a. Processing of your application in this form;
b. Carrying out relevant provisions of the Civil Aviation Ordinance (Chapter 448) and its subsidiary Orders / Regulations;
c. Assisting in the enforcement of any other Ordinances and Regulations by other Government Bureaux and Departments;
d. For communication purposes between Civil Aviation Department and yourself;
e. For validation and verification of authenticity of your supporting documents in association with the application;
f. For statistics and research purposes on the condition that the resulting statistics or results will not be made available in a form which will identify the data subjects.

It is obligatory for you to supply the personal data as required in this form. If you fail to supply the required data, we may not be able to process your application.

2. Classes of Transferees

The personal data you provided by means of this form may be disclosed to:

a. Other Government Bureaux and Departments for the purposes mentioned in paragraph 1 above;
b. Other Contracting States of the International Civil Aviation Organisation and Civil Aviation Authorities for the purpose mentioned in paragraph 1 above;
c. Other organisations or agencies for execution of their duties as required by Civil Aviation Department.

3. Access to Personal Data

You have a right of access and correction with respect to personal data as provided for in sections 18 and 22 and Principle 6 of Schedule 1 of the Personal Data (Privacy) Ordinance. Your right of access includes the right to obtain a copy of your personal data provided by this form.

4. Enquiries

Enquiries concerning the personal data collected by means of this form, including the making of access and correction, should be addressed to:

Unmanned Aircraft Office
Air Services and Safety Management Division
Civil Aviation Department Headquarters
1 Tung Fai Road
Hong Kong International Airport
Lantau, Hong Kong

Appendix B - Operations Manual for SUA Night Operations (for Advanced Operation Permission Applicant/ Holder)

The applicant may make reference to the sample of Operations Manual and incorporate into the manual specific descriptions/ policies/ procedures applicable to night operations to address any concerns and issues arose. While the following are not intended to be exhaustive or prescriptive, the applicant should give similar considerations in the Operations Manual.

A. Responsibilities and Duties

- The duties and responsibilities of the Remote Pilot, Visual Observer and/or Supporting Crew shall be detailed in the Operations Manual, including but not restricted to:

  Remote Pilot

  a) Conduct SUA flight in accordance with the procedures set out in the Operations Manual;
  b) Ensure the overall safety of the SUA operation on-site;
  c) Confirm the Visual Observer and Supporting Crew (if available) maintains currency of his/ her training and is physically fit to carry out duties as a Supporting Crew;
  d) Brief and debrief all members of the flight team and associated staff and ensure they are aware of their responsibilities and tasks for the particular SUA operation;
  e) Conduct risk assessment to identify any hazard for the operation and determine risk mitigating measures to be implemented;
  f) Conduct site and flight safety assessment in daylight hours to determine if the prevailing conditions are suitable for SUA night operations and complete the associated forms;
  g) Work out the flight details including flight time, flight duration, take-off and landing area, flight path, position of Visual Observer etc. and execute accordingly;
  h) Perform pre-flight check to ensure the SUA and the safety equipment are in good condition and functioning properly prior to take-off or launching;
  i) 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
  j) Ensure that all logs and records in relation to the operations are properly completed and signed.

  Visual Observer

  a) 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;

b) Communicate continuously and effectively with the Remote Pilot and provide sufficient collision avoidance information to the Remote Pilot; and
c) Inform the Remote Pilot when the SUA is approaching its maximum operating range limits.

Supporting Crew

a) Keep the Remote Pilot updated constantly on an independent monitor on flight parameters of the SUA including battery level and satellites tracked when the Remote Pilot is focused on keeping the SUA within Visual Line of Sight (VLOS) or manoeuvring the SUA;
b) Assist in ensuring the operation is executed according to plan such as flight path followed and image captured;
c) Maintain constant visual lookout for any uninvolved people, vehicles, vessels or structures within or getting close to the minimum lateral separation required; and
d) Alert the Remote Pilot in case of any emergencies such as battery level and satellites tracked reaching the minimum level for safe operations;

B. Qualification Requirements

- The Visual Observer and any Supporting Crew shall be competent for the SUA night operations to be conducted. They are required to complete satisfactorily internal training and assessment relevant to the duties and responsibilities and maintain currency by test flights, training flights and/ or actual SUA operations. The training programme for them shall be documented in the Operations Manual.

- All training records shall be properly kept and updated by the SUA Operator, and shall be made available in a legible format to the CAD upon request.

C. Equipment Requirements

- The SUA to be used for night operations must be equipped with appropriate navigation lighting (usually red lights on forward rotor arms and green lights on rear rotor arms). The lighting must be visible to the Remote Pilot at all times during the flight and it must be sufficient for the Remote Pilot to determine the orientation and direction of the SUA visually. If necessary, strobe or anti-collision light system will be used for operations.

- SUA equipped with obstacle avoidance function will be used for night operations whenever possible to provide an enhanced level of safety.

- Appropriate ground station or remote controller software shall be in place to assist the remote pilot in identifying the SUA's position in real time.

D. Communications

- The Remote Pilot shall consider adequate means of communication between crew members and any other relevant people when conducting operations, including any procedures that need to be implemented. Remote Pilot should also consider back up communication methods in case the primary means of communication fails.

- Communication protocols between the Remote Pilot, Visual Observer and/or Supporting Crew to communicate collision avoidance information and corresponding commands.

E. On-site Procedures and Pre-flight Checks

- Before the operation, the Remote Pilot shall conduct comprehensive flight planning (including daylight reconnaissance, site and flight safety assessment) prior to the operation to ensure compliance with all applicable statutory requirements, e.g. the flight path is so planned that the operation will be not be conducted in a congested area or within a restricted flying zone. Any hazards, restrictions and obstacles shall be identified, addressed and recorded. Arrangement of a recce flight(s) in daylight hours should be considered to assist in the site and flight safety assessment process.

- The Remote Pilot shall brief the all crew members participating in the operation, especially the Visual Observer and Supporting Crew, to ensure they are fully aware of their responsibilities and the operational task.

F. Flight Procedures

- The take-off and landing (including recovery landing) points shall be equipped with adequate lighting to provide clear visual reference, and also allow the Remote Pilot, Visual Observer and/or Supporting Crew to visually see and avoid hazards and obstacles on the ground to facilitate safe take-off and landing of the SUA.

- During night operations, the Supporting Crew shall keep the Remote Pilot updated constantly on an independent monitor on flight parameters of the SUA including battery level and satellites tracked.

- During night operations, the navigation lighting (usually red lights on forward rotor arms and green lights on rear rotor arms) of the SUA must be visible to the Remote Pilot and/or Visual Observer at all times during the flight for visual determination of SUA orientation and direction.

- If both the Remote Pilot and Visual Observer fail to visually determine the orientation and direction of the SUA, or the SUA becomes a hazard to any other aircraft, person or property, the Remote Pilot shall immediately respond in accordance with established emergency procedures to ensure the safety of operation. The relevant emergency procedures shall be documented in the operations manual.

G. Emergency Procedures

- The Remote Pilot shall determine suitable responses and fail-safe mechanism for emergency during operation, e.g. loss of command and control link, loss of navigation lighting. If the aircraft will return to the 'home' position and land automatically, considerations shall be given to possible flight path in accordance with the daylight reconnaissance, site and flight safety assessment conducted prior to the operation, such that, when such function is activated, the aircraft will not collide with obstacles. The altitude for such function shall also be deliberated for obstacle clearance and avoiding collision risk with other aircraft, in any case not above 300 feet AGL.

Appendix C – Safety Risk Assessment for Night Operations

The applicant shall identify risks specific to the proposed night operations and propose effective risk mitigation measures so that the risks are mitigated to an acceptable level. A template of risk assessment is available in the sample of Operations Manual. The following is an example of safety risk assessment for night operations and some anticipated risks to be addressed. Applicant should note that the list is not exhaustive. Any other risks associated with the proposed operation shall be identified and addressed.

Risk No.	Identified Hazard	Associated Risk (What & How)	Existing Mitigation	Current Risk Rating	Further Mitigation	Revised Risk Rating
1.	*Cannot see the SUA at night time*	*Fail to maintain VLOS with the SUA and the SUA may collide with obstacles*	*Ensure the navigation lights are on during the whole flight.*	*4C*	*Install strobe lighting system on SUA to ensure it is still visible during flight even if the SUA flies further.*	*1C*
2.	*Vision might be impaired by the light of the remote controller at night time*					
3.	*Unable to fly the SUA back easily at night time if there is any loss of GPS signal*					
4.	*No other means to locate the SUA visually*					

– END –