



CAR OPS 4A

REMOTELY PILOTED AIRCRAFT ABOVE 25 KG OPERATIONS

FOREWORD

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REVISION RECORD

LIST of EFFECTIVE PAGES



FOREWORD

1. The Civil Aviation and Maritime Navigation Authority (L'Autorità per l'Aviazione Civile e la Navigazione Marittima) of the Republic of San Marino is known in these regulations as the “Authority”
2. CAR OPS 4A addresses Remotely Piloted Aircraft (RPA) with a maximum take-off mass greater than 25 kgs and associated systems.

Note: CAR OPS 4B addresses Remotely Piloted Aircraft with a maximum take-off mass of 25 kgs or less operated within the Republic of San Marino.

3. Unless otherwise stated, the definitions and abbreviations contained in CAR DEF are applicable to these regulations.
4. The editing practices used in this document are as follows;
 - (a) ‘Shall’ is used to indicate a mandatory requirement.
 - (b) ‘Should’ is used to indicate a recommendation by the Authority and has no legal effect.
 - (c) ‘May’ is used to indicate discretion by the Authority, the industry or the applicant, as appropriate.

Note: The use of the male gender implies the female gender and vice versa.

5. Paragraphs and sub-paragraphs with new, amended and corrected text will be enclosed within square brackets until a subsequent amendment is issued.



REVISION RECORD

REVISION NO.	EFFECTIVE DATE	ENTERED BY (Hardcopy only)
Initial Issue	01 March 2016	N/A
Rev 01	01 June 2016	
Rev 02	01 July 2019	
Rev 03	01 January 2020	
Rev 04	01 January 2021	
Rev 05	01 July 2021	
Rev 06	01 January 2022	
Rev 07	01 January 2025	
2 nd Edition Initial Issue	26 November 2026	



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CHAPTER 1

GENERAL

OPS 4A.005 Applicability

- (a) OPS 4A is applicable to remotely piloted aircraft (RPA) that;
- (1) are certified under CAR 21;
 - (2) have a maximum take-off mass (MTOM) greater than 25 kg;
 - (3) hold, or required to hold, a remotely piloted aircraft system (RPAS) operator certificate (ROC) issued by the Authority; and
 - (4) are operated domestically or internationally.

Note 1: Where the Authority is stated in these regulations, it applies to the San Marino Civil Aviation Authority, as the State of Registry or State of the Operator, as applicable.

Note 2: These regulations do not currently support operations of RPA carrying persons on board.

- (b) OPS 4A applies to both aeroplane and helicopter categories that can be remotely piloted. In cases where a particular aircraft can, by design, be flown with a pilot on board or be remotely piloted, OPS 4A applies when the aircraft is being remotely piloted.
- (c) OPS 4A is applicable to the conduct of any international RPAS operation without distinction between commercial air transport and general aviation, including aerial work.
- (d) Unless otherwise stated, these provisions are applicable to both remotely piloted aeroplanes and remotely piloted helicopters without distinction between commercial air transport and general aviation, including aerial work.

Note 1: Where CAR OPS 4A applies to both remotely piloted aeroplanes and remotely piloted helicopters, the regulations refer to RPA. Where they apply to one or the other, a clear distinction is made between remotely piloted aeroplane (RPA(A)) and remotely piloted helicopter (RPA(H)).

Note 2: Some States use the term “rotorcraft” as an alternative to “helicopter”.

OPS 4A.010 Authority to Operate

(See Appendix 1 to OPS 4A.010)

(a) General operating rules

- (1) No RPA shall be flown over the territory of San Marino without special authorisation by the Authority and in accordance with the terms of such authorisation.
- (2) A RPAS, engaged in international air navigation, shall not be operated without appropriate authorisation from the State from which the take-off of the RPA is made.
- (3) A RPA shall not be operated across the territory of a State without special authorisation issued by each State in which the flight is to operate.



Note: This authorisation may be in the form of agreements between the State involved and the Authority.

- (4) A RPA shall not be operated over the high seas without prior coordination with the appropriate ATS authority.
- (5) The authorisation and coordination referred to in (2) and (3) shall be obtained prior to take-off if there is reasonable expectation, when planning the operation, that the aircraft may enter the airspace concerned.
- (6) A RPAS shall be operated in accordance with conditions specified by the Authority and the State(s) in which the flight is to operate.
- (7) Flight plans shall be submitted in accordance with CAR OPS 0 or as otherwise mandated by the State(s) in which the flight is to operate.
- (8) RPAS shall meet the performance and equipment carriage requirements for the specific airspace in which the flight is to operate.

(b) Certificates and licensing

- (1) A RPAS shall be approved, taking into account the interdependencies of the components, in accordance with OPS 4A and in a manner that is consistent with the provisions of related regulations. In addition;
 - (i) a RPA shall have a certificate of airworthiness issued in accordance CAR 21, Subpart H; and
 - (ii) the associated RPAS components specified in the type design shall be certificated and maintained in accordance with OPS 4A and in a manner that is consistent with the provisions of related airworthiness regulations.
- (2) An operator shall have a RPAS operator certificate issued in accordance with Chapter 3.
- (3) Remote pilots shall be licenced, or have their licences rendered valid, in accordance with CAR LIC, Subpart P.

(c) Request for authorisation

The request for authorisation referred to in (a)(3) above shall be made to the appropriate authorities of the State(s) in which the RPA will operate in accordance with Appendix 1 to OPS 4A.010, not less than seven days before the date of the intended flight unless otherwise specified by the State.

OPS 4A.015 Use of Alcohol and Psychoactive Substances

- (a) No person shall act as a remote pilot, flight crew member or a RPA observer;
 - (1) within 8 hours after consuming an alcoholic beverage;
 - (2) while under the influence of alcohol; or
 - (3) while using any drug that impairs the person's faculties to the extent that aviation safety or the safety of any person is endangered or likely to be endangered.



Note: Refer also to CAR OPS 0.040 on psychoactive substances.

OPS 4A.020 Reference Systems

- (a) Above ground level (AGL). This means the altitude of the aircraft expressed in metres above ground level.
- (b) Horizontal reference system. WGS-84 shall be used as the horizontal (geodetic) reference system. Reported aeronautical geographical data (indicating latitude and longitude) shall be expressed in terms of the WGS-84 geodetic reference datum.
- (b) Vertical reference system. Mean sea level (MSL) datum, which gives the relationship of gravity-related height (elevation) to the geoid shall be used as the vertical reference system except where the term above ground level (AGL) is used.
- (d) Temporal reference system. The Gregorian calendar and Coordinated Universal Time (UTC) shall be used as the temporal reference system.

OPS 4A.025 Mandatory Reporting

- (a) The registered owner shall report to the Authority and competent authorities any accident or incident which causes death or injury to a person or persons as soon as is practicable, but not later than one hour after the event.
- (b) The registered owner shall report to the Authority any accident or incident which causes loss or damage to persons or property as soon as is practicable, but not later than 24 hours after the event.
- (c) Any incident, other than an accident, associated with the operation of the RPA, which affects or could affect the safety of operation shall be reported to the Authority within 72 hours.

OPS 4A.030 Immediate Notification

- (a) A RPAS operator shall notify the Authority in writing at least 10 days before any change to the RPAS operation that has been planned in advance and that is likely to affect the accuracy of the information previously submitted.
- (b) A RPAS operator shall give to the Authority and an ATS, immediate notice giving details of any of the following circumstances of which the operator has knowledge;
 - (1) operations not in compliance with the operations specifications or any authorisation;
 - (2) penetration of any area for which approval has not been granted; and
 - (3) any condition that could affect safety on the ground or airborne.

OPS 4A.035 Radio Spectrum Requirements

- (a) A RPAS shall only utilise radio command and control frequencies acceptable to the Authority.
- (b) The Authority may ground any RPA where its radio command and control frequencies are determined to cause interference to other frequencies or public communications systems.

**OPS 4A.040 Abbreviations**

In addition to the abbreviations stated in CAR DEF - Definitions, the following abbreviations apply to the use of remotely piloted aircraft.

ACAS	-	Airborne Collision Avoidance System
ADS-B	-	Automatic Dependent Surveillance - Broadcast
AGL	-	Above ground level
AIP	-	Aeronautical Information Publication
ATC	-	Air Traffic Control
ATS	-	Air Traffic Services
ATM	-	Air Traffic Management
ATO	-	Approved Training Organisation
ATS	-	Air Traffic Services
BVLOS	-	Beyond Visual Line-of- Sight
C2	-	Command & Control
C2CSP	-	C2 Link Communications Service Provider
CDL	-	Configuration Deviation List
COMAT	-	Operator Material
CNS	-	Communication, Navigation and Surveillance
DAA	-	Detect and Avoid
ELT	-	Emergency Locator Transmitter
ERP	-	Emergency Response Plan
FDAP	-	Flight Data Analysis Programme
FRMS	-	Fatigue Risk Management System
GPWS	-	Ground Proximity Warning System
IFR	-	Instrument Flight Rules
IMC	-	Instrument Meteorological Conditions
MCM	-	Maintenance Control Manual
MCTOM	-	Maximum Certified Take-off Mass
MEL	-	Minimum Equipment List
MMEL	-	Master Minimum Equipment List
MSL	-	Mean Sea level
NOTOC	-	Notice to Captain
PBN	-	Performance Based Navigation
PIC	-	Pilot-in-Command
QoSD	-	Quality of Service Delivered
QoSE	-	Quality of Service Experienced
QoSR	-	Quality of Service Required
RCP	-	Required Communications Performance
RFSS	-	Rescue and Firefighting Service
RLOS	-	Radio Line of Sight
ROC	-	RPAS Operating Certificate
RPA	-	Remotely Piloted Aircraft
RPA(A)	-	Remotely Piloted Aircraft (Aeroplane)
RPA(As)	-	Remotely Piloted Aircraft (Airship)
RPA(B)	-	Remotely Piloted Aircraft (Balloon)
RPA(H)	-	Remotely Piloted Aircraft (Helicopter)
RPA-RS	-	Remote Piloted Aircraft-Recorder System
RPAS	-	Remotely Piloted Aircraft System
RPAS-RS	-	Remote Piloted Aircraft System-Recorder System
RPS-RS	-	Remote Pilot Station-Recorder System
RPL	-	Remote Pilot Licence



RPL(A)	-	Remote Pilot Licence (Aeroplane)
RPL(As)	-	Remote Pilot Licence (Airship)
RPL(H)	-	Remote Pilot Licence (Helicopter)
RPS	-	Remote Pilot Station
RPS-RS	-	Remote Pilot Station-Recorder System
RVR	-	Runway Visual Range
RVSM	-	Reduced Vertical Separation Minimum
SLA	-	Service Level Agreement
SMS	-	Safety Management System
SSR	-	Secondary Surveillance Radar
VLOS	-	Visual Line of Sight
VMC	-	Visual Meteorological Conditions

**Appendix 1 to OPS 4A.010****Request for Authorisation to Fly over a State
(See OPS 4A.010)**

1. The request for authorisation for a RPA to fly over a State, shall unless otherwise specified by the State(s), include the following;
 - (a) name and contact information of the operator;
 - (b) RPA characteristics (type of aircraft, maximum certificated take-off mass, number of engines, wing span);
 - (c) copy of certificate of registration;
 - (d) aircraft identification to be used in radiotelephony, if applicable;
 - (e) copy of the certificate of airworthiness;
 - (f) copy of the RPAS operator certificate;
 - (g) copy of the remote pilot(s) licence;
 - (h) copy of the aircraft radio station licence, if applicable;
 - (i) description of the intended operation (to include type of operation or purpose), flight rules, beyond visual line-of-sight (BVLOS); operation visual line-of-sight (VLOS) operation if applicable, date of intended flight(s), point of departure, destination, cruising speed(s), cruising level(s), route to be followed, duration/frequency of flight;
 - (j) take-off and landing requirements;
 - (k) RPA performance characteristics, including;
 - (1) operating speeds;
 - (2) typical and maximum climb rates;
 - (3) typical and maximum descent rates;
 - (4) typical and maximum turn rates;
 - (5) other relevant performance data (e.g. limitations regarding wind, icing, precipitation); and
 - (6) maximum aircraft endurance;
 - (l) communications, navigation and surveillance capabilities;
 - (1) aeronautical safety communications frequencies and equipment, including;
 - (i) ATC communications, including any alternate means of communication;



- (ii) C2 Link(s) including performance parameters and designated operational coverage area;
 - (iii) communications between remote pilot and RPA observer, if applicable;
 - (2) navigation equipment; and
 - (3) surveillance equipment (e.g. SSR transponder, ADS-B out);
 - (m) detect and avoid capabilities;
 - (n) emergency procedures, including;
 - (1) communications failure with ATC;
 - (2) C2 Link(s) failure; and
 - (3) remote pilot/RPA observer communications failure, if applicable;
 - (o) number and location of remote pilot stations as well as handover procedures between remote pilot stations, if applicable;
 - (p) document attesting noise certification that is consistent with the provisions of ICAO Annex 16, Volume 1, if applicable;
 - (q) confirmation of compliance with national security standards in a manner that is consistent with the provisions of ICAO Annex 17, to include security measures relevant to the RPAS operation, as appropriate;
 - (r) payload information/description; and
 - (s) proof of adequate insurance/liability coverage.
2. When certificates or other documents identified in paragraph 1. above are issued in a language other than English, an English translation shall be included.
3. After authorisation has been obtained from the appropriate State(s), air traffic services notification and coordination shall be completed in accordance with the requirements of the State(s).
- Note: A request for authorisation does not satisfy the requirement to file a flight plan with the air traffic services units.*
4. Changes to the authorisation shall be submitted for consideration to the appropriate State(s). If the changes are approved, all affected authorities shall be notified by the operator.
5. In the event of a flight cancellation, the operator or remote pilot shall notify all appropriate authorities as soon as possible.



CHAPTER 2

OPERATOR CERTIFICATION AND SUPERVISION

OPS 4A.045 General Rules for RPAS Operator Certification

- (a) The Authority shall establish a system for both the certification and the continued surveillance of the operator to ensure that the required standards of operations established in these regulations are maintained.

Note: The scope of certification and supervision includes RPA operations and use of one or more RPS located at one or more sites.

- (b) An operator shall not operate a remotely piloted aircraft otherwise than under, and in accordance with, the terms and conditions of a RPAS Operator Certificate (ROC).

Note: Unless otherwise specified, reference to a ROC includes the operations specifications associated with the ROC.

- (c) An applicant for a ROC, or variation of a ROC, shall allow the Authority to examine all safety aspects of the proposed operation.
- (d) An applicant for a ROC, and for the continued validity of a ROC, shall satisfy the Authority that he/she is able to conduct safe operations by the RPAS operator demonstrating an adequate organisation, method of control and supervision of flight operations, training programme as well as ground handling and maintenance arrangements consistent with the nature and extent of the operations specified and commensurate with the size, structure and complexity of the organisation.
- (e) An operator shall grant the Authority access to his/her organisation, remotely piloted aircraft, remote pilot station, and shall ensure that, with respect to maintenance, access is granted to any associated maintenance organisation.
- (f) The operator shall have nominated an Accountable Manager acceptable to the Authority who has corporate authority for ensuring that all operations and maintenance activities can be financed and carried out to the standard required by the Authority.
- (g) The operator shall have nominated persons, accountable to the Accountable Manager, with the responsibility for ensuring the operator remains in compliance with these regulations.
- (h) An operator will not be granted a ROC, or a variation to a ROC, and that ROC will not remain valid unless the Authority is satisfied that the operator can comply with these regulations.

OPS 4A.050 Application Requirements

- (a) Unless otherwise agreed, the application for an initial issue, variation and renewal of a ROC shall be submitted at least 60 days before the date of intended operation
- (b) An operator shall ensure that the following information is included in the initial application for a ROC and, when applicable, any variation or renewal applied for;
- (1) the official name and business name, address and mailing address of the applicant;
 - (2) a description of the proposed operation including area of operation;



- (3) a description of the management organisation, including the name of the Accountable Manager and the names of nominated personnel responsible for flight operations, the maintenance system, crew training and ground operations together with their qualifications and experience;
 - (4) Operations Manual;
 - (5) Safety Management System Manual;
 - (6) Maintenance Control Manual (MCM)
 - (7) Technical Log for RPA and RPS;
 - (8) Minimum Equipment List for RPA and RPS, if applicable;
 - (9) Maintenance Programme; and
 - (10) Contractual agreements with any service providers involved in the operation.
- (c) The operator shall notify the Authority as soon as practicable of any changes to the above information submitted.

OPS 4A.055 Recognition of ROC

A ROC issued by an ICAO Contracting State shall be recognised provided that the requirements under which the certificate was issued are consistent with ICAO Annex 6, Part IV.

OPS 4A.060 Contents of the ROC

- (a) The RPAS operator certificate and its associated operations specifications shall define the operations for which an operator is authorised.
- (b) The ROC shall contain the information in Appendix 6.
- (c) The operations specifications associated with the RPAS operator certificate shall contain the information in Appendix 6.



CHAPTER 3

GENERAL AND OPERATOR RESPONSIBILITIES

OPS 4A.065 Compliance with Laws, Regulations and Procedures

- (a) The operator shall ensure that all those involved in the RPAS operation know that they shall comply with the laws, regulations and procedures of those States in which;
- (1) the RPA is being operated; and
 - (2) the RPS are located.

Note: For operations over the high seas, CAR OPS 0 applies, without exception.

- (b) The operator shall ensure that all remote pilots are familiar with the laws, regulations and procedures, pertinent to the performance of their duties, prescribed for the areas to be traversed, the aerodromes to be used and the air navigation facilities relating thereto.
- (c) The operator shall ensure that other members of the remote flight crew are familiar with such of these laws, regulations and procedures as are pertinent to the performance of their respective duties in the operation of the RPAS.
- (d) The operator or a designated representative shall have responsibility for operational control.
- (e) Responsibility for operational control shall be delegated only to the remote pilot-in-command and to a flight operations officer/flight dispatcher if the operator's approved method of control and supervision of flight operations requires the use of flight operations officer/flight dispatcher personnel.
- (f) If an emergency situation, which endangers the safety of the RPA or persons becomes known first to the flight operations officer/flight dispatcher, action by that person in accordance with OPS 4A.360 shall include, where necessary, notification to the appropriate authorities of the nature of the situation without delay, and requests for assistance if required.
- (g) If an emergency situation, which endangers the safety of the RPA or persons necessitates the taking of action which involves a violation of local regulations or procedures, the remote pilot-in-command shall notify the appropriate authority without delay. If required by the State in which the incident occurs, the remote pilot-in-command shall submit a report on any such violation to the appropriate authority of such State; in that event, the remote pilot-in-command shall also submit a copy of it to the Authority and to the State of the RPS service provider, if different. Such reports shall be submitted as soon as possible and normally within ten days.
- (h) Operators shall ensure that remote pilots-in-command have available at the RPS all the essential information concerning the search and rescue services in the area over which the RPA will be flown.

Note: This information may be made available to the remote pilot by means of the operations manual or such other means as is considered appropriate.

- (i) Operators shall ensure that remote flight crew members demonstrate the ability to speak and understand the language used for radiotelephony communications as specified in ICAO Annex 1.

**OPS 4A.070 Compliance by a Foreign Operator with Laws, Regulations and Procedures**

- (a) When the Authority identifies a case of non-compliance or suspected non-compliance of a foreign operator with laws, regulations and procedures applicable within San Marino territory, or a similar serious safety issue with that operator, the Authority shall immediately notify the operator and, if the issue warrants it, the Authority. Where the Authority and the State of Registry are different, such notification shall also be made to the State of Registry, if the issue falls within the responsibilities of that State and warrants a notification.
- (b) In the case of notification to States as specified in (a), if the issue and its resolution warrant it, the Authority shall engage in consultations with the Authority and the State of Registry, as applicable, concerning the safety standards maintained by the operator.

Note: RPAS operations may be conducted in more than one State concurrently, as the RPA may be operating in one State while the RPS is in another State.

OPS 4A.075 Safety Management

- (a) The operator shall implement a safety management system (SMS), acceptable to the Authority, that incorporates the framework and principles defined in CAR SMS, Chapter 5 and Appendix 3, and in this Chapter.
- (b) The operator of a RPAS should establish and maintain a flight data analysis programme (FDAP) as part of its safety management system, which includes the flight data, including C2 Link data, required to be recorded at the RPS, the RPA and any other data designated by the Authority.

Note: The operator may contract the operation of a FDAP to another party while retaining overall responsibility for the maintenance of such a programme.

- (c) Where an FDAP is established, it shall contain adequate safeguards to protect the source(s) of the data in accordance with Appendix 3 to CAR SMS.
- (d) The Authority shall not allow the use of audio or images of persons by a RPA recorder system (RPA-RS) or a RPS recorder systems (RPS-RS) for purposes other than the investigation of an accident or incident as per ICAO Annex 13, except where the recordings or transcripts are;
 - (1) related to a safety-related event identified in the context of a safety management system; are restricted to the relevant portions of a de-identified transcript of the recording, and are subject to the protections accorded by CAR SMS;
 - (2) sought for use in criminal proceedings not related to an event involving an accident or incident investigation; and are subject to the protections accorded by CAR SMS; or
 - (3) used for inspections of recorder systems as provided in Section 6 of Appendix 8.

Note: Provisions on the protection of safety data, safety information and related sources are contained in Appendix 3 to CAR SMS. When an investigation under ICAO Annex 13 is instituted, investigation records are subject to the protections accorded by ICAO Annex 13.

- (e) The Authority shall not allow the use of recordings made by RPA-RS and RPS-RS and that are not addressed by (d), as well as transcripts of such recordings, for purposes other than the investigation of an accident or incident as per ICAO Annex 13, except where the recordings or transcripts are subject to the protections accorded by CAR SMS and are;



- (1) used by the operator for airworthiness or maintenance purposes;
 - (2) used by the operator in the operation of a flight data analysis programme;
 - (3) sought for use in proceedings not related to an event involving an accident or incident investigation;
 - (4) de-identified; or
 - (5) disclosed under secure procedures.
- (f) The operator shall establish a flight safety documents system, for the use and guidance of operational personnel, as part of its safety management system.

OPS 4A.080 Registration

RPA used for international operations shall be registered in accordance with the provisions in CAR GEN.

OPS 4A.085 RPS Identification

The operator shall include within the operations manual the following details for all RPS that it operates;

- (a) the individual or legal entity holding ownership of each RPS;
- (b) the RPS manufacturer and manufacturer's designation for the RPS;
- (c) the serial number of each RPS;
- (d) indication of the type, model and variant of each RPA a RPS is capable of controlling; and
- (e) other relevant data as required by applicable legislation.

OPS 4A.090 Safety-Critical Services

- (a) The operator shall verify that the provider of safety-critical services has an organisational structure, documented procedures, resources and personnel sufficient to ensure the safe provision of services.
- (b) Safety-critical services shall include, but are not limited to;
 - (1) provision of geographical data and airspace limitations;
 - (2) collection and forwarding of occurrence data;
 - (3) the training of remote pilots;
 - (4) communication services supporting the C2 Link;
 - (5) provision of services through RPS located anywhere in the world; and
 - (6) provision of services related to flight planning and management including related safety risk assessments.

**OPS 4A.095 Safe Operation of the C2 Link**

- (a) The Authority shall be responsible for the oversight of the C2 Link service provision, whether any of the C2 Link components are under the control of the RPAS operator or a C2 Link communications service provider (C2CSP).

Note: Such oversight of the C2 Link service provision may be conducted as part of the Authority's oversight of the RPAS Operator safety management system.

- (b) When the operator exercises direct control over the entire C2 Link(s), the operator shall be responsible for the safe operation of all C2 Link components. Such responsibilities shall be detailed in a service level agreement (SLA) internal to the operator.
- (c) When a portion of, or all of, the C2 Link(s) is under the operational control of a C2CSP, the operator shall establish an SLA with the C2CSP prior to commencing operations.
- (d) The SLA shall be approved by the Authority.
- (e) The SLA shall contain at least;
- (1) legal identification of the party(ies);
 - (2) scope of the provided service, including hours of service and service area;
 - (3) performance requirements of the C2 Link provision, including the quality of service required (QoS) which is commensurate with the C2 Link specification required, under normal conditions, for the operator's intended operations;
 - (4) security measures and management, including security requirements for the C2 Link provision;
 - (5) procedures for planned outages and contingencies, including reporting requirements;
 - (6) safety management responsibilities and processes related to safety risk management and safety assurance, including safety risk assessment and mitigation, safety performance monitoring and measurement, safety reporting, and safety analysis;
 - (7) arrangements to facilitate oversight of the C2 Link service provision by the Authority; and
 - (8) the C2CSP emergency response plan (ERP) including how they would address service losses and how they would be restored.
- (f) In exercising its oversight function of the C2 Link service provision in accordance with (a), the Authority shall;
- (1) verify that the C2 Link service is to be provided by an authorised C2CSP;

Note: Such an authorisation or approval would normally be issued by the State in which the C2CSP is located.

- (2) ensure that the operator has established and documented monitoring processes to ensure that the C2 Link service provision meets the established requirements, including C2 Link quality of service required (QoS) and security;



- (3) ensure that the operator has established and documented monitoring processes to raise findings, and to request and monitor corrective actions related to the C2 Link service provision;
 - (4) ensure that the operator takes appropriate measures, when necessary, to resolve C2 Link service provision findings identified in application of the continuous monitoring processes; and
 - (5) approve, in accordance with its national regulations, the use of a C2CSP which has been authorised as per (1) above.
- (g) The C2CSP shall establish and document processes to perform C2CSP monitoring of the QoSD as part of their routine operations, with the objective of ensuring that the C2 Link service provision meets the applicable requirements, including the C2 Link QoS SR specified in the SLA.
- (h) The operator shall be responsible for monitoring that the C2 Link service provision QoSD meets the QoS SR, including its security, and shall;
- (1) document any observed anomalies; and
 - (2) report any observed anomalies to the C2CSP, in accordance with the SLA.
- (i) The operator shall notify the Authority of;
- (1) all C2 Link provision degradations with regards to the SLA that occur during operations; and
 - (2) degradations that cannot be resolved by direct interaction between the operator and the C2CSP, when the C2CSP is not the operator.

OPS 4A.100 Safe Operation of the RPS

- (a) The operator shall be responsible for the safe operation of all RPS involved in the operation.
- (b) Each RPS used shall be installed at the intended operational location by personnel who have the required level of expertise and competence for the task, as determined by the type certificate holder.
- (c) During installation of the RPS, the installer shall verify that it meets applicable airworthiness and operational requirements and that it provides proper connection with the specified RPA type(s).
- (d) When one or more of the RPS involved in the operation are under the control of a service provider, this service provider shall be under the safety oversight of the Authority in conjunction with the State of the RPS service provider, if different.
- (e) When one or more of the RPS involved in the operation are under the control of a service provider, this service provider shall only allocate tasks to;
 - (1) remote flight crews which are properly trained and competent;
 - (2) remote pilots holding a valid remote pilot licence (RPL) issued or rendered valid by the Authority, complemented by appropriate ratings; and
 - (3) remote flight crews which are medically fit.



- (f) The safety, security and performance of the RPS service provided shall be acceptable to the Authority and to the State of the RPS service provider.
- (g) If the RPS is operated by a RPS service provider, the safety and security aspects of the RPS shall be addressed in an SLA between the RPAS operator and the RPS service provider.
- (h) Any SLA with a RPS service provider shall include the continuing airworthiness records required by OPS 4A.575.



CHAPTER 4

FLIGHT OPERATIONS

OPS 4A.105 Operating Facilities

- (a) The operator shall ensure that a flight will not be commenced unless it has been ascertained by every reasonable means available that the ground and/or water facilities including communication facilities and navigation aids available and directly required for the safe operation of the RPAS are adequate for the type of operation under which the flight is to be conducted and are adequately operated for this purpose.

Note: "Reasonable means" is intended to denote the use of information available to the operator either through official information published by the aeronautical information services or readily obtainable from other sources.

- (b) The operator shall ensure that any inadequacy of facilities observed in the course of operations is reported to the authority responsible for the facilities, without undue delay.
- (c) The operator shall, as part of its safety management system, assess the level of rescue and firefighting service (RFFS) protection available at any aerodrome intended to be specified in the operational flight plan in order to ensure that an acceptable level of protection is available for the RPA intended to be used.
- (d) Information related to the level of RFFS protection that is deemed acceptable by the operator shall be contained in the operations manual.

OPS 4A.110 Operational Certification and Supervision

- (a) The operator shall not engage in domestic or international RPAS operations unless in possession of a valid RPAS operator certificate (ROC) issued by the Authority.
- (b) The ROC shall authorise the operator to conduct RPAS operations in accordance with the operations specifications.
- (c) The issue of a ROC by the Authority shall be dependent upon the operator demonstrating an adequate organisation, a method of identifying, assessing, and mitigating the risks associated with flight operations, training, ground handling and maintenance requirements, consistent with the nature and extent of the operations specified.
- (d) For operators that also hold an Air Operator Certificate issued under CAR OPS 1 or OPS 3, the Authority should define an integrated surveillance schedule to include all applicable audit items. In order to avoid duplication of audits, credit may be granted for specific audit items already completed during the AOC surveillance planning cycle, subject to four conditions;
- (1) the specific audit item should be the same for all certificates under consideration;
 - (2) there should be satisfactory evidence on record that such specific audit items were carried out and that all corrective actions have been implemented to the satisfaction of the Authority;
 - (3) the Authority should be satisfied that there is no evidence that standards have deteriorated in respect of those specific audit items being granted a credit;



- (4) the interval between two audits for the specific item being granted a credit should not exceed the applicable surveillance planning cycle.
- (e) The continued validity of a ROC shall be subject to the operator;
 - (1) maintaining the requirements of (c) above under the supervision of the Authority, and
 - (2) granting access to any facilities, documents, records and equipment as required for the Authority to perform oversight.
- (f) The ROC shall contain at least the following information and follow the layout of Appendix 6;
 - (1) the Authority and the issuing authority;
 - (2) the ROC number and its expiration date;
 - (3) the operator's name, trading name (if different) and address of the principal place of business;
 - (4) the date of issue and the name, signature and title of the authority representative; and
 - (5) the location, in a controlled document, where the contact details of operational management can be found. With regards to the controlled document;
 - (i) an electronic copy shall be carried on the RPA; and
 - (ii) an electronic or paper copy shall be easily accessible at each RPS.
- (g) The operations specifications associated with the ROC shall follow the layout of and contain at least the information listed in Appendix 6.
- (h) The format (e.g. paper or electronic) of the ROC document shall be acceptable to all States in which the RPA is to be operated.
- (i) The Authority should grant operators that are approved to conduct operations under an AOC and a ROC, a single 'merged' certificate listing the privileges in the operations specification attached to that single certificate.

Note: The merged certificate may encompass the privileges of an AOC based on CAR OPS 1 or OPS 3 and the privileges of a ROC based on OPS 4A.

- (j) The operator shall ensure that the accountable executive has the authority to ensure that all activities can be financed and carried out in accordance with the ROC.

Note: The accountable executive is responsible for the implementation and maintenance of an effective safety management system.

- (k) The operator shall nominate a person or group of persons whose management responsibilities include ensuring that the operator remains in compliance with the ROC, laws, regulations and procedures of those States in which operations are conducted.

Note: Areas for which a person or persons are nominated typically include; RPAS operations, continuing airworthiness, crew training, and safety management.



- (l) The application for a ROC shall be made to the Authority.
- (m) The Authority shall establish a system for both the certification and the continued surveillance of the operator in accordance with Appendix 5 and Appendix 1 to CAR SMS to ensure that the required standards of operations are maintained.
- (n) The Authority shall ensure that the operator's actions are in compliance with the approvals and limitations established under CAR OPS 4A.

OPS 4A.115 Contracted Services

- (a) When the operator contracts any safety or security related services in support of its operations to a third party that is not certified by a State to carry out such an activity, the contracted third party shall comply with all of the RPAS operator's procedures, including those for safety and security management, as approved by the Authority.
- (b) The operator shall ensure that the authorities of the State where the contracted services are provided are given access to the premises, facilities, equipment and documents of the contracted organisation to the extent required for determining continued compliance with the applicable regulations specified in OPS 4A and CAR SMS.
- (c) The operator shall ensure that contracted service providers grant access to the premises, facilities, equipment and documents of the contracted organisation, to the authorities of the State where the contracted services are provided, to the extent required for determining continued compliance with the applicable regulations specified in OPS 4A and CAR SMS.

OPS 4A.120 Surveillance of Operations Conducted by a Foreign Operator

- (a) The Authority shall recognise as valid a ROC issued by a Contracting State, provided that the requirements under which the certificate was issued are at least equal to the applicable regulations specified in OPS 4A and CAR SMS.
- (b) The Authority shall establish a programme with procedures for the surveillance of RPAS operations in San Marino conducted by a foreign operator and for taking appropriate action when necessary to preserve safety.
- (c) The operator shall meet and maintain the requirements established by the States in which the operations are conducted.
- (d) If the operator intends to have an operating base from which operational control is exercised in a State other than San Marino, the operator shall notify the State in which the operating base will be located.

Note 1: An operating base is normally the location where personnel involved in the operation of the RPAS work and the records associated with the operation are located.

Note 2: Additional approvals or authorisations may be required from the State in which the operating base will be located.

**OPS 4A.125 Operations Manual**

- (a) The operator shall provide, for the use and guidance of operations personnel concerned, an operations manual in accordance with Appendix 2. The operations manual shall be amended or revised as is necessary to ensure that the information contained therein is kept up to date. All such amendments or revisions shall be issued to all personnel that are required to use this manual.
- (b) The operator shall provide a copy of the operations manual to the Authority, together with all amendments and/or revisions, for review and approval. The operator shall incorporate in the operations manual such mandatory material as the Authority may require.

OPS 4A.130 Operating Instructions — General

- (a) The operator shall ensure that all operations personnel are properly instructed in their particular duties and responsibilities and the relationship of such duties to the operation as a whole.
- (b) A RPA shall not be taxied on the movement area of an aerodrome unless the person at the controls;
 - (1) has been duly authorised by the operator or a designated agent;
 - (2) is fully competent to taxi the RPA;
 - (3) is qualified to use the radiotelephone; and
 - (4) has received instruction from a competent person in respect of aerodrome layout, routes, signs, marking, lights, air traffic control (ATC) instructions, phraseology and procedures, and is able to conform to the operational standards required for safe movement at the aerodrome.
- (c) The operator should issue operating instructions and provide information on RPA climb performance with all engines operating to enable the remote pilot-in-command to determine the climb gradient that can be achieved during the departure phase for the existing take-off conditions and intended take-off technique. This information should be included in the operations manual.

OPS 4A.135 In-flight Simulation of Abnormal and Emergency Situations

- (a) The operator shall ensure that when cargo is being carried, no emergency or abnormal situations are simulated.
- (b) The operator shall ensure that in-flight training of simulated emergency and abnormal situations is only conducted following careful consideration and mitigation of the risks to third parties.

OPS 4A.140 Checklists

- (a) The checklists provided in accordance with OPS 4A.400(c) shall be used by remote flight crews prior to, during and after all phases of operations, and in emergencies, to ensure compliance with the operating procedures contained in the flight manual or other documents associated with the certificate of airworthiness and otherwise in the operations manual.
- (b) The design and utilisation of checklists shall observe Human Factors principles.

**OPS 4A.145 Minimum flight altitudes**

- (a) The operator shall be permitted to establish minimum flight altitudes for those routes flown for which minimum flight altitudes have been established by the State being overflown or the responsible State, provided that they shall not be less than those established by that State.
- (b) The operator shall specify the method by which it is intended to determine minimum flight altitudes for operations conducted over routes for which minimum flight altitudes have not been established by the State being overflown or the responsible State, and shall include this method in the operations manual. The minimum flight altitudes determined in accordance with the above method shall not be lower than specified in CAR OPS 0.
- (c) The method for establishing the minimum flight altitudes should be approved by the Authority.
- (d) The Authority should approve such method only after careful consideration of the probable effects of the following factors on the safety of the operation in question;
 - (1) the accuracy and reliability with which the position of the RPA can be determined;
 - (2) the inaccuracies in the indications of the altimeters used;
 - (3) the characteristics of the terrain (e.g. sudden changes in the elevation);
 - (4) the probability of encountering unfavourable meteorological conditions (e.g. severe turbulence and descending air currents);
 - (5) possible inaccuracies in aeronautical charts; and
 - (6) airspace restrictions.

OPS 4A.150 Aerodrome Operating Minima

- (a) The Authority shall require that the operator establish aerodrome operating minima for each aerodrome to be used in operations and shall approve the method of determination of such minima. Such minima shall not be lower than any that may be established for such aerodromes by the State of the Aerodrome, except when specifically approved by that State for RPAS operations.

Note: This does not require the State of the Aerodrome to establish aerodrome operating minima.

- (b) The Authority shall require that in establishing the aerodrome operating minima, which will apply to any RPAS operation, the operator shall take full account of;
 - (1) the type, performance and handling characteristics of the RPA and any conditions or limitations stated in the flight manual;
 - (2) the composition of the remote flight crew, their competence and experience;
 - (3) the dimensions and characteristics of the runways, heliports or landing location, which may be selected for use;
 - (4) the adequacy and performance of the approach and automatic landing capabilities of the RPAS;



- (5) the equipment available to the remote pilot-in-command for the purpose of navigation and/or control of the flight path during the approach to landing and the missed approach;
 - (6) the obstacles in the approach and missed approach areas and the obstacle clearance altitude/height for the instrument approach procedures;
 - (7) the means used to determine and report meteorological conditions;
 - (8) the obstacles in the climb-out areas and necessary clearance margins;
 - (9) the conditions prescribed in the operations specifications; and
 - (10) any minima that may be promulgated by the State of the Aerodrome.
- (c) The Authority shall issue a specific approval for operations that involve the use of an automatic landing capability, irrespective of the prevailing weather conditions.
- (d) For landing in low visibility, if the design of the RPAS enables this to be conducted visually, the Authority shall issue a specific approval for instrument approach operations in low visibility which shall only be conducted when RVR information is provided.

Note: In this case, “visually” can refer to a VLOS operation or any synthetic/camera based solution which enables the remote pilot to monitor and correct the RPA’s track along the ground.

- (e) The Authority shall issue a specific approval for operations that involve the use of an automatic take-off capability, irrespective of the prevailing weather conditions.
- (f) For take-off in low visibility, if the design of the RPAS enables this to be conducted visually, the Authority shall issue a specific approval for the minimum take-off RVR.

Note 1: In this case, ‘visually’ can refer to a VLOS operation or any synthetic/camera based solution which enables the remote pilot to monitor and correct the RPA’s track along the ground.

Note 2: In general, visibility for take-off is defined in terms of RVR. An equivalent horizontal visibility may also be used.

- (g) The operating minima for 3D instrument approach RPAS operations using instrument approach procedures where the landing is conducted visually, shall be determined by establishing a decision altitude (DA) or decision height (DH) and the minimum visibility or RVR.

Note: In this case, “visually” can refer to a VLOS operation or any synthetic/camera based solution which enables the remote pilot to monitor and correct the RPA’s track when below the DA or DH.

OPS 4A.155 Threshold Crossing Height for Automatic Landing/3D Instrument Approach

The operator shall establish operational procedures designed to ensure that a RPA being used to conduct automatic landings or 3D instrument approach operations crosses the threshold by a safe margin, with the RPA in the landing configuration and attitude.

**OPS 4A.160 Fuel and Oil Records**

Note: The term “fuel” is intended to include all sources of energy, to include (but not limited to) petroleum based, solar, battery or any future source that provides energy to the RPA.

- (a) The operator shall maintain fuel records to enable the Authority to ascertain that, for each flight, the requirements of OPS 4A.205 have been complied with.
- (b) If an engine relies on oil for lubrication, the operator shall maintain oil records to enable the Authority to ascertain that trends for oil consumption are such that a RPA has sufficient oil to complete each flight.
- (c) Fuel and oil records shall be retained by the operator for a period of three months following the conclusion of the flight.

OPS 4A.165 Remote Pilot-In-Command

- (a) For each flight, the operator shall designate a remote pilot to act as remote pilot-in-command.
- (b) The operator shall only designate one remote pilot to act as remote pilot-in-command for a RPA, at any given time.
- (c) The operator shall only permit the remote pilot-in-command to control one RPA, at any given time.
- (d) The operator may designate more than one remote pilot-in-command for a RPA over the course of a RPAS flight.
- (e) The remote pilot-in-command responsibilities should be transferred to the remote pilot-in-command taking control of the RPA when conducting a RPS handover.

Note 1: There may be multiple changes of the individual designated as remote pilot-in-command during the flight of a RPA.

Note 2: Provisions regarding handovers and the transfer of control between remote pilots at a single RPS are available OPS 4A.290 and OPS 4A.295.

- (f) In the event that the remote pilot-in-command is incapacitated during the flight, the operator should designate a substitute remote pilot to act as remote pilot-in-command.

OPS 4A.170 Passengers

Reserved for future use.

Flight Preparation

Note: Flight Preparation includes the requirements of OPS 4A.175 to OPS 4A.225 inclusive.

OPS 4A.175 General

- (a) A flight shall not be commenced until flight preparation forms have been completed certifying that the remote pilot-in-command is satisfied that;



- (1) the RPA is airworthy and the appropriate certificates (i.e. airworthiness, registration) are on board the RPA;
- (2) the instruments and equipment installed in the RPAS are appropriate, taking into account the expected flight conditions and airspace requirements;
- (3) the RPS(s) used for the flight is (are) serviceable and compatible with the RPA used;
- (4) a C2 Link(s) is (are) expected to be available for the duration of the flight and meets the performance criteria;
- (5) the C2 Link QoS for each phase of flight is described in flight documents and is provided to the remote pilot by the operator.

Note: The service level agreement between the RPAS operator and the C2CSP describes the C2 Link QoS for each phase of the flight.

- (6) a release to service has been issued in respect of the RPA;
- (7) the mass of the RPA and centre of gravity location are such that the flight can be conducted safely, taking into account the flight conditions expected;
- (8) any load carried is properly distributed and safely secured;
- (9) the RPA operating limitations, contained in the flight manual, or its equivalent, will not be exceeded;
- (10) OPS 4A.180 requirements, relating to operational flight planning, have been complied with; and
- (11) a special authorisation from the Authority and States being overflown, if applicable, has been obtained in accordance with OPS 4A.010.

Note: These responsibilities above apply to the first remote pilot-in-command responsible for the flight of the RPA.

- (b) Completed flight preparation forms shall be kept by the operator for a period of three months following the conclusion of the flight.

OPS 4A.180 Operational Flight Planning

- (a) An operational flight plan shall be completed for every intended flight. The operational flight plan shall be approved and signed by the first remote pilot-in-command responsible for the flight of the RPA and, where applicable, signed by the flight operations officer/flight dispatcher, and a copy shall be filed with the operator or a designated agent, or, if these procedures are not possible, it shall be left with the aerodrome authority or on record in a suitable place at the point of departure.

Note: The duties of a flight operations officer/flight dispatcher are contained OPS 4A.350.

- (b) Whenever there is a change of the remote pilot-in-command, the remote pilot-in-command taking control of the RPA shall approve the operational flight plan before accepting command for the subsequent segments of the flight.



Note: Procedures for changing the remote pilot-in-command can be found in OPS 4A.290 and OPS 4A.295.

- (c) The operations manual shall describe the content and use of the operational flight plan.
- (d) The approval(s) of the operational flight plan shall be recorded in a manner acceptable to the Authority and retained for a period of three months following the conclusion of the flight.
- (e) The operator shall specify flight planning procedures to provide for the safe conduct of the flight based on considerations of RPAS performance, other operating limitations and relevant expected conditions on the route to be followed and at the aerodromes, including alternate aerodromes, concerned.
- (f) Flight planning procedures, including considerations for inflight emergency situations, shall be included in the operations manual.
- (g) The operator shall ensure that the remote pilot is provided with information regarding factors that could affect the quality of the C2 Link for each segment of the operation, and appropriate mitigations to minimise the impact of a degraded C2 Link.
- (h) Operational flight planning should include specific needs for RPAS such as the number of remote pilots and crew duty time planning for long endurance missions. The future availability of RPS may also need to be considered. Such requirements may not be available at the time of departure but may be necessary for operation in a later phase of the flight.
- (i) The operator shall establish procedures in the operations manual to ensure a seamless operation throughout the duration of the flight including the different phases of the flight such as take-off, climb, en-route, approach, and landing carried out by remote pilots responsible for each phase of flight.

OPS 4A.185 Alternate Aerodromes

For an aerodrome to be selected as an alternate the available information shall indicate that, at the estimated time of use, the C2 Link required to effect a landing will be available.

OPS 4A.190 Take-Off Alternate Aerodrome

- (a) A take-off alternate aerodrome shall be selected and specified in the flight plan if either the meteorological conditions at the aerodrome of departure are below the operator's established aerodrome landing minima for that operation or if it would not be possible to return to the aerodrome of departure for other reasons.
- (b) The take-off alternate aerodrome shall be located at a distance and within a flight time from the aerodrome of departure that is readily attainable with regard to the RPA's calculated performance and endurance.
- (c) For an aerodrome to be selected as a take-off alternate the available information shall indicate that, at the estimated time of use, the conditions will be at or above the operator's established aerodrome operating minima for that operation.

**OPS 4A.195 Destination Alternate Aerodromes**

- (a) For a flight to be conducted in accordance with instrument flight rules, at least one destination alternate aerodrome shall be selected and specified in the operational and ATS flight plans, unless;
- (1) the duration of the flight from the departure aerodrome, or from the point of in-flight re-planning, to the destination aerodrome is such that, taking into account all meteorological conditions and operational information relevant to the flight, at the estimated time of use, a reasonable certainty exists that;
 - (i) the approach and landing may be made without reliance on an instrument approach procedure; and
 - (ii) for remotely piloted aeroplanes, separate runways are usable at the estimated time of use of the destination aerodrome with at least one runway having an operational instrument approach procedure; or
 - (2) the aerodrome is isolated. Operations into isolated aerodromes do not require the selection of a destination alternate aerodrome(s) and shall be planned in accordance with OPS 4A.205(d)(4)(iv);
 - (i) for each flight into an isolated aerodrome a point of no return shall be determined; and
 - (ii) a flight to be conducted to an isolated aerodrome shall not be continued past the point of no return unless a current assessment of meteorological conditions, traffic and other operational conditions indicate that a safe landing can be made at the estimated time of use.

Note: Separate runways are two or more runways at the same aerodrome configured such that if one runway is closed, operations to the other runway(s) can be conducted.

- (b) Two destination alternate aerodromes shall be selected and specified in the operational and ATS flight plans when, for the destination aerodrome;
- (1) meteorological conditions at the estimated time of use will be below the operator's established aerodrome operating minima for that operation; or
 - (2) meteorological information is not available.
- (c) When an offshore alternate heliport is specified, it shall be specified subject to the following;
- (1) if the departure point is onshore, the offshore alternate heliport shall be used only after a point of no return. Prior to a point of no return, onshore alternate heliports shall be used;
 - (2) mechanical reliability of critical control systems and critical components shall be considered and taken into account when determining the suitability of the alternate heliport(s);
 - (3) one engine inoperative performance capability shall be attainable prior to arrival at the alternate heliport;
 - (4) to the extent possible, helideck availability shall be guaranteed; and



- (5) weather information shall be reliable and accurate.

Note: The landing technique specified in the flight manual following control system failure may preclude the nomination of certain helidecks as alternate heliports.

- (d) Notwithstanding the provisions in OPS 4A.185 and OPS 4A.190, the Authority may, based on the results of a specific safety risk assessment conducted by the operator which demonstrates how an equivalent level of safety will be maintained, approve operational variations to alternate aerodrome selection criteria. The specific safety risk assessment shall include at least the;
 - (1) capabilities of the operator;
 - (2) overall capability of the RPAS;
 - (3) available aerodrome technologies, capabilities and infrastructure;
 - (4) quality and reliability of meteorological information;
 - (5) identified hazards and safety risks associated with each alternate aerodrome variation; and
 - (6) specific mitigation measures.

OPS 4A.200 Meteorological Conditions

- (a) A flight to be conducted in accordance with instrument flight rules shall not;
 - (1) take-off from the departure aerodrome unless the meteorological conditions, at the time of use, are at or above the operator's established aerodrome operating minima for that operation; and
 - (2) take-off or continue beyond the point of in-flight re-planning unless at the aerodrome of intended landing or at each alternate aerodrome to be selected, current meteorological reports or a combination of current reports and forecasts indicate that the meteorological conditions will be, at the estimated time of use, at or above the operator's established aerodrome operating minima for that operation.
- (b) To ensure that an adequate margin of safety is observed in determining whether or not an approach and landing can be safely carried out at each alternate aerodrome, the operator shall specify appropriate incremental values for height of cloud base and visibility, acceptable to the Authority, to be added to the operator's established aerodrome operating minima.
- (c) The Authority shall approve a margin of time established by the operator for the estimated time of use of an aerodrome.
- (d) A flight to be operated in known or expected icing conditions shall not be commenced unless the RPA is certificated and equipped to cope with such conditions.
- (e) A flight to be planned or expected to operate in suspected or known ground icing conditions shall not take off unless the RPA has been inspected for icing and, if necessary, has been given appropriate de-icing/anti-icing treatment. Accumulation of ice or other naturally occurring contaminants shall be removed so that the RPA is kept in an airworthy condition prior to take-off.

**OPS 4A.205 Fuel Requirements**

- (a) A RPA shall have available a sufficient amount of usable fuel to complete the planned flight safely and to allow for deviations from the planned operation.
- (b) If fuel is planned to be generated or supplied during flight (e.g. air refuelling or charging of batteries via solar energy), the RPA shall maintain sufficient capability at any given time to continue to a safe landing, including the necessary reserves and contingency fuel.
- (c) The amount of usable fuel available shall, as a minimum, be based on;
 - (1) fuel consumption data;

- (i) provided by the RPAS manufacturer; or
 - (ii) if available, current RPA-specific data derived from a fuel consumption monitoring system; and

Note: Where no specific fuel consumption data exist for the precise conditions of the flight, the RPA may be operated in accordance with estimated fuel consumption data.

- (2) the operating conditions for the planned flight including;
 - (i) anticipated RPA mass;
 - (ii) NOTAM;
 - (iii) current meteorological reports or a combination of current reports and forecasts;
 - (iv) air traffic services procedures, restrictions and anticipated delays; and
 - (v) the effects of deferred maintenance items and/or configuration deviations.
 - (3) the efficiency and capacity of fuel storage devices (e.g. batteries) for the planned operating conditions considering degradation of those fuel storage devices as appropriate.
 - (d) The pre-flight calculation of usable fuel required shall include;
 - (1) *Taxi fuel*, which shall be the amount of fuel expected to be consumed before take-off taking into account local conditions at the point of departure and auxiliary power unit (APU) fuel consumption;
 - (2) *Trip fuel*, which shall be the amount of fuel required to enable the RPA to fly from take-off until landing at the destination aerodrome taking into account the operating conditions of (c)(2) above;

Note: The trip fuel at the beginning of the flight may be reduced for some types of RPA or types of operation (e.g. solar powered RPA or in-flight refuelling).

- (3) *contingency fuel*, which shall be the amount of fuel required to compensate for unforeseen factors;



Note: Unforeseen factors are those which could have an influence on the fuel consumption to the destination aerodrome, such as deviations of an individual RPA from the expected fuel consumption data, deviations from forecast meteorological conditions, extended delays and deviations from planned routings and/or cruising levels.

- (4) *destination alternate fuel*, which shall be;
 - (i) where a destination alternate is required, the amount of fuel required to enable the RPA to;
 - (A) perform a missed approach at the destination aerodrome;
 - (B) climb to the expected cruising altitude;
 - (C) fly the expected routing;
 - (D) descend to the point where the expected approach is initiated; and
 - (E) conduct the approach and landing at the destination alternate aerodrome; or
 - (ii) where two destination alternate aerodromes are required, the amount of fuel, as calculated in (d)(4)(i) above, required to enable the RPA to proceed to the destination alternate aerodrome which requires the greater amount of alternate fuel; or
 - (iii) where a flight is operated without a destination alternate aerodrome, the amount of fuel required to enable the RPA to fly 15 minutes at holding speed at 450 m (1500 ft.) above destination elevation in standard conditions; or
 - (iv) where the intended destination is an isolated aerodrome;
 - (A) for a non-turbine-engined RPA, the amount of fuel required to fly for 45 minutes plus 15 per cent of the flight time planned to be spent at cruising level, including final reserve fuel, or two hours, whichever is less; or
 - (B) for a turbine-engine RPA, the amount of fuel required to fly for two hours at normal cruise consumption above the destination, including final reserve fuel;
- (5) *final reserve fuel*, which shall be the amount of fuel calculated using the estimated mass on arrival at the destination alternate aerodrome, or the intended destination aerodrome when no destination alternate aerodrome is required;
 - (i) for a non-turbine-engined RPA, the amount of fuel required to fly for 45 minutes, under speed and altitude conditions specified by the Authority; or
 - (ii) for a turbine-engined RPA, the amount of fuel required to fly for 30 minutes at holding speed at 450 m (1500 ft.) above aerodrome elevation in standard conditions;
- (6) *additional fuel*, which shall be the supplementary amount of fuel required if the minimum fuel calculated is not sufficient to;
 - (i) allow the RPA to descend as necessary and proceed to an alternate aerodrome in the event of engine failure based on the assumption that such a failure occurs at the most critical point along the route;



- (A) fly for 15 minutes at holding speed at 450 m (1500 ft.) above aerodrome elevation in standard conditions; and
- (B) make an approach and landing;

(ii) meet additional requirements not covered above;

Note: Fuel planning for a failure that occurs at the most critical point along a route may place the RPA in a fuel emergency situation based on OPS 4A.210(b).

- (7) *discretionary fuel*, which shall be the extra amount of fuel to be carried at the discretion of the remote pilot-in-command.
- (e) Operators should determine one final reserve fuel value for each RPA type and variant in their fleet rounded up to an easily recalled figure.
- (f) A flight shall not commence unless the usable fuel on board meets the above requirements and shall not continue from the point of in-flight re-planning unless the usable fuel on board meets the above requirements.
- (g) Notwithstanding the provisions above, the Authority may, based on the results of a specific safety risk assessment conducted by the operator which demonstrates how an equivalent level of safety will be maintained, approve variations to the pre-flight fuel calculation of taxi fuel, trip fuel, contingency fuel, destination alternate fuel, and additional fuel. The specific safety risk assessment shall include at least the:
 - (1) flight fuel calculations;
 - (2) capabilities of the operator to include:
 - (i) a data-driven method that includes a fuel consumption monitoring programme; and/or
 - (ii) the advanced use of alternate aerodromes; and
 - (3) specific mitigation measures.
- (h) The use of fuel after flight commencement for purposes other than originally intended during pre-flight planning shall require a re-analysis and, if applicable, adjustment of the planned operation.

OPS 4A.210 In-flight Fuel Management

- (a) The operator shall establish policies and procedures, approved by the Authority, to ensure that in-flight fuel checks and fuel management are performed.
- (b) The remote pilot-in-command shall continually ensure that the amount of usable fuel remaining on board is not less than the fuel required to proceed to a destination where a safe landing can be made with the planned final reserve fuel remaining upon landing.

Note: The protection of final reserve fuel is intended to ensure a safe landing at any destination when unforeseen occurrences may not permit safe completion of an operation as originally planned.



- (c) The remote pilot-in-command shall request delay information from ATC when unanticipated circumstances may result in landing at the destination with less than the final reserve fuel plus any fuel required to proceed to a destination alternate or the fuel required to operate to a destination which is isolated.
- (d) The remote pilot-in-command shall advise ATC of a minimum fuel state by declaring “MINIMUM FUEL” when, having committed to land at a specific destination, the pilot calculates that any change to the existing clearance to that destination may result in landing with less than the planned final reserve fuel.

Note: The declaration of “MINIMUM FUEL” informs ATC that all planned destination options have been reduced to a specific aerodrome of intended landing and any change to the existing clearance may result in landing with less than the planned final reserve fuel. This is not an emergency situation but an indication that an emergency situation is possible should any additional delay occur.

- (e) The remote pilot-in-command shall declare a situation of fuel emergency by broadcasting “MAYDAY, MAYDAY, MAYDAY FUEL” when the calculated usable fuel estimated to be available upon landing at the nearest destination where a safe landing can be made is less than the planned final reserve fuel.

Note: The planned final reserve fuel refers to the value calculated in OPS 4A.205(d)(5) and is the minimum amount of fuel required upon landing at any aerodrome.

OPS 4A.215 Refuelling with Passengers on Board

Reserved for future use.

OPS 4A.220 Oxygen Supply

Reserved for future use.

OPS 4A.225 Time Capability of Cargo Compartment Fire Suppression System

All flights should be planned so that the diversion time to an aerodrome where a safe landing could be made does not exceed the cargo compartment fire suppression time capability of the RPA, when one is identified in the relevant RPA documentation, reduced by an operational safety margin of fifteen minutes.

Note: Cargo compartment fire suppression time capabilities will be identified in the relevant RPA documentation when they are to be considered for the operation.

In-Flight Procedures

Note: In-flight Procedures include OPS 4A.230 To OPS 4A.290 inclusive

OPS 4A.230 Aerodrome Operating Minima

- (a) A flight shall not be continued towards the aerodrome of intended landing, unless the latest available information indicates that at the expected time of arrival, a landing can be effected at that aerodrome or at least one destination alternate aerodrome, in compliance with the operating minima established in accordance with OPS 4A.150(a).



- (b) An instrument approach shall not be continued below 300 m (1000 ft.) above the aerodrome elevation or into the final approach segment unless the reported visibility or controlling RVR is at or above the aerodrome operating minima.
- (c) For approaches to aerodromes where the final part of the landing is to be conducted visually, if, after entering the final approach segment or after descending below 300 m (1000 ft.) above the aerodrome elevation, the reported visibility or controlling RVR falls below the specified minimum, the approach may be continued to DA/H or MDA/H. In any case, a RPA shall not continue its approach-to-land at any aerodrome beyond a point at which the limits of the operating minima specified for that aerodrome would be infringed.

Note 1: In this case, 'visually' can refer to a VLOS operation or any synthetic/camera-based solution which enables the remote pilot to monitor and correct the RPA's track when below the DA or DH.

Note 2: Controlling RVR means the reported values of one or more RVR reporting locations (touchdown, mid-point and stop-end) used to determine whether operating minima are or are not met. Where RVR is used, the controlling RVR is the touchdown RVR, unless otherwise specified by State criteria.

OPS 4A.235 Meteorological Observations

Note: The procedures for making meteorological observations could be obtained from on board sensors.

The remote pilot-in-command shall report the runway braking action via a special air-report (AIREP) when the runway braking action encountered is not as good as reported.

OPS 4A.240 Hazardous Flight Conditions

Hazardous flight conditions encountered, other than those associated with meteorological conditions, should be reported to the appropriate aeronautical station as soon as possible. The reports so rendered should give such details as may be pertinent to the safety of other aircraft.

OPS 4A.245 Remote Flight Crew Members at Duty Stations

- (a) *Take-off and landing.* All remote flight crew members required for take-off and landing shall be at their duty stations.
- (b) *En-route.* All remote flight crew members required to be at their stations shall remain at their stations except when their absence is necessary for the performance of duties in connection with the operation of the RPA or for physiological needs.

OPS 4A.250 Use of Oxygen

Reserved for future use.

OPS 4A.255 Safeguarding of Cabin Crew and Passengers

Reserved for future use.

**OPS 4A.260 In-flight Operational Instructions**

Operational instructions involving a change in the ATS flight plan shall be coordinated with the appropriate ATS unit before transmission to the remote pilot, when practicable.

Note: When the above coordination has not been possible, operational instructions do not relieve a remote pilot of the responsibility for obtaining an appropriate clearance from an ATS unit, if applicable, before making a change in flight plan.

OPS 4A.265 Instrument Flight Procedures

- (a) One or more instrument approach procedures designed to support instrument approach operations shall be approved and promulgated by the State in which the aerodrome is located to serve each instrument runway or aerodrome utilised for instrument flight operations.
- (b) All RPAS operated in accordance with instrument flight rules shall comply with the instrument flight procedures approved by the State in which the aerodrome is located, or by the State which is responsible for the heliport when located outside the territory of any State.

OPS 4A.270 RPA Operating Procedures for Noise Abatement

- (a) RPA operating procedures should include noise abatement.
- (b) Noise abatement procedures specified by an operator for any one RPA type should be the same for all aerodromes.

Note: A single procedure may not satisfy the requirements at some aerodromes.

OPS 4A.275 RPAS Operating Procedures for Rates of Climb and Descent

Unless otherwise specified in an air traffic control instruction, to avoid unnecessary airborne collision avoidance system (ACAS II) resolution advisories in aircraft at or approaching adjacent altitudes or flight levels, operators should specify procedures to ensure that a rate of climb or descent of less than 8 m/s or 1500 ft./min (depending on the instrumentation available) is achieved throughout the last 300 m (1000 ft.) of climb or descent to the assigned altitude or flight level, when made aware of another aircraft at or approaching an adjacent altitude or flight level.

OPS 4A.280 RPAS Operating Procedures for Landing Performance

For remotely piloted aeroplanes, an approach to land shall not be continued below 300 m (1000 ft.) above aerodrome elevation unless the remote pilot-in-command is satisfied that, with the runway surface condition information available, the RPA performance information indicates that a safe landing can be made.

OPS 4A.285 Handovers

- (a) All RPS involved in the handover shall be under the operational control of the operator.
- (b) The operator shall develop procedures for the handover of control of a RPA from one RPS to another that ensure;
 - (1) the availability of the gaining RPS;



- (2) the remote pilot initiating the handover retains responsibility for the RPA until handover is complete and the remote pilot in the gaining RPS has confirmed that control has been established;
 - (3) the remote pilot taking control of the RPA is notified of or briefed on the current ATC clearance and the current radio communication frequency and/or data link authority;
 - (4) the gaining RPS control settings are correctly aligned to the configuration of the RPA;
 - (5) the gaining RPS type is specified in the certificate of airworthiness of the RPA involved in the handover;
 - (6) the RPA is within C2 Link coverage of both the transferring and gaining RPS;
 - (7) communications between the transferring and gaining RPS involved in the handover are available and as near real-time as possible;
 - (8) the transferring RPS can retain or regain control of the RPA in the event that the handover to the gaining RPS is unsuccessful;
 - (9) notices to the remote pilot-in-command regarding the carriage of dangerous goods, including the NOTOC, are transferred to the remote pilot-in-command taking control of the RPA;
 - (10) the journey log book is transferred and that the RPA technical log is accessible to the gaining RPS prior to conducting the handover, to allow the remote pilot taking control of the RPA to be made aware of the current status of the RPAS to include any faults/system failures; and
 - (11) that the remote pilot-in-command is provided with following information prior to conducting the handover;
 - (i) location of the RPA and surrounding traffic;
 - (ii) current meteorological conditions;
 - (iii) destination weather forecast or conditions;
 - (iv) C2 Link status and configuration;
 - (v) changes or limitations to the intended flight or RPA performance; and
 - (vi) ATM-related limitations or outages (e.g. communications, navigation, surveillance equipment).
- (c) There shall be only one RPS actively controlling a RPA at any one time.
- (d) The RPS intended to gain control of a RPA may monitor the activities of the controlling RPS to obtain situational awareness or to facilitate communications between the remote pilots, but should only send commands to the RPA once control has been transferred.
- (e) The remote flight crew members involved in the handover shall be qualified for the;
- (1) RPS they are operating;



- (2) RPA being transferred; and
- (3) portion or phase of the flight which they are conducting.

Note: An electronic method for an operator to verify the qualification of the remote flight crew members involved in handovers may be used.

- (f) Handovers conducted when the RPA is on the ground for maintenance or other purposes, shall only be conducted if the;
 - (1) RPA is secured so as to prevent inadvertent ground movements or take-off; and
 - (2) C2 Link is approved for use on the ground where the RPA and the RPS are located.

Note: To facilitate maintenance or taxiing operations, qualified personnel other than remote pilots may be authorised by the operator to conduct handovers.

OPS 4A.290 Transfer of Control Between Remote Pilots at a Single RPS

- (a) The operator shall develop procedures for the transfer of control of a RPA between remote pilots as one remote pilot relieves the other at the same RPS. These procedures shall include the following minimum information to be provided to the remote pilot taking control of the RPA;
 - (1) current status of the RPAS, to include any faults/system failures;
 - (2) location of the RPA and surrounding traffic;
 - (3) current ATC clearance, ATC unit, and communication frequency or channel and if using data link communications, the current data link authority;
 - (4) current meteorological conditions;
 - (5) destination weather forecast or conditions;
 - (6) status of fuel and other RPA consumables;
 - (7) C2 Link status and configuration;
 - (8) changes or limitations to the intended flight or RPA performance;
 - (9) ATM-related limitations or outages (e.g. communications, navigation, surveillance equipment); and
 - (10) notices to the remote pilot-in-command regarding the carriage of dangerous goods, including the NOTOC, as applicable.
- (b) If flight operations will necessitate transfer of remote pilot-in-command responsibility during flight, the operator shall establish transfer procedures that ensure the safe continuity of the operation.

RPAS Specific Operating Regulations

Note 1: RPAS Specific Operating Regulations include OPS 4A.295 to OPS 4A.30 inclusive.



Note 2: See also CAR OPS 0.260 for general operating rules applicable to RPAS.

OPS 4A.295 Establishment, Assurance and Termination of the C2 Link

- (a) When managed through the C2 Link, taxiing or ground movement shall not be initiated or shall be aborted if the Quality of Service Experienced (QoSE) does not provide the required performance for the remote pilot to safely control the RPA.
- (b) Take-off shall not be initiated or, if safe to do so, shall be aborted if the QoSE does not provide the required performance for the remote pilot to safely control the RPA.
- (c) A switchover to another C2 Link or network shall be conducted in accordance with the procedures defined in the operations manual. Such procedures shall include confirming the QoSE of the accepting C2 Link or network.
- (d) The remote pilot shall initiate the condition of a lost C2 Link state if, while in flight, the QoSE has been determined by the remote pilot to be insufficient to actively manage the flight in a safe and timely manner.

OPS 4A.300 Visual Line-of-Sight

For portions of the flight requiring visual line-of-sight (VLOS) procedures, including night-time operations, the remote pilot or a RPA observer shall maintain direct unaided visual contact with the RPA.

OPS 4A.305 Take-off and Landing

Note 1: RPAS may be operated from aerodromes, to include both airports and heliports, open to public use or other locations fulfilling the operational requirements and that meet the system configuration, design and performance requirements.

Note 2: This section also applies to launch and recovery operations.

For operations at locations other than aerodromes open to public use, the operator or remote pilot, prior to conducting operations at that location, shall take into account the following;

- (a) take-off and landing area and the condition thereof, to include protections for persons and property;
- (b) meteorological conditions appropriate to the intended flight;
- (c) location and height of all obstacles that could hinder take-off or landing;
- (d) performance and capability related to obstacle clearance, departure or arrival procedures (if applicable) and any flight restrictions;
- (e) communications with the appropriate ATS unit, if required;
- (f) service provision ensuring required C2 Link performance (transaction time, availability, continuity and integrity);
- (g) compliance with ATC clearances and instructions in controlled airspace or remaining well clear from other air traffic in uncontrolled airspace; and



- (h) availability of ground infrastructure, services and equipment required for take-off/launch, landing/recovery and taxiing (if applicable).

OPS 4A.310 Launch and Recovery Equipment

- (a) Where specific launch and recovery equipment is required, the positioning, set-up, and operation of the launch and recovery equipment shall be coordinated with the aerodrome operator and appropriate ATS unit(s) to ensure there is no adverse impact on safety.
- (b) The RPAS ground crew and/or the remote flight crew shall position, prepare, set up and check that the condition and operability of all required launch and recovery equipment is;
 - (1) in accordance with the instructions provided by the manufacturer;
 - (2) in a position coordinated with the aerodrome operator and appropriate ATS unit(s) if located at an aerodrome; and
 - (3) for operations at locations other than aerodromes open to public use, in a position to afford protection to persons and property.
- (c) The operator shall ensure that the required launch and recovery equipment is serviceable before each launch and compatible with each RPA being used.
- (d) During launch and recovery operations, only persons and vehicles authorised by the operator shall be permitted within the launch and recovery area of the RPA.

OPS 4A.315 Emergencies and Contingencies

The RPAS operations manual shall contain procedures to mitigate at least the following;

- (a) lost C2 Link, including the potential loss of air-ground communications;
- (b) loss of essential systems or navigational data;
- (c) unavailability of required services or equipment;
- (d) unscheduled closure of airspace or aerodromes;
- (e) emergency landing;
- (f) RPS crew incapacitation; and
- (g) inadvertent release of dangerous goods.

OPS 4A.320 Emergency Landing, Ditching Locations, Flight Termination

Note: Depending on the configuration of the RPA, remote pilots may have limited ability to observe actual details on the ground in the vicinity of the RPA during an emergency. The remote pilot may rely to a much greater extent on preplanning emergency scenarios that may occur along the intended route of flight.

- (a) When planning for, or selecting, emergency landing locations, remote pilots shall prioritize the safety of persons on the ground over RPA recovery.



- (b) During flight, remote pilots shall reassess the selected emergency landing areas so that risks to persons and property on the ground are minimised, considering the following;
 - (1) type of terrain and ground obstructions;
 - (2) population density and open air assemblies of persons;
 - (3) accessibility for recovery or fire suppression;
 - (4) proximity of aerodromes;
 - (5) possibility of landing on open water; and
 - (6) type and quantity of dangerous goods on board.
- (c) The operator shall establish procedures for the use of a flight termination system, if the RPA is so equipped.

OPS 4A.325 C2 Link Contingency and Emergency Procedures

- (a) If any of the C2 Link components fail, actions shall be taken to minimise the time that the remote pilot is not actively managing the flight of the RPA.
- (b) The RPAS operations manual shall state the actions to be taken by the remote pilot to minimise the time that the RPAS is in a lost C2 Link state.
- (c) Contingency switchovers shall be performed in line with security measures and procedures that ensure that the accepting C2 Link or network is authenticated and authorised.
- (d) Contingency handovers shall be performed in line with security measures and procedures that ensure that the gaining RPS is authenticated and authorised to take control of the RPA.
- (e) A means or process for anticipating C2 Link interruptions or lost C2 Link states shall be provided to the remote pilot.

OPS 4A.330 Lost C2 Link

- (a) In the event of a lost C2 Link, a RPA shall be capable of following a pre-programmed and predictable flight profile.
- (b) Prior to flight, the operator shall ensure that if the RPAS enters a lost C2 Link state, the RPA will follow the procedures contained in CAR OPS 0 or the relevant State Aeronautical Information Publication (AIP).
- (c) The operator shall establish crew procedures for C2 Link interruption and lost C2 Link operations.
- (d) When operating in airspace where SSR transponder carriage is required, the RPAS/RPA shall set the transponder to Mode A Code 7400 to indicate a lost C2 Link state.
- (e) When operating in airspace where ADS-B carriage is required or if ADS-B is part of the RPA detect and avoid (DAA) capability, the RPAS/RPA shall be capable of selecting the appropriate functionality to indicate a lost C2 Link state.



- (f) Remote pilots shall notify the ATC unit as soon as practicable upon the lost C2 Link procedures being activated for any flight operated as a controlled flight or any flight that may affect other aircraft operating in controlled airspace and, if applicable, upon the C2 Link being successfully restored.

OPS 4A.335 Duties of Remote Pilot-in-Command

Note: OPS 4A.165 permits the use of multiple remote pilots-in-command during a flight.

- (a) The remote pilot-in-command is responsible for the operation and safety of the RPA from the moment the RPA is ready to move with the purpose of flight until such time as it comes to rest at the end of the flight and the primary propulsion system is shut down.
- (b) The remote pilot-in-command shall hold the duties of remote pilot-in-command during the period detailed in (a) above, or for flights involving the use of multiple remote pilots-in command, from the time that person has assumed the duties from the previous remote pilot-in-command until the duties have been accepted by another remote pilot-in-command, or the RPA has come to rest at the end of the flight, as appropriate.
- (c) The remote pilot-in-command shall ensure that the checklists are complied with in detail.
- (d) The remote pilot-in-command shall be responsible for notifying the nearest appropriate authorities, by the quickest available means, of any accident involving the RPAS resulting in serious injury or death of any person or substantial damage to the aeroplane or property.

Note: The appropriate authorities could include the civil aviation authority and the accident investigation authority in the State of Occurrence and in the State where the RPS is located, if different.

- (e) In the event that the remote pilot-in-command is unable to comply with (d), the operator should notify the nearest appropriate authorities.
- (f) The remote pilot-in-command, or a person designated by the operator, shall be responsible for reporting all known or suspected defects in the RPAS to the operator at the earliest practicable time.
- (g) The remote pilot-in-command shall be responsible for the journey log book or the general declaration containing the information listed in OPS 4A.660(b).

OPS 4A.340 Duties of Flight Operations Officer/Flight Dispatcher

- (a) Where required in the operations manual, a flight operations officer/flight dispatcher in conjunction with a method of control and supervision of flight operations shall;
- (1) assist the remote pilot-in-command in flight preparation and provide the relevant information;
 - (2) assist the remote pilot-in-command in preparing the operational and ATS flight plans, sign when applicable and file the ATS flight plan with the appropriate ATS unit;
 - (3) furnish the remote pilot-in-command while in flight, by appropriate means, with information which may be necessary for the safe conduct of the flight; and



- (4) notify the appropriate ATS unit when the position of the RPA cannot be determined by an aircraft tracking capability and/or attempts to establish communication with the remote pilot are unsuccessful.
- (b) In the event of an emergency, a flight operations officer/flight dispatcher shall;
 - (1) initiate such procedures as outlined in the operations manual while avoiding taking any action that would conflict with ATC procedures; and
 - (2) convey safety-related information to the remote pilot-in-command that may be necessary for the safe conduct of the flight, including information related to any amendments to the flight plan that become necessary in the course of the flight.

Note: It is equally important that the remote pilot-in-command also convey similar information to the flight operations officer/ flight dispatcher during the course of the flight, particularly in the context of emergency situations.

OPS 4A.345 Extended Diversion Time Operations (EDTO)

Reserved for future use.

OPS 4A.350 Carry-on Baggage

Reserved for future use.

OPS 4A.355 Fatigue Management

- (a) The Authority shall establish regulations for the purpose of managing fatigue. These regulations shall be based upon scientific principles, knowledge and operational experience with the aim of ensuring that remote flight crew members are performing at an adequate level of alertness. Accordingly, the Authority shall establish;
 - (1) prescriptive regulations for duty periods, duty period limitations and rest period requirements; and
 - (2) where authorising the operator to use a Fatigue Risk Management System (FRMS) to manage fatigue, FRMS regulations in accordance with Appendix 7.
- (b) The Authority shall require that the operator to establish either;
 - (1) duty periods, duty period limitations and rest period requirements that are within the prescriptive fatigue management regulations established by the Authority; or
 - (2) a FRMS in compliance with (a)(2) above for all operations; or
 - (3) a FRMS in compliance with (d) below for part of its operations and the requirements of (b)(1) for the remainder of its operations.

Note: Complying with the prescriptive fatigue management regulations does not relieve the operator of the responsibility to manage its risks, including fatigue-related risks, using its safety management system (SMS) in accordance with the provisions of CAR SMS.



- (c) Where the operator adopts prescriptive fatigue management regulations for part or all of its operations, the Authority;
- (1) shall require evidence that the limitations are not exceeded and that non-duty period requirements are met;
 - (2) shall require that the operator familiarises its personnel with the principles of fatigue management and its policies with regard to fatigue management;
 - (3) shall establish a process to allow variations from the prescriptive fatigue management regulations to address any additional risks associated with sudden, unforeseen operational circumstances; and
 - (4) may approve, in exceptional circumstances, variations to these regulations on the basis of a risk assessment provided by the operator. Approved variations shall provide a level of safety equivalent to, or better than, that achieved through the prescriptive fatigue management regulations.

- (d) Where an operator implements a FRMS to manage fatigue-related safety risks in the provision of part or all of its operations, the Authority shall;
- (1) require the operator to have processes to integrate FRMS functions with its other safety management functions; and
 - (2) approve a FRMS, according to a documented process, that provides a level of safety acceptable to the Authority.

Note: Provisions on the protection of safety information, which support the continued availability of information required by a FRMS, are contained in CAR SMS.

- (e) Where the operator implements a FRMS to manage fatigue-related safety risks, the operator shall, as a minimum; incorporate scientific principles and knowledge within the FRMS;
- (1) identify fatigue-related safety hazards and the resulting risks on an ongoing basis;
 - (2) ensure that remedial actions, necessary to effectively mitigate the risks associated with the hazards, are implemented promptly;
 - (3) provide for continuous monitoring and regular assessment of the mitigation of fatigue risks achieved by such actions; and
 - (4) provide for continuous improvement to the overall performance of the FRMS.

Note: Detailed requirements for a FRMS are in Appendix 7.

- (f) Where the operator has a FRMS, it should be integrated with the operator's SMS.
- (g) The operator shall maintain records for all its remote flight crew members of duty periods and rest periods for a period of time specified by the Authority.



CHAPTER 5

RPAS PERFORMANCE OPERATING LIMITATIONS

OPS 4A.360 General

- (a) RPA shall be operated in accordance with the approved operating limitations contained in its flight manual as well as the applicable requirements of this Chapter.
- (b) The level of performance for RPA shall be at least substantially equivalent to the overall level embodied in this Chapter.
- (c) Except as provided in OPS 4A.380 and OPS 4A.385 for single-engine RPA, RPA shall only be operated over such routes and diversions therefrom, that permit a safe forced landing to be executed in the event of a critical engine failure.
- (d) For remotely piloted helicopters, notwithstanding the provisions of (b) above, the Authority may, based on the result of a risk assessment, allow for variations without a safe forced landing to be included in the code of performance established in accordance with the provisions of (a). The risk assessment shall take into consideration at least the following;
 - (1) the type and circumstances of the operation;
 - (2) the area/terrain over which the operation is being conducted and the population density;
 - (3) the probability of, and length of exposure to, a critical engine failure and the tolerability of such an event;
 - (4) the procedures and systems for monitoring and maintaining the reliability of the engine(s);
 - (5) the training and operational procedures to mitigate the consequences of the critical engine failure; and
 - (6) remotely piloted helicopter equipment.
- (e) Where the Authority permits operations over heavily populated areas with remotely piloted helicopters in performance Class 3, such operations shall be conducted in accordance with the provisions of OPS 4A.385.
- (f) The Authority shall take such precautions as are reasonably possible to ensure that the general level of safety contemplated by these provisions is maintained under all expected operating conditions, including those not covered specifically by the provisions of this Chapter.

OPS 4A.365 RPA with Certificate of Airworthiness

- (a) The regulations contained in (b) to OPS 4A.370(f)(2) inclusive are applicable to the RPA to which Parts VIII and IX of ICAO Annex 8 are applicable.
- (b) A RPA shall be operated in compliance with the terms of its certificate of airworthiness and within the approved operating limitations contained in its flight manual.



- (c) The Authority shall take such precautions as are reasonably possible to ensure that the general level of safety contemplated by these provisions is maintained under all expected operating conditions, including those not covered specifically by the provisions of this chapter.
- (d) A flight shall not be commenced unless the performance information provided in the flight manual, supplemented as necessary with other data acceptable to the Authority, indicates that OPS 4A.365(f) and (g) and OPS 4A.370(a) to (f) inclusive can be complied with for the flight to be undertaken.
- (e) Account shall be taken of all factors that significantly affect the performance of the RPA, including but not limited to the;
 - (1) mass of the RPA;
 - (2) operating procedures;
 - (3) pressure-altitude appropriate to the elevation of the aerodrome;
 - (4) for remotely piloted aeroplanes, runway slope;
 - (5) ambient temperature;
 - (6) wind;
 - (7) surface conditions of the runway, heliport or landing location at the expected time of use, i.e. presence of snow, slush, water, and/or ice for land RPA, water surface condition for sea RPA; and
 - (8) C2 Link specification and performance.
- (f) Such factors as addressed in (g) above shall be taken into account directly as operational parameters or indirectly by means of allowances or margins, which may be provided in the scheduling of performance data or in the comprehensive and detailed code of performance in accordance with which the RPA is being operated.

OPS 4A.370 Mass Limitations

- (a) The mass of the RPA at the start of take-off shall not exceed the mass at which (d) below is complied with, or the mass at which (e) and (f) below are complied with, allowing for expected reductions in mass as the flight proceeds, and for such fuel jettisoning as is envisaged in applying (f) below and, in respect of alternate aerodromes, (b) and (g) below.
- (b) In no case shall the mass at the start of take-off exceed the maximum take-off mass specified in the flight manual for the pressure altitude appropriate to the elevation of the aerodrome, and if used as a parameter to determine the maximum take-off mass, any other local atmospheric condition.
- (c) In no case shall the estimated mass for the expected time of landing at the destination of intended landing and at any destination alternate aerodromes, exceed the maximum landing mass specified in the flight manual for the pressure altitude appropriate to the elevation of those aerodromes, and if used as a parameter to determine the maximum landing mass, any other local atmospheric condition.



(d) In no case shall the mass at the start of take-off, or at the expected time of landing at the aerodrome and at any destination alternate aerodrome, exceed the relevant maximum masses at which compliance has been demonstrated with the applicable noise certification Standards in ICAO Annex 16, Volume I, unless otherwise authorised in exceptional circumstances for a certain destination or a runway where there is no noise disturbance problem, by the State of the Aerodrome in which the aerodrome is situated.

(e) **Take-off phase**

(1) *Remotely piloted aeroplanes.*

- (i) The remotely piloted aeroplane shall be able, in the event of a critical engine failing, or for other reasons, at any point in the take-off, either to discontinue the take-off and stop within either the accelerate-stop distance available or the runway available, or to continue the take-off and clear all obstacles along the flight path by an adequate vertical or horizontal distance until the remotely piloted aeroplane is in a position to comply with (f)(1)(i) below. When determining the resulting take-off obstacle accountability area, the operating conditions, such as the crosswind component and navigation accuracy, shall be taken into account.
- (i) For remotely piloted aeroplanes, in determining the length of the runway available, account shall be taken of the loss, if any, of runway length due to alignment of the remotely piloted aeroplane prior to take-off.

(2) *Remotely piloted helicopters*

- (i) Operations in performance Class 1.

The remotely piloted helicopter shall be able, in the event of the failure of the critical engine being recognized at or before the take-off decision point, to discontinue the take off and stop within the rejected take-off area available or, in the event of the failure of the critical engine being recognized at or after the take-off decision point, to continue the take-off, clearing all obstacles along the flight path by an adequate margin until the remotely piloted helicopter is in a position to comply with (f)(2) below.

- (ii) Operations in performance Class 2.

The remotely piloted helicopter shall be able, in the event of the failure of the critical engine at any time after reaching the defined point after take-off (DPATO), to continue the take-off, clearing all obstacles along the flight path by an adequate margin until the remotely piloted helicopter is in a position to comply with (f)(2) below.. Before the DPATO, failure of the critical engine may cause the remotely piloted helicopter to force-land; therefore the conditions stated in OPS 4A.360(b) shall apply.

- (iii) Operations in performance Class 3.

At any point of the flight path, failure of an engine will cause the remotely piloted helicopter to force-land; therefore, the conditions stated in OPS 4A.380 and OPS 4A.385 shall apply.



(f) **En-route phase**

(1) *Remotely piloted aeroplanes*

(i) One engine inoperative.

In the case of a remotely piloted aeroplane having no less than two engines, the remotely piloted aeroplane shall be able, in the event of the critical engine becoming inoperative at any point along the route or planned diversions therefrom, to continue the flight to an aerodrome at which (g)(1) below can be met, without flying below the minimum obstacle clearance altitude at any point.

(ii) Two engines inoperative.

In the case of a remotely piloted aeroplane having three or more engines, on any part of a route where the location of en-route alternate aerodromes and the total duration of the flight are such that the probability of a second engine becoming inoperative shall be allowed for if the general level of safety implied by the requirements of this chapter is to be maintained, the remotely piloted aeroplane shall be able, in the event of any two engines becoming inoperative, to continue the flight to an en-route alternate aerodrome and land.

(2) *Remotely piloted helicopters*

(i) operations in performance Classes 1 and 2.

The remotely piloted helicopter shall be able, in the event of the failure of the critical engine at any point in the en-route phase, to continue the flight to a site at which the conditions of (g)(2)(i) below for operations in performance Class 1, or the conditions of (g)(2)(i) below for operations in performance Class 2 can be met, without flying below the appropriate minimum flight altitude at any point.

(ii) Operations in performance Class 3.

The remotely piloted helicopter shall be able, with all engines operating, to continue along its intended route or planned diversions without flying at any point below the appropriate minimum flight altitude. At any point of the flight path, failure of an engine will cause the remotely piloted helicopter to force-land; therefore the conditions stated in OPS 4A.380 and OPS 4A.385 shall apply.

(g) **Approach and landing phase**

(1) *Remotely piloted aeroplanes.*

The remotely piloted aeroplane shall, at the aerodrome of intended landing and at any alternate aerodrome, after clearing all obstacles in the approach path by a safe margin, be able to land, with assurance that it can come to a stop or, for a sea remotely piloted aeroplane, to a satisfactorily low speed, within the landing distance available. Allowance shall be made for expected variations in the approach and landing techniques, if such allowance has not been made in the scheduling of performance data.



(2) *Remotely piloted helicopters*

(i) Operations in performance Class 1.

In the event of the failure of the critical engine being recognized at any point during the approach and landing phase, before the landing decision point, the remotely piloted helicopter shall, at the destination and at any alternate, after clearing all obstacles in the approach path, be able to land and stop within the landing distance available or to perform a balked landing and clear all obstacles in the flight path by an adequate margin equivalent to that specified in (e)(2)(i) above. In case of the failure occurring after the landing decision point, the remotely piloted helicopter shall be able to land and stop within the landing distance available.

(ii) Operations in performance Class 2.

In the event of the failure of the critical engine before the defined point before landing (DPBL), the remotely piloted helicopter shall, at the destination and at any alternate, after clearing all obstacles in the approach path, be able either to land and stop within the landing distance available or to perform a balked landing and clear all obstacles in the flight path by an adequate margin equivalent to that specified in (e)(2)(ii) above. After the DPBL, failure of an engine may cause the remotely piloted helicopter to force-land; therefore, the conditions stated in OPS 4A.360(b) shall apply.

(iii) Operations in performance Class 3. At any point of the flight path, failure of an engine will cause the remotely piloted helicopter to force-land; therefore, the conditions stated in OPS 4A.360(b) shall apply.

OPS 4A.375 Obstacle Data

(a) The operator shall use available obstacle data to;

- (1) for remotely piloted aeroplanes, develop procedures to comply with OPS 4A.370 (f)(1)(i); or
- (2) for remotely piloted helicopters, develop procedures to comply with the take-off, initial climb, approach and landing phases detailed in the code of performance established by the Authority.

(b) The operator shall take account of charting accuracy when assessing compliance with OPS 4A.370(e).

OPS 4A.380 Operations of Approved Single-Engine RPA(A) Over Heavily Populated Areas

- (a) In approving operations by single-engine remotely piloted aeroplanes over heavily populated areas, the Authority shall ensure that the airworthiness certification of the remotely piloted aeroplane is appropriate and that the overall level of safety intended by the provisions of ICAO Annexes 6 and 8 is provided by;
- (1) the reliability of the engine;
 - (2) the operator's maintenance procedures, operating practices, flight dispatch procedures and crew training programmes; and



- (3) equipment and other requirements provided in accordance with Appendix 3.
- (b) All single-engine remotely piloted aeroplanes operated over heavily populated areas shall have an automatic engine trend monitoring system.

OPS 4A.385 Operations of RPA(H) In Performance Class 3 Over Heavily Populated Areas

- (a) Remotely piloted helicopter operations in performance Class 3 shall be conducted only over a surface environment acceptable to either the Authority for operations within the territory of San Marino, or the competent authority of the State where the operations are performed.
- (b) In approving operations by remotely piloted helicopters operating in performance Class 3 over heavily populated areas, the Authority shall ensure that the airworthiness certification of the remotely piloted helicopter is appropriate and that the overall level of safety intended by the provisions of ICAO Annexes 6 and 8 is provided by;
 - (1) the reliability of the engines;
 - (2) the operator's maintenance procedures, operating practices and crew training programmes; and
 - (3) equipment and other requirements provided in accordance with Appendix 3.
- (c) Operators of remotely piloted helicopters operating in performance Class 3 over heavily populated areas shall have a programme for engine trend monitoring and shall utilise the engine and helicopter manufacturers' recommended instruments, systems and operational/maintenance procedures to monitor the engines.
- (d) In order to minimise the occurrence of mechanical failures, remotely piloted helicopters operating over heavily populated areas in performance Class 3 should utilise vibration health monitoring for the tail-rotor drive system.



CHAPTER 6

RPAS INSTRUMENTS, EQUIPMENT AND FLIGHT DOCUMENTS

OPS 4A.390 General

- (a) In addition to the minimum equipment necessary for the issuance of a certificate of airworthiness, the instruments, equipment, flight documents, information and data prescribed in the following paragraphs shall be installed or carried, as appropriate, in the RPA or RPS according to the RPAS used and to the circumstances under which the operation is to be conducted.
- (b) The prescribed instruments and equipment, including their installation, shall be approved or accepted by the Authority.
- (c) The operator shall provide a minimum equipment list (MEL) in the operations manual, approved by the Authority which will enable the remote pilot-in-command to determine whether a flight may be commenced or continued from any intermediate stop should any instrument, equipment or systems become inoperative.
- (d) Where the Authority is not the State of Registry, the Authority shall ensure that the MEL does not affect the RPA's compliance with the airworthiness requirements applicable in the State of Registry.
- (e) The operator shall provide operations staff and remote flight crew with a RPAS operating manual, for each RPA type operated, containing the normal, abnormal and emergency procedures relating to the operation of the RPA/RPS.
- (f) The manual shall include details of the RPA/RPS systems and of the checklist to be used.
- (g) The design of flight manuals shall observe human performance principles.

OPS 4A.395 RPAS Operated Under an Article 83 *Bis* Agreement

Reserved

OPS 4A.400 All RPAS on all Flights

A RPAS shall be equipped with the systems and instruments necessary to enable the remote pilot to control the flight path of the RPA, carry out any required procedural manoeuvres and observe the operating limitations of the RPA in the expected operating conditions.

OPS 4A.405 C2 Link

The C2 Link shall comply with the requirements defined in ICAO Annex 10, Volume VI.

OPS 4A.410 Remote Pilot Station**(a) General**

- (1) The RPS shall be equipped with suitable controls and displays which will enable the remote pilot(s) to monitor and control the intended operation of the RPA on the ground and in the air.



- (2) The RPS shall enable the remote pilot(s) to carry out any required manoeuvres and deal with emergencies while observing the operating limitations in the expected operating conditions.
- (3) The RPS shall provide the means for the remote pilot(s) to communicate with ATS units and other airspace users as appropriate.
- (4) The RPS shall be equipped to provide the remote pilot with all the relevant information, alerts and warnings pertaining to the operation, in a timely and distinctive manner.

(b) RPS work environment

- (1) The operator shall ensure that the RPS is located in an environment which;
 - (i) allows the remote pilot(s) to concentrate on their tasks; and
 - (ii) minimises distractions.
- (2) The operator shall ensure that the working environment for the remote flight crew takes into account the application of Human Factors principles.

Note: Considerations related to the working environment may include appropriate space, lighting, air conditioning, ergonomic furniture and required information or tools for the operation to be readily available.

- (3) The display(s) shall be so arranged as to permit the remote pilot(s) to see the indications readily from their station.
- (4) A means of measuring and displaying time in hours, minutes and seconds shall be available to the remote flight crew.

(c) Manuals, charts and information

- (1) The remote pilot shall have the following manuals, charts and information, readily available at the RPS;
 - (i) the operations manual or those parts of it that pertain to flight operations;
 - (ii) the flight manual for the RPAS, or other documents containing performance data required for the application of Chapter 5, and any other information necessary for the operation of the RPAS within the terms of its certificate of airworthiness, unless these data are available in the operations manual;
 - (iii) current and suitable charts for the route of the proposed flight and all routes along which it is reasonable to expect that the flight may be diverted;
 - (iv) procedures, as prescribed in CAR OPS 0, for pilots-in-command of intercepted aircraft;
 - (v) visual signals for use by intercepting and intercepted aircraft, if relevant for the RPA being used, as contained in CAR OPS 0;
 - (vi) the appropriate licence for each remote flight crew member;



- (vii) the checklists to which OPS 4A.140 refers; and
 - (viii) any information and procedures identified as relevant in the safety assessment performed by the operator including emergency and contingency procedures.
- (2) Each RPS shall have available a flight manual for each RPA type capable of being, and intended to be, operated from the RPS.

(d) Contingency plans

- (1) The operator shall provide the remote flight crew with the capability to contact and coordinate with the appropriate ATS unit in the event of an evacuation of the RPS.
- (2) The remote flight crew shall contact and coordinate with the appropriate ATS unit in the event of an evacuation of the RPS.
- (3) The operator shall develop, promulgate and implement contingency plans to provide alternative RPS facilities when assigned RPS facilities are unavailable.

Note: A widespread outage affecting assigned RPS facilities at a single location may necessitate the use of alternative RPS facilities at other locations.

- (4) Contingency plans shall include, as a minimum, the following;
 - (i) provisions for alternative facilities and services;
 - (ii) detailed agreements among the parties concerned, before the occurrence of the event requiring contingency action, including the manner and timing of promulgating such arrangements; and
 - (iii) details regarding alternative RPS facilities, infrastructure and remote pilots.
- (5) Such plans should be developed in consultation with affected stakeholders.

Note: The operator may consider enhancing contingency arrangements if a RPS facility is to be located in a geographical area susceptible to adverse natural phenomena (e.g. earthquakes or floods), to ensure that an alternate RPS facility is suitable for long-term operations at short notice in the event of the total destruction of the original RPS facility.

OPS 4A.415 RPAS Recorder Systems

Note: RPAS recorder systems record data from any system on-board the RPA and the RPS (e.g. video from the RPA, audio, data, and C2 Link).

(a) Applicability

- (1) For all RPA of a maximum certified take-off mass (MCTOM) of over 2250 kg, and that are first issued with a certificate of airworthiness on or after 26 November 2029, a RPA-RS on board the RPA shall record the data associated with the RPA functions defined in Appendix 8, Section 3.
- (2) For all RPA of a MCTOM of 2250 kg or less, the data associated with the RPA functions defined in Appendix 8 should be recorded on board the RPA.



- (3) All RPS controlling RPA operating under OPS 4A and that are manufactured on or after 26 November 2029 shall be equipped with a RPS-RS.

Note: The functions to be recorded by the RPS-RS are described in Appendix 8, Section 4.

(b) Duration

- (1) All RPA-RS shall be capable of retaining the information recorded from the moment the RPA is ready to move with the purpose of flight until such time as it comes to rest at the end of the flight and the primary propulsion system is shut down, or the last 25 hours, whichever is longer.
- (2) The RPS-RS shall begin recording continuously from the commencement of the RPS checks prior to connecting to a specific RPA, either pre-flight or inflight, until connection with the specific RPA is terminated, either inflight or post-flight, and RPS post connection checks are completed.
- (3) In the case of multiple RPS controlling the flight of a specific RPA sequentially, each RPS shall record data for the duration stated in (1).

Note: The intention is to capture all remote pilot activities that have an effect on the operation, from RPA pre-flight checks to completion of the flight.

(c) Construction and installation

RPA-RS shall be constructed, located and installed so as to provide maximum practical protection for the recordings in order that the recorded information may be preserved, recovered and analysed. The recorder systems shall meet the prescribed crashworthiness and fire protection specifications.

(d) Preservation of data

- (1) In the case of an accident or incident occurring during a flight, the data recorded by the RPA-RS, when required by (a)(1), and RPS-RS shall be preserved for investigation purposes.
- (2) *RPA-RS crash protection.* All RPA required to carry a RPA-RS in accordance with (a)(1) shall be equipped with a RPA-RS protected with Flight Recorder Systems industry crashworthiness and fire protection. The crashworthiness and fire protection shall be based on analysis of potential damages to the recording media.
- (3) *RPS-RS protection.* RPS-RS shall ensure the recorded data is safely maintained with respect to environmental conditions, security and emergencies that could affect the integrity of the RPS. Where the RPS is carried on board a vehicle, vessel or another aircraft, the RPS-RS shall include crashworthiness and fire protection.
- (4) The RPA-RS shall be deactivated whenever possible upon completion of the flight if an accident or incident has occurred or is suspected of having occurred and shall not be reactivated before the disposition of the recorders is determined in accordance with ICAO Annex 13.
- (5) The RPS-RS shall preserve the original recorded data related to the accident or incident of a RPA without affecting the continued operation of the RPS-RS. The original recorded data related to the accident or incident of a RPA shall be preserved and retained until the disposition of the recorders is determined in accordance with ICAO Annex 13.



Note: The need for recovery of the recorded data from the RPA-RS and RPS-RS will be determined by the accident investigation authority in the State conducting the investigation with due regard to the seriousness of an occurrence and the circumstances, including the impact on the operation.

(e) RPAS recorder system data recovery

- (1) A RPA meeting the applicability requirements outlined in (a) above shall be equipped with a means, approved by the Authority, to recover the data from RPAS recorder systems (RPAS-RS), and make it available in a timely manner.
- (2) In approving the means to make the RPAS-RS data available in a timely manner, the Authority shall take into account the following;
 - (i) the capabilities of the operator;
 - (ii) overall capability of the RPAS as certified by the State of Design;
 - (iii) the reliability of the means to recover the appropriate RPS-RS voice recorder channels; and
 - (iv) specific mitigation measures.

(3) Continued serviceability

Operational checks and evaluations of recordings from the recording systems shall be conducted to ensure the continued serviceability of the recorders.

(4) RPS recorder systems

- (i) All RPAS required to meet the operational requirements of Chapter 2 and the applicability requirements outlined in subparagraph (a)(3) shall record voice communications and the aural environment at the RPS.
- (ii) All RPS required to meet the operational requirements of Chapter 2 and the applicability outlined in (a) shall record the information displayed to the remote flight crew from electronic displays, as well as the operation of switches and selectors by the remote flight crew as defined in Appendix 8.
- (iii) Remote flight crew-machine interface recording shall be able to be correlated to the recorded RPS audio.
- (iv) All RPS shall record on a RPS-RS the data associated with the functions defined in Section 5 of Appendix 8.
- (v) The operator shall retain the documentation necessary to convert the recorded flight data into flight parameters expressed in engineering units. This documentation shall be provided upon request to the accident investigation authorities.
- (vi) The documentation necessary to convert the recorded data into data usable by an accident investigation team should be provided in electronic format.



- (vii) The operator shall maintain a record of each RPS that has controlled a RPA during each flight.
- (viii) Data shall be secured in a manner that prevents readout of the data without the use of special tools or techniques. Data encryption of the RPA-RS or RPS-RS shall not be used as it may affect data recovery if the memory or media is damaged.

(f) **Data link recorders**

All RPS which utilise any of the data link communications applications listed in Appendix 8 and are required to be equipped with a RPS-RS, shall record the data link communications.

OPS 4A.420 All RPAS on Flights Over Water

(a) **Sea RPA**

- (1) For all flights, sea RPA shall be equipped with equipment for making the sound signals prescribed in the International Regulations for Preventing Collisions at Sea, where applicable.
- (2) A sea RPA should be equipped with;
 - (i) an anchor, unless it is intended to secure the sea RPA to a fixed berth; and
 - (ii) a sea anchor (drogue), when necessary to assist in manoeuvring.

Note: "Sea RPA" includes amphibians operated as sea RPA.

(b) **RPA not Configured for Sea Operations**

Reserved for future use.

(c) **All RPA on Long-range Over-water Flights**

Reserved for future use.

OPS 4A.425 All RPA Carrying Live Animals or Passengers Over Designated Land Areas

Reserved for future use.

OPS 4A.430 All RPA Carrying Live Animals or Passengers on High Altitude Flights

Reserved for future use.

OPS 4A.435 All RPA in Icing Conditions

- (a) All RPA shall be equipped with suitable de-icing and/or anti-icing devices when operated in circumstances in which icing conditions are reported to exist or are expected to be encountered.
- (b) The RPA shall be equipped with an ice detection system, when required, in order to comply with (a).

**OPS 4A.440 All RPAS Operated in Accordance With Instrument Flight Rules**

- (a) All RPAS when operated in accordance with the instrument flight rules shall be equipped with a means of detecting as a minimum the following information;
- (1) magnetic heading;
 - (2) pressure altitude;
 - (3) airspeed;
 - (4) RPA attitude;
 - (5) outside air temperature;
 - (6) rate-of-climb and descent; and
 - (7) failures of an altitude, airspeed or attitude system.

Note: This may be met by one or a combination of systems provided that the safeguards against total failure are retained.

- (b) For operations in accordance with instrument flight rules, this information shall be displayed at the RPS to the remote pilot(s).

Note: This may be met by one or a combination of displays provided that the safeguards against total failure are retained.

- (c) RPAS shall be equipped with such additional instruments and equipment as may be prescribed by the appropriate authority.

OPS 4A.445 RPS Emergency Power Supply

- (a) The RPS shall be fitted with an emergency power supply, independent of the main electrical supply or generated power supply systems, which is capable of providing power for a duration that is sufficient to implement contingency actions or transfer control of the RPA to an alternate RPS.
- (b) The emergency power supply shall be automatically operative after the total failure of the main electrical generating system and clear indication shall be given that the RPS is being operated on emergency power.
- (c) When operating on emergency power supply, the RPS shall provide the remote pilot with, as a minimum, the essential flight information required to conduct a safe recovery.

OPS 4A.450 All RPA When Operated at Night

- (a) All RPA when operated at night shall be equipped with;
- (1) all equipment as specified in OPS 4A.440;
 - (2) the lights required by CAR OPS 0, Appendix 4 for aircraft in flight or operating on the movement area of an aerodrome; and



- (3) two landing lights.

OPS 4A.455 Pressurised RPA When Carrying Animals or Passengers — Weather Radar

Reserved for future use.

OPS 4A.460 All RPA Operated Above 15000 m (49000 ft) — Radiation Indicator

Reserved for future use.

OPS 4A.465 Mach Number Indicator

RPA with speed limitations expressed in terms of Mach number shall be equipped with a means of displaying Mach number in the RPS.

OPS 4A.470 Ground Proximity Warning Systems (GPWS)

(a) Applicability

- (1) Unless the design of the RPAS already includes a capability to fully address the risk of ground collision, all RPA conducting IFR operations shall be equipped with a GPWS which has a forward-looking terrain avoidance function.
- (2) When a GPWS is installed in a RPA, the operator shall implement database management procedures that ensure the timely distribution and update of current terrain and obstacle data to the GPWS.
- (3) A GPWS shall provide, automatically, a timely and distinctive warning to the remote flight crew when the RPA is in potentially hazardous proximity to the earth's surface.
- (4) A GPWS shall provide, unless otherwise specified herein, warnings of the following circumstances;
 - (i) excessive descent rate;
 - (ii) excessive terrain closure rate;
 - (iii) excessive altitude loss after take-off or go-around;
 - (iv) unsafe terrain clearance while not in landing configuration;
 - (v) gear not locked down;
 - (vi) flaps not in a landing position; and
 - (vii) excessive descent below the instrument glide path.

OPS 4A.475 RPA Carrying Passengers — Cabin Crew Seats

Reserved for future use.

**OPS 4A.480 Emergency Locator Transmitter (ELT)**

Only RPA configured to carry persons on board shall be equipped with an ELT.

OPS 4A.485 Location of a RPA in Distress

Note: RPAS SARPs do not currently address RPA with persons on board. Consequently, provisions that apply to RPAS search and rescue services have not been developed.

OPS 4A.490 Detect and Avoid Capability**(a) DAA operational requirements**

- (1) The Authority shall ensure that the operator has established and documented the operational limitations, procedures for the use of, and training requirements for, the DAA equipment.
- (2) Any RPAS operated in accordance with IFR shall have a DAA capability which enables the remote pilot to avoid conflicting traffic and other hazards.

Note: Other hazards may refer to terrain, weather, wake turbulence, incompatible airspace activity and, when the aircraft is on the ground, surface vehicles and other obstructions on the movement area of an aerodrome.

- (3) A DAA airborne collision avoidance capability shall operate in accordance with the relevant provisions of Annex 10, Volume IV, Parts 1 and 2.

Note: DAA capability does not necessarily require RPAS installed equipment. It may be supported by other forms of external equipment, (e.g. ground-based detect and avoid system) if necessary, to perform its function.

- (4) DAA shall provide the remote pilot with the capability of exercising vigilance for the purpose of detecting and avoiding potential collisions with other aircraft.
- (5) DAA shall provide the remote pilot with the capability of ensuring appropriate action is taken when different hazards are present at the same time whether DAA for these hazards is provided by one system or different systems.
- (6) The remote pilot shall be able to intervene in the management of automated hazard avoidance manoeuvres, except in the case of a C2 Link interruption.
- (7) RPAS controls, displays and alerts shall enable the remote pilot to recognize when an action may be necessary to override an automated hazard avoidance manoeuvre.

(b) Automated collision avoidance

- (1) The RPA shall be equipped with an automated system that performs appropriate collision avoidance manoeuvres, except when the collision avoidance responsibilities of the remote pilot can be adequately exercised using other means.
- (2) Notwithstanding the provisions in (1), the Authority may approve RPAS operations without automated collision avoidance, based on the results of a specific safety risk assessment conducted by the operator which demonstrates how an equivalent level of safety will be maintained. The specific safety risk assessment shall include at least the;



- (i) integrity and performance of the C2 Link;
- (ii) diversity of multiple C2 Links, if installed; and
- (iii) reliability of other systems that are required to allow the remote pilot to exercise control of the RPA flight trajectory.

Note: The presence of any single-point failures in one or more RPAS systems that could lead to frequent and/or long -duration loss of the remote pilot's ability to control the RPA flight trajectory will require an automated means to conduct manoeuvres to avoid conflicting traffic.

OPS 4A.495 Requirements for Pressure-Altitude Reporting Transponders

- (a) All RPA shall be equipped with a Mode S transponder which operates in accordance with the relevant provisions of ICAO Annex 10, Volume IV.
- (b) All RPA shall be equipped with a data source that provides pressure-altitude information with a resolution of 7.62 m (25 ft.), or better.
- (c) The Mode S transponder shall be provided with the airborne/on-the-ground status of the RPA.

Note: These provisions will improve the effectiveness of airborne collision avoidance systems as well as air traffic services that employ Mode S radar. In particular, tracking processes are significantly enhanced with a resolution of 7.62 m (25 ft.), or better.

OPS 4A.500 Microphones

All remote flight crew members required to be on duty at the RPS shall communicate through hands-free microphones whenever the situation is such that they shall not be distracted by the overall environment within the RPS and at all times during;

- (a) the departure and arrival phases of the flight; and
- (b) periods when close monitoring of the flight is deemed to be essential.

OPS 4A.505 Remotely Piloted Aeroplanes — Forward-Looking Wind Shear Warning System

- (a) All remotely piloted aeroplanes should be equipped with a forward-looking wind shear warning system.
- (b) A forward-looking wind shear warning system should be capable of providing the remote pilot with a timely aural and visual warning of wind shear ahead of the remotely piloted aeroplane, and the information required to permit the remote pilot to safely commence and continue a missed approach or go-around or to execute an escape manoeuvre if necessary. The system should also provide an indication to the remote pilot when the limits specified for the certification of automatic landing equipment are being approached, when such equipment is in use.

OPS 4A.510 Documents Held by the Operator

The following documents, manuals and information specific to the operator, shall be available, in the authentic form, at the location of the operator's operational management location or other location specified by the Authority;



- (a) the ROC;
- (b) operations specifications relevant to the RPA and RPS models, associated with the ROC;
- (c) special authorisations obtained from States, if applicable, as required by OPS 4A.010;
- (d) certificate of registration of each RPA;
- (e) certificate of airworthiness of each RPA;
- (f) radio station licence(s), if applicable;
- (g) noise certificate(s), if applicable;
- (h) documents of any additional RPAS components, if applicable;
- (i) flight manual(s) of each model of RPA;
- (j) operations manual;
- (k) maintenance control manual (MCM);
- (l) contract(s) and service level agreement(s) with third parties providing safety-related services, if applicable;
- (m) third party liability insurance certificate(s) if required;
- (n) emergency response plan (ERP) to cover actions resulting from risks to the RPS, such as earthquakes, floods, security incidents, etc.; and
- (o) any other document required by the Authority.

OPS 4A.515 Documents Carried on Board the RPA

- (a) A certified true copy of the ROC, and a copy of the operations specifications relevant to the RPA, issued in conjunction with the certificate shall be carried on the RPA and be available at each RPS used in the operation.
- (b) Additionally, the following documents shall be readily accessible on board each RPA and be available at each RPS used in the operation, for inspection by authorised inspection authorities. When these documents are issued in a language other than English, an English translation shall be included;
 - (1) RPA certificate of registration;
 - (2) RPA certificate of airworthiness;
 - (3) appropriate licences for each member of the remote flight crew;
 - (4) RPA radio station licence;
 - (5) noise certificate, if applicable;



- (6) RPA journey log book;

Note: In addition, the RPA journey log book may have sections that are also maintained at each RPS, used in the operation.

- (7) RPA technical log; and

- (8) if it carries cargo, a manifest and detailed declarations of the cargo.

- (c) The format and access (e.g. paper or electronic) of the documents shall be acceptable to the Authority and all States involved in the operation.

Note 1: The documents listed above may be accessed electronically through information on board the RPA, such as a QR code.

Note 2: States involved in the operation could include the State of Registry, the State where the RPA departed, the State of intended landing and any States that are overflown.

OPS 4A.520 Documents at the RPS

- (a) As a minimum, the following documents, manuals and information shall be available at each RPS used for the operation;
 - (1) appropriate licences for each member of the remote flight crew involved in the operation, during respective duty periods;
 - (2) flight manual, or pertinent subset thereof, including configuration deviation list (CDL);
 - (3) operations manual or pertinent subset thereof, including the minimum equipment list (MEL);
 - (4) applicable checklists;
 - (5) operations specifications relevant to the RPA and RPS models;
 - (6) RPA journey log book;
 - (7) RPA technical log;
 - (8) RPS technical log;
 - (9) details of the filed and the current ATS and operational flight plans, if applicable;
 - (10) current and suitable aeronautical charts for the route of flight and all routes along which it is reasonable to expect that the flight may be diverted, including departure, arrival and approach charts for all relevant aerodromes/heliports, or electronic access to such charts;
 - (11) information concerning search and rescue services for the area of the intended flight;
 - (12) NOTAM and aeronautical information service (AIS) briefing documentation or electronic access to it;
 - (13) meteorological information;



- (14) fuel requirements, fuel load and records;
 - (15) if the RPA carries cargo, a manifest and detailed declarations of the cargo;
 - (16) if the RPA carries dangerous goods, the notification of dangerous goods;
 - (17) mass and balance documentation; and
 - (18) any other documentation that may be pertinent to the flight or be required by the State(s) involved in the operation.
- (b) The format and access (e.g. electronic) of the documents listed above shall be acceptable to the Authority and the State where the RPS is located.
- (c) Documents, manuals and information retained at the RPS shall be provided upon request to a State authority inspecting the RPS or the RPA, in the most efficient manner available.



CHAPTER 7

RPS COMMUNICATION, NAVIGATION & SURVEILLANCE EQUIPMENT

OPS 4A.525 Communication Equipment

- (a) The RPAS communication equipment readily available to the remote pilot shall be capable of;
- (1) conducting two-way communication for aerodrome control purposes;
 - (2) receiving meteorological information at any time during flight; and
 - (3) conducting two-way communication at any time during flight with at least one aeronautical station and with such other aeronautical stations and on such frequencies as may be prescribed by the appropriate authority.

Note: These requirements are considered fulfilled if the ability to conduct the communications specified therein is established during radio propagation conditions which are normal for the route.

- (b) The RPAS radio communication equipment shall provide for communication on the aeronautical emergency frequency 121.5 MHz.
- (c) For operations where communication equipment is required to meet RCP specification for performance-based communication (PBC), the RPAS shall, in addition to the requirements specified in (a);
- (1) be provided with communication equipment which will enable it to operate in accordance with the prescribed required communication performance (RCP) specification(s);
 - (2) have information relevant to the RPAS RCP specification capabilities listed in the flight manual or other RPAS documentation approved by the State of Design or State of Registry; and
 - (3) have information relevant to the RPAS RCP specification capabilities included in the MEL.
- (d) The Authority shall, for operations where an RCP specification for PBC has been prescribed, ensure that the operator has established and documented;
- (1) normal and abnormal procedures, including contingency procedures;
 - (2) remote flight crew qualification and proficiency requirements, in accordance with appropriate RCP specifications;
 - (3) a training programme for relevant personnel consistent with the intended operations; and
 - (4) appropriate maintenance procedures to ensure continuing airworthiness, in accordance with appropriate RCP specifications.

Note: The Authority may require an alternate means of communication with ATC, if ATC communications are relayed via the RPA, in order to mitigate failure of the RPA relay function.



- (e) The Authority shall ensure that, in respect of those RPAS mentioned in (c) above, adequate provisions exist for;
 - (1) receiving the reports of observed communication performance issued by monitoring programmes established in accordance with ICAO Annex 11, Chapter 3; and
 - (2) taking immediate corrective action for individual RPAS, RPAS types or operators, identified in such reports as not complying with the RCP specification(s).

OPS 4A.530 Navigation Equipment

- (a) A RPAS shall be provided with navigation equipment which will enable the remote pilot to proceed;
 - (1) in accordance with the operational flight plan; and
 - (2) in accordance with the requirements of air traffic services.
- (b) For operations where a navigation specification for performance-based navigation (PBN) has been prescribed, a RPAS shall, in addition to the requirements specified in (a);
 - (1) be provided with navigation equipment which will enable it to operate in accordance with the prescribed navigation specification(s);
 - (2) have information relevant to the RPAS navigation specification capabilities listed in the flight manual or other RPAS documentation approved by the State of Design or State of Registry; and
 - (3) have information relevant to the RPAS navigation specification capabilities included in the MEL.
- (c) The Authority shall, for operations where a navigation specification for PBN has been prescribed, ensure that the operator has established and documented;
 - (1) normal and abnormal procedures including contingency procedures;
 - (2) remote flight crew qualification and proficiency requirements in accordance with the appropriate navigation specifications;
 - (3) a training programme for relevant personnel consistent with the intended operations; and
 - (4) appropriate maintenance procedures to ensure continuing airworthiness in accordance with the appropriate navigation specifications.

Note: Electronic navigation data management is an integral part of normal and abnormal procedures.

- (d) The Authority shall issue a specific approval for operations based on PBN authorisation required (AR) navigation specifications.
- (e) For flights in defined portions of airspace where, based on Regional Air Navigation Agreement, minimum navigation performance specifications (MNPS) are prescribed, a RPAS shall include navigation equipment which;



- (1) continuously provides indications to the remote flight crew of adherence to or departure from track to the required degree of accuracy at any point along that track; and
 - (2) has been authorised by the Authority for the MNPS operations concerned.
- (f) For flights in defined portions of airspace where, based on Regional Air Navigation Agreement, a reduced vertical separation minimum (RVSM) of 300 m (1000 ft.) is applied between FL 290 and FL 410 inclusive;
- (1) a RPAS shall be provided with equipment which is capable of;
 - (i) indicating to the remote flight crew the flight level being flown;
 - (ii) automatically maintaining a selected flight level;
 - (iii) providing an alert to the remote flight crew when a deviation occurs from the selected flight level. The threshold for the alert shall not exceed ± 90 m (300 ft.);
 - (iv) automatically reporting pressure-altitude; and
 - (2) the Authority shall issue a specific approval for RVSM operations.
- (g) Prior to granting the RVSM specific approval, the Authority shall be satisfied that;
- (1) the vertical navigation performance capability of the RPAS satisfies the requirements specified in Appendix 4;
 - (2) the operator has instituted appropriate procedures in respect of continuing airworthiness (maintenance and repair) practices and programmes; and
 - (3) the operator has instituted appropriate remote flight crew procedures for operations in RVSM airspace.
- Note: An RVSM specific approval is valid globally on the understanding that any operating procedures specific to a given region will be stated in the operations manual or appropriate remote flight crew guidance.*
- (h) The Authority, in consultation with the State of Registry if appropriate, shall ensure that, in respect of those RPAS mentioned in (f)(1), adequate provisions exist for;
- (1) receiving the reports of height-keeping performance issued by the monitoring agencies established in accordance with ICAO Annex 11, Chapter 3; and
 - (2) taking immediate corrective action for individual RPAS, or type of RPAS, identified in such reports as not complying with the height-keeping requirements for operation in airspace where RVSM is applied.
- (i) The Authority, if it has issued an RVSM specific approval to an operator, shall require that a minimum of two RPA from each RPA type grouping of the operator have their height keeping performance monitored, at least once every two years or within intervals of 1000 flight hours per RPA, whichever period is longer.



- (j) If an operator RPA type grouping consists of a single RPA, monitoring of that RPA shall be accomplished within the specified period.

Note: Monitoring data from any regional monitoring programme established in accordance with ICAO Annex 11, Chapter 3, may be used to satisfy the requirement.

- (k) The Authority, having issued RVSM specific approvals to owners/operators within their State, shall ensure that appropriate action will be taken in respect of RPAS and owners/operators found to be operating in RVSM airspace without a valid RVSM specific approval.

Note: These provisions and procedures need to address both the situation where the RPAS in question was operating without a specific approval in the airspace of the State, and the situation where an operator for which the State has regulatory oversight responsibility is found to be operating without the required specific approval in the airspace of a State.

- (l) The RPAS shall be sufficiently provided with navigation equipment to ensure that, in the event of the failure of one item of equipment at any stage of the flight, the remaining equipment will enable the RPAS to navigate in accordance with subparagraph (a) and where applicable (b), (e) and (f).

Note: This requirement may be met by means other than the duplication of equipment.

- (m) At each aerodrome at which a RPAS operator intends to execute an instrument approach and landing, including at any designated alternate aerodromes, a RPAS shall be provided with a navigation capability that provides;

- (1) sufficient performance and functionality to guide the RPA to landing; or
- (2) to allow the remote pilot to conduct a landing under VLOS or through indirect observation utilising appropriately certified visual surveillance system or methodology.

- (n) When the RPA is taxiing, the RPAS shall be provided with a navigation capability providing sufficient performance and functionality to guide the RPA to a designated point on the movement area.

Note: This requirement applies equally for situations where the RPA is being taxied under the direct control of the remote pilot, or where the RPA is taxiing under an automated function.

OPS 4A.535 Surveillance Equipment

- (a) A RPAS shall be provided with surveillance equipment which will enable it to operate in accordance with the requirements of air traffic services.
- (b) For operations where surveillance equipment is required to meet a required surveillance performance (RSP) specification for performance-based surveillance (PBS), a RPAS shall, in addition to the requirements specified in (a);
- (1) be provided with surveillance equipment which will enable it to operate in accordance with the prescribed RSP specification(s);
 - (2) have information relevant to the RPAS RSP specification capabilities listed in the flight manual or other RPAS documentation approved by the State of Design or State of Registry; and



- (3) have information relevant to the RPAS RSP specification capabilities included in the MEL.
- (c) The Authority shall, for operations where an RSP specification for PBS has been prescribed, ensure that the operator has established and documented;
 - (1) normal and abnormal procedures, including contingency procedures;
 - (2) remote flight crew qualification and proficiency requirements, in accordance with appropriate RSP specifications;
 - (3) a training programme for relevant personnel consistent with the intended operations; and
 - (4) appropriate maintenance procedures to ensure continuing airworthiness, in accordance with appropriate RSP specifications.
- (d) The Authority shall ensure that, in respect of those RPAS mentioned in (b), adequate provisions exist for;
 - (1) receiving the reports of observed surveillance performance issued by monitoring programmes established in accordance with ICAO Annex 11, Chapter 3; and
 - (2) taking immediate corrective action for individual RPAS, RPAS types or operators, identified in such reports as not complying with the RSP specification(s).

OPS 4A.540 Installation

The equipment installation shall be such that the failure of any single unit required for communication, navigation or surveillance purposes or any combination thereof will not result in the failure of another unit required for communication, navigation or surveillance purposes.

OPS 4A.545 Electronic Navigation Data Management

- (a) The operator shall not employ electronic navigation data products that have been processed for application in the air and on the ground unless the Authority has approved the operator's procedures for ensuring that the process applied and the products delivered have met acceptable standards of integrity and that the products are compatible with the intended function of the equipment that will use them.
- (b) The Authority shall ensure that the operator continues to monitor both process and products.
- (c) The operator shall implement procedures that ensure the timely distribution and insertion of current and unaltered electronic navigation data to all necessary RPAS.



CHAPTER 8

AIRCRAFT MAINTENANCE

Note 1: For the purpose of this chapter “aircraft” includes; engines, propellers, power transmissions, rotors, components, accessories, instruments, equipment and other apparatus.

Note 2: The applicable requirements of CAR GEN – General Airworthiness & Registration also apply to RPA operating under OPS 4A.

OPS 4A.550 Operator’s Continuing Airworthiness Responsibilities

- (a) The RPAS operator shall ensure that;
 - (1) the aircraft is maintained in an airworthy condition; and
 - (2) the operational equipment necessary for an intended flight is serviceable; and
 - (3) the certificate of airworthiness of the aircraft remains valid.
 - (4) each RPS conforms to the approved design and is maintained in a condition for the safe operation of the RPAS.
- (b) The operator shall not operate a RPAS unless maintenance on the RPAS, including any associated engine, propeller and part, is carried out;
 - (1) by an organisation that is either approved by the Authority or is approved by a Contracting State and is accepted by the Authority; or
 - (2) by a person or organisation in accordance with procedures that are authorised by the Authority and there is a release to service in relation to the maintenance carried out.
- (c) When the release to service is not issued by an approved maintenance organisation, the person signing the release to service shall be licensed in accordance with ICAO Annex 1.
- (d) The operator shall employ a person or group of persons to ensure that all maintenance is carried out in accordance with the maintenance control manual.
- (e) The RPAS operator shall ensure that the maintenance of the RPAS is performed in accordance with a maintenance programme accepted by the Authority.
- (f) The operator shall ensure that maintenance personnel receive initial and continuation training acceptable to the Authority that includes the application of Human Factors principles.

OPS 4A.555 Maintenance Control Manual

An operator shall provide a maintenance control manual, in accordance with OPS 4A.645, acceptable to the Authority for the use and guidance of maintenance and operations personnel.

**OPS 4A.560 Maintenance Programme**

- (a) The operator shall provide, for the use and guidance of maintenance and operational personnel concerned, maintenance programme(s), approved by the Authority, containing the information required by OPS 4A.650 for RPA, the RPS, any ground-based infrastructure and ground-based equipment under the direct control of the operator.
- (b) The design and application of the operator's maintenance programme shall observe Human Factors principles.

Note: Ground-based infrastructure and equipment includes, inter alia, launch and recovery equipment and any C2 Link equipment under the operator's control, associated with the operation of RPAS.

- (c) Copies of all amendments to the maintenance programme(s) shall be furnished promptly to all organisations or persons to whom the maintenance programme has been issued.

OPS 4A.565 Continuing Airworthiness Records

- (a) The RPAS operator shall ensure that records associated with the maintenance of all components of the RPAS are received from the maintenance organisation and retained in accordance with the RPAS operator's approved procedures and applicable regulations.
- (b) The following maintenance records shall be kept by the RPAS operator for a minimum period of 90 days after the unit to which they refer has been permanently withdrawn from service;
 - (1) the total time in service (hours, calendar time and cycles, as appropriate) of the RPAS and all associated life limited components;
 - (2) the current status of compliance with all applicable mandatory continuing airworthiness information;
 - (3) appropriate details of modifications and repairs;
 - (4) the time in RPAS service (hours, calendar time and cycles, as appropriate) since the last overhaul of the aircraft or its components subject to a mandatory overhaul life;
 - (5) the current status of the RPAS's compliance with the maintenance programme; and
 - (6) the detailed maintenance records to show that all requirements for the signing of a release to service have been met.
- (c) In the event of a temporary change of operator, the records shall be made available to the new operator. In the event of any permanent change of operator, the records shall be transferred to the new operator.

Note: A judgement on what should be considered as a temporary change of operator will be made by the Authority in the light of the need to exercise control over the records, which will depend on access to them and the opportunity to update them.

- (d) For each RPA and each RPS, records kept and transferred shall be maintained in a form and format that ensures readability, security and integrity of the records at all times.



Note: The form and format of the records may include, for example, paper records, film records, electronic records or any combination thereof.

- (e) The detailed maintenance records should be kept for a minimum period of one year after the signing of the release to service to show that all requirements for the signing of a release to service have been met.
- (f) In cases where the State of Registry and Authority are different, the RPAS operator shall ensure that appropriate records for the RPA, RPS and launch/recovery equipment are available at each relevant location for inspection by the competent authority.

OPS 4A.570 Modifications and Repairs

- (a) The RPAS operator shall ensure that all modifications and repairs carried out on the RPAS components are in compliance with airworthiness requirements of CAR 21.433 and 21.435.
- (b) The RPAS operator shall establish procedures to ensure that the substantiating data supporting compliance with the airworthiness requirements are retained for a minimum period of one year.

OPS 4A.575 Release to Service

A release to service shall meet the requirements of CAR GEN, Subpart C.

OPS 4A.580 Technical Log

- (a) The operator of a remotely piloted aircraft shall provide a technical log for the RPAS which has provision for recording;
 - (1) the name of the operator;
 - (2) the registration and designation of the aircraft;
 - (3) record of RPAS utilisation including total time (daily, hours, cycles sectors) as applicable including those cycles, such as landings, pressure cycles, engine power ranges, which affect the life of an aircraft or component;
 - (4) records of fuel and oil;
 - (5) the maintenance status of the RPAS, the identity of the next scheduled inspection, including date/hours/cycles at which any other out of phase maintenance/inspection is required;
 - (6) any defects or abnormal occurrences found during or following a flight; and details of rectification of defects occurring between scheduled inspections including the certificate of release to service for any rectification;
 - (7) details of any deferred rectification including any inoperative RPA/RPS equipment with which the aircraft is permitted to be flown under the applicable CARs relating to the operation of the aircraft;
 - (8) the pre-flight inspection signature;
 - (9) the time spent in particular engine power ranges where the use of such engine power affects the life of the engine, engine component or engine module; and



- (10) the number of landings where landings affect the life of an aircraft or aircraft component.
- (b) The content of the Technical Log may be altered from the above if alternative methods of recording this data acceptable to the Authority are used.
- (c) The Technical Log shall be kept in hard copy form or in electronic coded form provided that this form allows for the preservation and retrieval of information.

OPS 4A.585 Continuing Airworthiness Information

- (a) The operator of a RPAS shall monitor and assess maintenance and operational experience with respect to continuing airworthiness and provide the information as prescribed by the Authority and report through the system specified in the operator's maintenance control manual.
- (b) The operator of a RPAS shall obtain and assess continuing airworthiness information and recommendations available from the organisation responsible for the type design and shall implement resulting actions considered necessary in accordance with the procedures specified in the operator's maintenance control manual.

**CHAPTER 9****REMOTE FLIGHT CREW****OPS 4A.590 Composition of the Remote Flight Crew**

- (a) The number and composition of the remote flight crew shall not be less than that specified in the operations manual. When necessitated by considerations related to the type(s) of RPA and RPS used, the type of operation involved and the duration of flight between points where remote flight crews are changed, the remote flight crew shall include remote flight crew members in addition to the minimum numbers specified in the flight manual or other documents associated with the certificate of airworthiness.
- (b) The operator shall establish procedures for remote flight crew rostering, particularly in consideration of long duration flights.
- (c) At all times during a RPAS operation, the remote flight crew shall include at least one member who holds a valid licence, issued by, or rendered valid by, the Authority, as the State of Registry authorising operation of the type of communication equipment to be used.

OPS 4A.595 Remote Flight Crew Member Duties

- (a) The operator shall define the roles and task allocation of remote flight crew members for the operation of the RPAS.
- (b) The operator shall, for each type of RPS, assign to all remote flight crew members the necessary functions they are to perform in an emergency or in a situation requiring emergency evacuation of the RPS.
- (c) Recurrent training in accomplishing these functions shall be contained in the operator's training programme and shall include instruction in the use of all emergency and life-saving equipment required to be installed, and drills in the emergency evacuation of the RPS, when appropriate.

OPS 4A.600 Remote Flight Crew Member Training Programmes

- (a) The operator shall establish and maintain a ground and flight training programme, approved by the Authority, which ensures that all remote flight crew members are adequately trained to perform their assigned duties. The training programme shall;
 - (1) include ground and flight training facilities and properly qualified RPAS instructors as determined by the Authority;
 - (2) consist of ground and flight training in the class or type of RPAS for which the remote flight crew member will be assigned;
 - (3) include appropriate remote flight crew coordination and training in all types of emergency and abnormal situations or procedures caused by engine, airframe or systems malfunctions;
 - (4) include RPS malfunctions, including fire, natural disaster such as earthquakes, or other abnormalities;
 - (5) include training on the causes of upsets and means of prevention;



- (6) include training in knowledge and skills related to flight procedures for the intended area of operation, human performance including threat and error management and in the transport of dangerous goods;
- (7) ensure that all remote flight crew members know the duties for which they are responsible and the relation of these duties to the duties of other remote flight crew members, particularly in regard to abnormal or emergency procedures;
- (8) be given on a recurrent basis, as determined by the Authority and shall include an assessment of competence;
- (9) establish a recurrent crew resource management (CRM) training programme for the remote flight crew; and
- (10) for RPAS equipped with a DAA capability, ensure that each remote flight crew member has been appropriately trained to be competent in the use of such equipment.

Note 1: Flight training may, to the extent deemed appropriate by the Authority, be given in flight simulation training devices approved for that purpose.

Note 2: The scope of the recurrent training may be varied and need not be as extensive as the initial training given in a particular type of RPA and RPS.

Note 3: The use of correspondence courses and written examinations as well as other means may, to the extent deemed feasible by the Authority, be utilised in meeting the requirements for periodic ground training.

- (b) The requirement for recurrent flight training for a particular type of RPA or RPS shall be considered fulfilled by;
 - (1) the use, to the extent deemed feasible by the Authority, of flight simulation training devices approved for that purpose; or
 - (2) the completion within the appropriate period of the proficiency check in that type of RPAS.

OPS 4A.605 Qualifications

- (a) The operator shall only designate a remote pilot to act as remote pilot-in-command if they have;
 - (1) the minimum level of training, experience and currency specified in the operations manual; and
 - (2) in the case of multi-crew operations, completed a command course appropriate for the envisaged operations.
- (b) The operator shall ensure each remote flight crew member;
 - (1) holds a valid licence issued by, or rendered valid by, the Authority;
 - (2) holds the appropriate ratings; and
 - (3) is competent to carry out assigned duties.



- (c) When a remote pilot-in-command or a remote co-pilot is flying several variants of the same RPAS or different RPAS with similar characteristics in terms of operating procedures, systems and handling, the Authority shall decide under which conditions the requirements of (b) above for which variants of RPA and RPS can be combined.

OPS 4A.610 Recent Experience

- (a) The operator shall not assign a remote pilot to act as remote pilot-in-command to perform take-off and landing duties or to operate the flight controls of a RPAS during take-off and landing unless that remote pilot has conducted at least three take-offs and landings within the preceding 90 days with the same combination of RPA and RPS or a flight simulation training device approved for that purpose.
- (b) The operator shall not assign a remote pilot to act as remote pilot-in-command or remote co-pilot for any portion of a flight unless that remote pilot has conducted at least three flights within the preceding 90 days with the same combination of RPA and RPS or a flight simulation training device approved for that purpose.

OPS 4A.615 Remote Pilot-in-Command Area, Route and Aerodrome Qualification

- (a) The operator shall not utilise a remote pilot as remote pilot-in-command on a route or route segment for which that remote pilot is not currently qualified until such remote pilot has complied with (b) and (c) below.
- (b) Each such remote pilot shall demonstrate to the operator an adequate knowledge of;
- (1) the route to be flown, and the aerodromes which are to be used. This shall include knowledge of;
 - (i) the terrain and minimum safe altitudes;
 - (ii) the seasonal meteorological conditions;
 - (iii) the meteorological, communication and air traffic facilities, services and procedures;
 - (iv) the search and rescue procedures;
 - (v) the navigational facilities and procedures, including any long-range navigation procedures, associated with the route along which the flight is to take place; and
 - (2) procedures applicable to flight paths over heavily populated areas and areas of high air traffic density, obstructions, physical layout, lighting, approach aids and arrival, departure, holding and instrument approach procedures, and applicable operating minima.

Note: That portion of the demonstration relating to arrival, departure, holding and instrument approach procedures may be accomplished in an appropriate training device which is adequate for this purpose.

- (c) A remote pilot-in-command shall have made an actual approach into each aerodrome of landing on the route, accompanied by a remote pilot who is qualified for the aerodrome, as a member of the remote flight crew or as a remote pilot observing at the RPS, unless;



- (1) the approach to the aerodrome is not over difficult terrain and the instrument approach procedures and aids available are similar to those with which the remote pilot is familiar, and a margin to be approved by the Authority is added to the normal operating minima, or there is reasonable certainty that approach and landing can be made in visual conditions;
 - (2) the descent from the initial approach altitude can be made by day in visual conditions;
 - (3) the operator qualifies the remote pilot-in-command to land at the aerodrome concerned by means of an adequate pictorial presentation; or
 - (4) the aerodrome concerned is adjacent to another aerodrome at which the remote pilot-in-command is currently qualified to land.
- (d) The operator shall maintain a record, sufficient to satisfy the Authority of the qualification of the remote pilot and of the manner in which such qualification has been achieved.
- (e) The operator shall not continue to utilise a remote pilot as a remote pilot-in-command on a route or within an area specified by the operator and approved by the Authority unless, within the preceding 12 months, that remote pilot has made at least one trip as a remote pilot, or as a remote check pilot, or as a remote pilot observing at the RPS;
- (1) within that specified area; and
 - (2) if appropriate, on any route where procedures associated with that route or with any aerodromes intended to be used for take-off or landing require the application of special skills or knowledge.
- (f) In the event that more than 12 months elapse in which a remote pilot-in-command has not made such a trip on a route in close proximity and over similar terrain, within such a specified area, route or aerodrome, and has not practised such procedures in a training device which is adequate for this purpose, prior to again serving as a remote pilot-in-command within that area or on that route, that remote pilot shall requalify in accordance with (b) and (c) above.

OPS 4A.620 Remote Pilot Proficiency Checks

- (a) The operator shall ensure that piloting technique and the ability to execute emergency procedures is checked in such a way as to demonstrate the remote pilot's competence on each combination of RPA and RPS.
- (b) Where the operation may be conducted under IFR, the operator shall ensure that the remote pilot's competence to comply with such rules is demonstrated to either a remote check pilot of the operator or a representative of the Authority.
- (c) Checks in (a) and (b) above shall be performed twice within any period of one year. Any two such checks which are similar and which occur within a period of four consecutive months shall not alone satisfy this requirement.

Note: Flight simulation training devices approved by the Authority may be used for those parts of the checks for which they are specifically approved.



- (d) When the operator schedules remote flight crew on several combinations of RPA and RPS or different combinations of RPA and RPS with similar characteristics in terms of operating procedures, systems and handling, the Authority shall decide under which conditions the requirements of (a) above for which variants of RPA and RPS can be combined.

OPS 4A.625 Remote Flight Crew Equipment

A remote flight crew member assessed as fit to exercise the privileges of a licence, subject to the use of suitable correcting lenses, shall have a spare set of the correcting lenses readily available when exercising those privileges.



CHAPTER 10

FLIGHT OPERATIONS OFFICER/FLIGHT DISPATCHER

OPS 4A.630 Licensing

- (a) When the Authority requires that a flight operations officer/flight dispatcher, employed in conjunction with an approved method of control and supervision of flight operations, be licensed, that flight operations officer/flight dispatcher shall be licensed in accordance with the provisions of ICAO Annex 1.
- (b) In accepting proof of qualifications other than the option of holding of a flight operations officer/flight dispatcher licence, the Authority in accordance with the approved method of control and supervision of flight operations, shall require that, as a minimum, such persons meet the requirements specified in ICAO Annex 1 for the flight operations officer/flight dispatcher licence.

OPS 4A.635 Knowledge and Competence

- (a) A flight operations officer/flight dispatcher shall not be assigned to duty unless that person has;
 - (1) satisfactorily completed the operator-specific training course that addresses all the specific components of its approved method of control and supervision of flight operations;
 - (2) made, within the preceding 12 months, at least one qualification flight observing the remote flight crew at the RPS over any area for which that individual is authorised to exercise flight supervision. The flight should include landings at as many aerodromes as practicable;

Note: For the purpose of the qualification flight, the flight operations officer/flight dispatcher shall be able to monitor the remote flight crew intercommunication system and radio communications and be able to observe the actions of the remote flight crew.
- (3) demonstrated to the operator a knowledge of;
 - (i) the contents of the operations manual described in Appendix 2;
 - (ii) the radio equipment used by the RPAS;
 - (iii) the navigation equipment used by the RPAS;
- (4) demonstrated to the operator a knowledge of the following details concerning operations for which the officer is responsible and areas in which that individual is authorised to exercise flight supervision;
 - (i) the seasonal meteorological conditions and the sources of meteorological information;
 - (ii) the effects of meteorological conditions on C2 Link and radio reception in the RPAS used;
 - (iii) the peculiarities and limitations of each navigation system which is used by the operation;



- (iv) the RPA loading instructions;
 - (5) demonstrated to the operator knowledge and skills related to human performance relevant to dispatch duties; and
 - (6) demonstrated to the operator the ability to perform the duties specified in OPS 4A.340.
- (b) A flight operations officer/flight dispatcher assigned to duty should maintain complete familiarisation with all features of the operation which are pertinent to such duties, including knowledge and skills related to human performance.
- (c) A flight operations officer/flight dispatcher should not be assigned to duty after 12 consecutive months of absence from such duty, unless the provisions of (a) above are met.



CHAPTER 11

MANUALS LOGS & RECORDS

OPS 4A.640 Flight Manual

The aircraft flight manual shall be updated by implementing changes made mandatory by the Authority.

OPS 4A.645 RPAS Maintenance Control Manual

- (a) The operator shall provide, for the use and guidance of maintenance and operational personnel concerned, a maintenance control manual (MCM) acceptable to the Authority.
- (b) The RPAS operator shall provide copies of the maintenance control manual at each RPS and maintenance location.
- (c) The RPAS operator shall provide the Authority with a copy of the operator's maintenance control manual, together with all amendments and/or revisions to it and shall incorporate in it such mandatory material as the Authority may require.
- (d) The design of the manual shall observe the Human Factors.
- (e) An operator's maintenance control manual, which may be issued in separate parts, shall contain the following information;
 - (1) A description of the procedures required by OPS 4A.550(a) including, when applicable
 - (i) a description of the administrative arrangements between the operator and the approved maintenance organisation;
 - (ii) a description of the RPA and RPS maintenance procedures for completing and signing a release to service when maintenance is based on a system other than that of an approved maintenance organisation;
 - (2) names and duties of the person or persons required by OPS 4A.550(d);
 - (3) a reference to the maintenance programme;
 - (4) a description of the methods used for the completion and retention of the operator's continuing airworthiness records;
 - (5) a description of the procedures for monitoring, assessing and reporting maintenance and operational experience;
 - (6) a description of the procedures for complying with the service information reporting requirements of CAR GEN.205(g) & (h);
 - (7) a description of the procedures for assessing continuing airworthiness information and implementing any resulting actions;
 - (8) a description of the procedures for implementing action resulting from mandatory continuing airworthiness information;



- (9) a description of establishing and maintaining a system of analysis and continued monitoring of the performance and efficiency of the maintenance programme, in order to correct any deficiency in that programme;
- (10) a description of the RPA and RPS types and models to which the manual applies;
- (11) a description of the procedures for ensuring that unserviceabilities affecting airworthiness are recorded and rectified; and
- (12) a description of the procedures for advising the Authority of significant in-service occurrences.

OPS 4A.650 Maintenance Programme

- (a) An operator shall provide, for the use and guidance of maintenance and operational personnel concerned, a maintenance programme, acceptable to the Authority, containing the information required by (d) below.
- (b) The design and application of the operator's maintenance programme shall observe Human Factors principles.
- (c) Copies of all amendments to the maintenance programme shall be furnished promptly to all organisations or persons to whom the maintenance programme has been issued.
- (d) The maintenance programme for each RPA, each RPS and any ground-based communication infrastructure, shall contain the following information;
 - (1) maintenance tasks and the intervals at which these are to be performed taking into account the anticipated utilisation of the RPAS;
 - (2) when applicable, a continuing structural integrity programme (SIP);
 - (3) procedures for deviating from (a) and (b) above for tasks that do not have mandatory designations from the State of Design; and
 - (4) when applicable, condition monitoring and reliability programme descriptions for RPAS, and all its components.
- (e) Maintenance tasks and intervals that have been specified as mandatory in approval of the type design, shall be identified as such.
- (f) The maintenance programme should be based on maintenance programme information made available by the State of Design or by the organisation responsible for the type design, and any additional applicable experience.

OPS 4A.655 Operations Manual

- (a) A RPAS operator shall provide an operations manual, approved by the Authority, for the use and guidance of the RPAS operations personnel concerned.
- (b) The operations manual shall be amended or revised as is necessary to ensure that the information contained therein is kept up to date. All such amendments or revisions shall be issued to all personnel that are required to use this manual.



- (c) The RPAS operator shall provide a copy of the operations manual together with all amendments and/or revisions, for review and acceptance and, where required, approval.
- (d) The RPAS operator shall incorporate in the operations manual such mandatory material as the Authority may require.
- (e) The operations manual, which may be issued in separate parts corresponding to specific aspects of operations, shall be organised in the following structure;
 - (1) general;
 - (2) RPAS operating information for each RPA type operated, which includes each associated RPS model, containing the normal, abnormal and emergency procedures relating to the operation of all the relevant systems associated with the operation of each RPA and of the checklists to be used.
 - (3) areas, routes and aerodromes; and
 - (4) training.

Note: The design of RPAS operating manuals should observe human performance principles.

OPS 4A.660 Journey Log Book

- (a) A journey log book shall be maintained for every RPA engaged in international air navigation in which particulars of the RPAS and its crew shall be entered at the end of the duty period of each remote pilot-in-command.

Note: A RPA journey log may also consist of a section that stays in the RPA and a RPS section at each remote pilot station.

- (b) The aircraft journey log should contain the following items;
 - (1) RPA nationality and registration;
 - (2) a record of each RPS used in the course of a flight;
 - (3) the duration of use for each RPS and the times of transfer between RPS;
 - (4) date;
 - (5) names and duty assignments of remote flight crew members and other remote crew members;
 - (6) departure and arrival points and times;
 - (7) purpose and type of flight;
 - (8) incidents, observations regarding the RPAS, if any; and
 - (9) signature of the remote pilot(s)-in-command.



- (c) A signature should be required for each instance in which the remote pilot-in-command is changed, which, during long duration flights, may occur while the RPA remains airborne.
- (d) Completed journey log book should be retained to provide a continuous record of the last six months' operations.

Note: The journey log may need to accommodate multiple remote pilot-in-command signature blocks.

OPS 4A.665 Minimum Equipment List

Where a master minimum equipment list (MMEL) is established, the operator shall include in the operations manual a minimum equipment list (MEL) approved by the Authority, which will enable the remote pilot-in-command to determine whether a flight may be commenced or continued from any intermediate stop should any RPAS instrument, equipment or systems become inoperative.

OPS 4A.670 Flight Recorder Records

- (a) The operator shall ensure, to the extent possible, in the event the RPAS becomes involved in an accident or incident, the preservation of all related RPA-RS and RPS-RS records and, if necessary, the associated recorders, and their retention in safe custody pending their disposition as determined in accordance with ICAO Annex 13.
- (b) In the event a contracted RPS service provider is used, the operator shall ensure, in the event the RPAS becomes involved in an accident or incident, the preservation of all related RPS-RS records and, if necessary, the associated recorders, and their retention in safe custody pending their disposition as determined in accordance with ICAO Annex 13.

OPS 4A.675 Record-Keeping

- (a) A RPAS operator shall establish a system of record-keeping that allows adequate storage and reliable traceability of all activities developed, covering in particular all the elements related to RPAS operations as defined in the operations manual and management system processes as defined in this chapter covering at a minimum;
 - (1) operator's organisation;
 - (2) SMS or risk assessments;
 - (3) personnel training and competence verification;
 - (4) documentation of all management system key processes;
 - (5) maintenance records; and
 - (6) security management records.
- (b) The format of the records shall be specified in the operations manual.
- (c) Records shall be stored in a manner that ensures protection from damage, alteration and theft for the periods shown in the Tables below.

**Table 1 – Information used for the preparation and execution of a flight**

Information used for the preparation and execution of the flight	
Operational flight plan	3 months
Aeroplane Technical Log	36 months after the date of the last entry.
Route specific NOTAM/AIS briefing documentation if edited by the operator	3 months
Mass and balance documentation	3 months
Notification of special loads including written information to the commander about dangerous goods	3 months

Table 2 – Reports

Reports	
Journey log	6 months
Flight report(s) for recording details of any occurrence, or any event which a pilot-in-command deems necessary to report/record	3 months
Reports on exceedances of duty and/or reducing rest periods	3 months
Fuel and oil records	3 months

Table 3 – Flight crew records

Flight Crew Records	
Flight duty periods, Duty periods and Rest periods	15 months
Licence/validation	As long as the flight crew member is exercising the privileges of the licence for the operator
Conversion training and checking	3 years
Command course (including checking)	3 years
Recurrent training and checking	3 years
Training and checking to operate in either pilot's seat	3 years
Recent experience	15 months
Route and aerodrome competence	3 years
Training and qualification for specific operations when required by OPS 4	3 years
Dangerous Goods training as appropriate	3 years

**Table 4 – Records for other operations personnel**

Records for other operations personnel	
Training/qualification records of other personnel for whom an approved training programme is required by OPS 4A.	Last 2 training records

Table 5 – Other records

Other Records	
Quality System records	3 years
Dangerous Goods Transport Document	3 months after completion of the flight
Dangerous Goods Acceptance Checklist	3 months after completion of the flight



CHAPTER 12

CABIN CREW
(Reserved)

**CHAPTER 13****SECURITY****OPS 4A.700 General**

- (a) The Authority shall establish the structure, responsibilities, processes and procedures to promote and establish a culture of continuous improvement and enhancement of aviation security for RPAS operations.
- (b) The Authority shall ensure the development and implementation of RPAS-related training programmes and a certification system that ensures that RPAS instructors are qualified in the applicable subject matters in accordance with the national civil aviation security programme.

Note: In the context of this chapter, the word “security” is used in the sense of prevention of illicit acts against civil aviation.

OPS 4A.705 Aerodrome Operations

The Authority shall require aerodromes serving RPAS operations to include within their written airport security programme measures for RPAS operations appropriate to meet the requirements of the national civil aviation security programme.

OPS 4A. 710 RPAS Operator Security

- (a) Operators of RPAS shall establish, implement and maintain a written RPAS operator security programme, and an associated training programme, that meets the requirements of the national civil aviation security programme.
- (b) The operator shall be responsible for ensuring the security of the RPAS before, during and after an operation.
- (c) The operator shall be responsible for ensuring that only authorised persons have access to the RPS.

OPS 4A.715 Reporting Acts of Unlawful Interference

- (a) Following an act of unlawful interference, the remote pilot-in-command shall submit, without delay, a report of such an act to the designated local authority.
- (b) The Authority, when concerned with an act of unlawful interference involving RPAS, shall provide ICAO with all pertinent information concerning the security aspects of the act of unlawful interference as soon as practicable after the act is resolved.



CHAPTER 14

DANGEROUS GOODS

OPS 4A.720 General

Transport of dangerous goods as cargo on board RPA shall not be permitted unless the Authority has issued a specific approval.

OPS 4A.725 Operators with No Specific Approval for the Transport of Dangerous Goods

- (a) An operator, with no specific approval to transport dangerous goods, shall;
 - (1) establish a dangerous goods training programme that meets the requirements of ICAO Annex 18, the applicable requirements of Technical Instructions, Part 1, Chapter 4, and the CAR DG, as appropriate.
 - (2) establish dangerous goods policies and procedures in its operations manual to meet, at a minimum, the requirements of Annex 18, the Technical Instructions and CAR DG to allow operator personnel to;
 - (i) identify and reject undeclared dangerous goods, including COMAT classified as dangerous goods;
 - (ii) report to the appropriate authorities of the Authority and the State in which it occurred any occasions when undeclared dangerous goods are discovered in cargo or mail and dangerous goods accidents and incidents.
- (b) Details of the dangerous goods training programme shall be included in the operator's operations manual.

OPS 4A.730 Operators with a Specific Approval for the Transport of Dangerous Goods

- (a) The Authority shall issue specific approval for the transport of dangerous goods and ensure that the operator;
 - (1) establishes a dangerous goods training programme that meets the requirements of Annex 18, the Technical Instructions, Part 1, Chapter 4, and CAR DG, as appropriate.
 - (2) establishes dangerous goods policies and procedures in its operations manual to meet, at a minimum, the requirements of ICAO Annex 18, the Technical Instructions and CAR DG to enable operator personnel to;
 - (i) identify and reject undeclared or mis declared dangerous goods, including COMAT classified as dangerous goods;
 - (ii) report to the appropriate authorities of the Authority and the State in which it occurred any;
 - (A) occasions when undeclared or mis declared dangerous goods are discovered in cargo or mail;
 - (B) dangerous goods accidents and incidents;



- (iii) report to the appropriate authorities of the Authority and the State of Origin any occasions when dangerous goods are discovered to have been carried;
 - (A) when not loaded, segregated, separated or secured in accordance with Technical Instructions, Part 7, Chapter 2;
 - (B) without information having been provided to the remote pilot-in-command;
 - (iv) accept, handle, store, transport, load and unload dangerous goods, including COMAT classified as dangerous goods as cargo on board a RPA;
 - (v) provide the remote pilot-in-command with accurate information concerning dangerous goods that are to be carried as cargo in the format required in Annex 18 and the Technical Instructions; and
 - (vi) notify emergency services at the scene of an incident or accident of the information provided to the remote pilot on the NOTOC.
- (b) Details of the dangerous goods training programme shall be included in the operator's operations manual.

OPS 4A.735 Provision of Information

The operator shall ensure that all personnel, including third-party personnel, involved in the acceptance, handling, loading and unloading of cargo are informed of the operator's specific approval and limitations with regard to the transport of dangerous goods.



CHAPTER 15

CARGO COMPARTMENT SAFETY

OPS 4A.740 Transport of Items in the Cargo Compartment

The Authority shall ensure that the operator establishes policies and procedures for the transport of items in the cargo compartment, which include the conduct of a specific safety risk assessment. The safety risk assessment shall include at least the;

- (a) hazards associated with the properties of the items to be transported;
- (b) capabilities of the operator;
- (c) operational considerations (e.g. area of operations, diversion time);
- (d) capabilities of the RPA and its systems (e.g. cargo compartment fire suppression capabilities);
- (e) containment characteristics of unit load devices;
- (f) packing and packaging;
- (g) safety of the supply chain for items to be transported; and
- (h) quantity and distribution of dangerous goods items to be transported.

Note: Additional operational requirements for the transport of dangerous goods are contained in Chapter 14.

OPS 4A.745 Fire Protection

- (a) The elements of the cargo compartment(s) fire protection system, as approved by the State of Design and a summary of the demonstrated cargo compartment fire protection certification standards, shall be provided in the flight manual or other documentation supporting the operation of the RPAS.
- (b) The Operator shall establish policies and procedures that address the items to be transported in the cargo compartment. These shall ensure, to a reasonable certainty, that in the event of a fire involving those items, it can be detected and sufficiently suppressed or contained by the elements of the RPA design associated with cargo compartment fire protection, until the RPA makes a safe landing.



APPENDIX 1

LIGHTS TO BE DISPLAYED BY RPA

(Refer to CAR OPS 0, Appendix 4)



APPENDIX 2

ORGANISATION AND CONTENTS OF AN OPERATIONS MANUAL

1. Organisation

1.1 An operations manual, which may be issued in separate parts corresponding to specific aspects of RPAS operations, shall be organised with the following structure;

- (a) General;
- (b) RPAS operating information;
- (c) Areas, routes and aerodromes; and
- (d) Training.

2. Contents

The operations manual shall contain at the least the following;

2.1 General

- 2.1.1 Instructions outlining the responsibilities of operations personnel pertaining to the conduct of flight operations.
- 2.1.2 Information and policy relating to fatigue management including;
 - (a) policies pertaining to flight time, flight duty period, duty period limitations and rest requirements for remote flight crew members; and
 - (b) where applicable, policy and documentation pertaining to the operator's FRMS in accordance with Appendix 7.
- 2.1.3 A list of the navigational equipment to be carried including any requirements relating to operations where performance-based navigation is prescribed.
- 2.1.4 Where relevant to the operations, the long-range navigation procedures and the nomination and utilisation of diversion aerodromes.
- 2.1.5 The circumstances in which a radio listening watch is to be maintained.
- 2.1.6 The method for determining minimum flight altitudes.
- 2.1.7 The methods for determining aerodrome operating minima.
- 2.1.8 Ground handling arrangements and procedures.
- 2.1.9 Procedures, as prescribed in ICAO Annex 12, for remote pilots-in-command observing an accident.
- 2.1.10 The remote flight crew for each type of operation including the designation of the succession of command.



- 2.1.11 Specific instructions for the computation of the quantities of fuel and oil to be carried, taking into account all circumstances of the operation including the possibility of the failure of one or more engines while en-route.
- 2.1.12 Instructions for mass and balance control.
- 2.1.13 Instructions for the conduct and control of ground de-icing/anti-icing operations.
- 2.1.14 The specifications for the operational flight plan.
- 2.1.15 Standard operating procedures (SOPs) for each phase of flight.
- 2.1.16 Instructions on the use of normal checklists and the timing of their use.
- 2.1.17 Departure contingency procedures.
- 2.1.18 Instructions on the maintenance of altitude awareness and the use of automated or remote flight crew altitude call out.
- 2.1.19 Instructions on the use of autopilots and auto-throttles.

Note: Instructions on the use of autopilots and auto-throttles are essential for avoidance of approach and landing accidents and controlled flight into terrain accidents.
- 2.1.20 Instructions on the clarification and acceptance of ATC clearances, particularly where terrain clearance is involved.
- 2.1.21 Departure and approach briefings.
- 2.1.22 Procedures for familiarisation with areas, routes and aerodromes.
- 2.1.23 Stabilized approach procedure.
- 2.1.24 Limitation on high rates of descent near the surface.
- 2.1.25 Conditions required to commence or to continue an instrument approach.
- 2.1.26 Instructions for the conduct of precision approach (PA) procedures, approach procedures with vertical guidance (APV) and non-precision approach (NPA) procedures.
- 2.1.27 Allocation of remote flight crew duties and procedures for the management of remote crew workload during night and IMC instrument approach operations.
- 2.1.28 Instructions and training requirements for the avoidance of controlled flight into terrain and, when installed, policy for the use of the ground proximity warning system (GPWS).
- 2.1.29 Policy, instructions, procedures and training requirements for the avoidance of collisions and the use of the detect and avoid (DAA) capability.
- 2.1.30 Information and instructions relating to the interception of civil RPA including;

- (a) procedures, as prescribed in CAR OPS 0, for remote pilots-in-command of intercepted aircraft; and



- (b) visual signals for use by intercepting and intercepted aircraft, as contained in CAR OPS 0.
- 2.1.31 For RPA intended to be operated above 15000 m (49000 ft.), procedures in the event that a decision to descend is taken, covering;
- (a) the necessity of giving the appropriate ATS unit prior warning of the situation and of obtaining a provisional descent clearance; and
 - (b) the action to be taken in the event that communication with the ATS unit cannot be established or is interrupted.
- 2.1.32 Details of the safety management system (SMS) provided in accordance with Appendix 2 to CAR SMS.
- 2.1.33 Information and instructions on the carriage of dangerous goods, in accordance with Chapter 14, including action to be taken in the event of an emergency.
- 2.1.34 Security instructions and guidance.

2.2 RPAS Operating Information

- 2.2.1 Certification limitations and operating limitations.
- 2.2.2 The normal, abnormal and emergency procedures to be used by the remote flight crew and the checklists relating thereto.
- 2.2.3 Operating instructions and information on climb performance with all engines operating, if provided in accordance with Chapter 4.
- 2.2.4 Flight planning data for pre-flight and in-flight planning with different thrust/power and speed settings.
- 2.2.5 The maximum crosswind and tailwind components for each RPA type operated and the reductions to be applied to these values having regard to gusts, low visibility, runway surface conditions, remote crew experience, use of autopilot, abnormal or emergency circumstances, or any other relevant operational factors.
- 2.2.6 Instructions and data for mass and balance calculations.
- 2.2.7 Instructions for RPA loading and securing of load.
- 2.2.8 RPAS systems, associated controls and instructions for their use.
- 2.2.9 The minimum equipment list and configuration deviation list for the RPA types operated and specific operations authorised, including any requirements relating to operations where performance-based navigation is prescribed. Checklist of emergency and safety equipment and instructions for its use.
- 2.2.10 Emergency evacuation procedures for the RPS, including type-specific procedures, remote crew coordination, assignment of remote crew's emergency positions and the emergency duties assigned to each remote crew member.
- 2.2.11 Procedures to mitigate at least the emergencies and contingencies.



2.2.12 Procedures related to the quality of the C2 Link and mitigations for degraded C2 Link.

2.2.13 Procedures for the establishment, assurance and termination of the C2 Link, including switchover procedures.

2.2.14 Procedures to ensure a seamless operation throughout the duration of the flight.

2.3 Routes and Aerodromes

2.3.1 A route guide to ensure that the remote flight crew will have, for each flight, information relating to communication facilities, navigation aids, aerodromes, instrument approaches, instrument arrivals and instrument departures as applicable for the operation, and such other information as the operator may deem necessary for the proper conduct of flight operations.

2.3.2 The minimum flight altitudes for each route to be flown.

2.3.3 Aerodrome operating minima for each of the aerodromes that are likely to be used as aerodromes of intended landing or as alternate aerodromes.

2.3.4 The increase of aerodrome operating minima in case of degradation of approach or aerodrome facilities.

2.3.5 The necessary information for compliance with all flight profiles required by regulations, including but not limited to, the determination of;

- (a) for remotely piloted aircraft, take-off runway length requirements for dry, wet and contaminated conditions, including those dictated by system failures which affect the take-off distance;
- (b) take-off climb limitations;
- (c) en-route climb limitations;
- (d) approach climb limitations and landing climb limitations;
- (e) for remotely piloted aircraft, landing runway length requirements for dry, wet and contaminated conditions, including systems failures which affect the landing distance; and
- (f) supplementary information, such as tyre speed limitations.

2.4 Training

2.4.1 Details of the remote flight crew training programme.

2.4.2 Details of the flight operations officer/flight dispatcher training programme when employed in conjunction with a method of flight supervision in accordance with Chapter 4.

**APPENDIX 3****ADDITIONAL REQUIREMENTS FOR APPROVED OPERATIONS BY SINGLE-ENGINE RPA OVER HEAVILY POPULATED AREAS****1. Engine Reliability**

- 1.1 Engine reliability shall be shown to have a power loss rate of less than 1 per 100,000 engine hours.

Note: Power loss in this context is defined as any loss of power, the cause of which may be traced to faulty engine or engine component design or installation, including design or installation of the fuel ancillary or engine control systems.

- 1.2 The operator shall be responsible for engine trend monitoring.

- 1.3 To minimise the probability of in-flight engine failure, the engine shall be equipped with:

- (a) for an engine that has an ignition system, an ignition system that activates automatically, or is capable of being operated manually, for take-off and landing, and during flight, in visible moisture;
- (b) a magnetic particle detection or equivalent system that monitors the engine, accessories gearbox, and reduction gearbox, and which includes a flight deck caution indication; and
- (c) an emergency engine power control device that permits continuing operation of the engine through a sufficient power range to safely complete the flight in the event of any reasonably probable failure of the fuel control unit, batteries or fuel-cell systems.

2. Systems and Equipment

Single-engine RPA approved to operate over heavily populated areas shall be equipped with the following:

- (a) Systems and equipment capable of transmitting data or transferring capability to the RPS to ensure continued safe flight and to assist in achieving a safe forced landing after an engine failure, under all allowable operating conditions:
 - (1) a radio altimeter;
 - (2) two attitude indicators, powered from independent sources;
 - (3) a means to provide for at least one attempt at engine re-start;
 - (4) a weather radar, if this capability is provided from the RPA;
 - (5) a certified area navigation system capable of being programmed with the positions of aerodromes and safe forced landing areas, and providing instantly available track and distance information to those locations;
 - (6) if the RPAS design is such that a means of external vision from the RPA is available to the remote pilot, a landing light that is independent of the landing gear and is capable of adequately illuminating the touchdown area in a night forced landing; and
 - (7) an engine fire warning system.



- (b) Systems intended to ensure continued safe flight and to assist in achieving a safe forced landing after an engine failure, under all allowable operating conditions:
 - (1) two separate electrical generating systems, each one capable of supplying all probable combinations of continuous in-flight electrical loads for instruments, equipment and systems; and
 - (2) an emergency electrical supply system of sufficient capacity and endurance, following loss of all generated power, to as a minimum:
 - (i) maintain the operation of the C2 Link, detect and avoid (DAA) capabilities and all essential flight instruments, communication and navigation systems during a descent from the maximum certificated altitude in a glide configuration to the completion of a landing;
 - (ii) lower the flaps and landing gear, if applicable;
 - (iii) provide power to one pitot heater, which shall serve an air speed indicator that provides indications to the remote pilot;
 - (iv) provide for one engine restart, if applicable; and
 - (v) provide for the operation of the radio altimeter.

3. Minimum Equipment List

The Authority shall require the minimum equipment list to specify the operating equipment required for over heavily populated areas.

4. Flight Manual Information

The flight manual shall include limitations, procedures, approval status and other information relevant to operations by single-engine RPA over heavily populated areas.

5. Event Reporting

- 5.1 The operator approved for operations by single-engine RPA over heavily populated areas shall report all significant failures, malfunctions or defects to the Authority who in turn will notify the State of Design.
- 5.2 The Authority shall review the safety data and monitor the reliability information so as to be able to take any actions necessary to ensure that the intended safety level is achieved. The Authority will notify major events or trends of particular concern to the appropriate Type Certificate Holder and the State of Design.

6. Operator Planning

- 6.1 Operator route planning shall take account of all relevant information in the assessment of intended routes or areas of operations, including the following:
 - (a) the nature of the terrain to be overflown, including the potential for carrying out a forced landing without unreasonably elevating risk to persons on the surface or other airspace users in the event of an engine failure or major malfunction;



- (b) weather information, including seasonal and other adverse meteorological influences that may affect the flight; and
- (c) other criteria and limitations as specified by the Authority.

6.2 The operator shall identify aerodromes or safe forced landing areas available for use in the event of engine failure, and the position of these shall be programmed into the area navigation system.

Note 1: A 'safe' forced landing in this context means a landing in an area at which it can reasonably be expected that it will not lead to serious injury or loss of life, even though the RPA may incur extensive damage.

Note 2: Operation over routes and in weather conditions that permit a safe forced landing in the event of an engine failure, is not required by 6.1 and 6.2 for RPA approved in accordance with OPS 4A.380 or OPS 4A.385. The availability of forced landing areas at all points along a route is not specified for these RPA because of the very high engine reliability, additional systems and operational equipment, procedures and training requirements specified in this Appendix.

7. Remote Flight Crew Experience, Training and Checking

- 7.1 The Authority shall prescribe the minimum remote flight crew experience required for operations by approved single-engine RPA over heavily populated areas.
- 7.2 The operator's remote flight crew training and checking shall be appropriate to operations over heavily populated areas by approved single-engine RPA, covering normal, abnormal and emergency procedures and, in particular, engine failure, including descent to a forced landing.

8. Route Limitations Over Water

Reserved for future use.

9. Operator Certification or Validation

The operator shall demonstrate the ability to conduct operations by approved single-engine RPA over heavily populated areas through a certification and approval process specified by the Authority.

**APPENDIX 4****ALTIMETRY SYSTEM PERFORMANCE REQUIREMENTS FOR
OPERATIONS IN RVSM AIRSPACE**

1. The design of the altimetry system and any errors therein shall be considered in context of the safety of the entirety of the RPAS flight systems; including but not limited to potential loss or latency of the C2 Link, and the continuing valid operation of the detect and avoid (DAA) capability.
2. In respect of groups of RPA that are nominally of identical design and build with respect to all details that could influence the accuracy of height-keeping performance, the height-keeping performance capability shall be such that the total vertical error (TVE) for the group of RPA shall have a mean no greater than 25 m (80 ft.) in magnitude and shall have a standard deviation no greater than $28 - 0.013z^2$ for $0 \leq z \leq 25$ when z is the magnitude of the mean TVE in metres, or $92 - 0.004z^2$ for $0 \leq z \leq 80$ where z is in feet. In addition, the components of TVE shall have the following characteristics:
 - (a) the mean altimetry system error (ASE) of the group shall not exceed 25 m (80 ft.) in magnitude;
 - (b) the sum of the absolute value of the mean ASE and of three standard deviations of ASE shall not exceed 75 m (245 ft.); and
 - (c) the differences between cleared flight level and the indicated pressure altitude actually flown shall be symmetric about a mean of 0 m, with a standard deviation no greater than 13.3 m (43.7 ft.), and in addition, the decrease in the frequency of differences with increasing difference magnitude shall be at least exponential.
3. In respect of RPA for which the characteristics of the airframe and altimetry system fit are unique and so cannot be classified as belonging to a group of RPA encompassed by paragraph 1, the height-keeping performance capability shall be such that the components of the TVE of the RPA have the following characteristics:
 - (a) the ASE of the RPA shall not exceed 60 m (200 ft.) in magnitude under all flight conditions; and
 - (b) the differences between the cleared flight level and the indicated pressure altitude actually flown shall be symmetric about a mean of 0 m, with a standard deviation no greater than 13.3 m (43.7 ft.), and in addition, the decrease in the frequency of differences with increasing difference magnitude shall be at least exponential.



APPENDIX 5

SAFETY OVERSIGHT OF RPAS OPERATORS

1. Primary Aviation Legislation

The Authority shall enact and implement laws to regulate the certification and continued supervision of RPAS operators and the resolution of safety issues identified by the Authority.

2. SPECIFIC OPERATING REGULATIONS

The Authority shall adopt regulations that provide for the certification and continued surveillance of RPAS operations and the maintenance of RPAS in conformity with the Annexes to the Convention on International Civil Aviation.

3. Safety Oversight System and Functions

- 3.1 The Authority shall ensure that the authority is responsible for the safety oversight of RPAS operators.
- 3.2 The Authority shall use a methodology to determine its inspector staffing requirements according to the size and complexity of civil RPAS operations.
- 3.3 The methodology in 3.2 should be documented.
- 3.4 The Authority shall ensure that authority inspectors have adequate support, credentials and transportation to accomplish, independently, their certification and continued surveillance tasks.
- 3.5 The Authority shall ensure that the operator maintains a complete record of certifications, authorisations and approvals for the RPA, each RPS, and each C2CSP, for each phase of flight, and all operational personnel, covering all phases of the RPAS flight.

4. Qualified Technical Personnel

The Authority shall require that the initial and recurrent training of the authority inspectors include RPAS-specific subjects.

5. Technical Guidance, Tools and Provision of Safety-Critical Information

- 5.1 The Authority shall ensure that authority inspectors are provided with technical guidance manuals containing the policies, procedures and standards to be used in the certification and continued surveillance of RPAS operators.
- 5.2 The Authority shall ensure that authority inspectors are provided with technical guidance manuals containing the policies, procedures and standards to be used in the resolution of safety issues, including enforcement.
- 5.3 The Authority shall ensure that authority inspectors are provided with technical guidance manuals that address ethics, personal conduct and the avoidance of actual or perceived conflicts of interest in the performance of official duties.



6. Certification Obligations

The Authority shall require, prior to commencement of new RPAS operations, RPAS operators to demonstrate that they can safely conduct the proposed operations.

7. Continued Surveillance Obligations

The Authority shall use an ongoing surveillance plan to confirm that operators continue to meet the relevant requirements for initial certification and that each RPAS operator is functioning satisfactorily.

8. Resolution of Safety Issues

Note: Provisions for the resolution of safety issues are contained in Appendix 1 to CAR SMS.



APPENDIX 6

FORMAT AND CONTENT OF RPAS OPERATOR CERTIFICATE (ROC)

1. Purpose and Scope

- 1.1 The ROC and its associated specific operations specifications shall contain the minimum information required as detailed in the paragraphs below, in a standardised format.
- 1.2 The ROC and its associated operations specifications shall define the operations for which the operator is authorised including specific approvals, conditions and limitations.

2. ROC Template

Note: An electronic copy of the ROC is required to be carried on board the RPA.

RPAS OPERATOR CERTIFICATE		
¹	SAN MARINO CIVIL AVIATION AUTHORITY²	¹
	ISSUING AUTHORITY³	
ROC number ⁴ : Expiration date ⁵ :	OPERATOR NAME⁶ Operator's trading name ⁷ : Operator address ⁸ : Telephone ⁹ : Email:	OPERATIONAL POINTS OF CONTACT¹⁰ Contact details, at which operational management can be contacted without delay, are listed in _____ ¹¹ .
This certificate certifies that _____ ¹² is authorised to perform international RPAS operations, as defined in the operations specifications, in accordance with the operations manual and the _____ ¹³ .		
Date of issue ¹⁴ :	Name and signature ¹⁵ : Title	

Notes:

1. *The logo of the Authority.*
2. *Name of the Authority.*
3. *Replace by the identification of the issuing authority of the Authority.*
4. *Unique ROC number, as issued by the Authority..*
5. *Date after which the ROC ceases to be valid (dd-mm-yyyy).*
6. *Replace by the operator's registered name.*
7. *Operator's trading name, if different. Insert "dba" before the trading name (for "doing business as").*
8. *Operator's principal place of business address. Operator's principal place of business telephone details, including the country code. Email to be provided if available.*



9. *The contact details include the telephone numbers, including the country code, and the email address (if available) at which operational management can be contacted without undue delay for issues related to flight operations, airworthiness, remote flight crew competency, dangerous goods and other matters, as appropriate.*
10. *Insert the controlled document, carried on board, in which the contact details are listed, with the appropriate paragraph or page reference, e.g.: “Contact details are listed in the operations manual, Gen/Basic, Chapter 1, 1.1” or “... are listed in the operations specifications, page 1” or “... are listed in an attachment to this document”.*
11. *Operator’s registered name.*
12. *Insertion of reference to the appropriate civil aviation regulations.*
13. *Issuance date of the ROC (dd-mm-yyyy).*
14. *Title, name and signature of the authority representative. In addition, an official stamp may be applied on the ROC.*

3. Operations Specifications for Each RPAS Model

Note: A copy of the operations specifications shall be carried on board the RPA.

- 3.1 For each RPA model in the operator’s fleet, identified by RPA make, model and variant, the following information shall be included;
 - (a) issuing authority contact details;
 - (b) operator name and ROC number;
 - (c) date of issue and signature of the authority representative;
 - (d) RPA model;
 - (e) RPS model;
 - (f) types and areas of operations; and
 - (g) special limitations and specific approvals.

Note: If specific approvals and limitations are identical for two or more models, these models may be grouped in a single list.

- 3.2 The operations specifications layout shall be as follows;

Note: The MEL constitutes an integral part of the operations manual



RPAS OPERATIONS SPECIFICATIONS (subject to the approved conditions in the operations manual)				
ISSUING AUTHORITY CONTACT DETAILS¹				
Telephone: _____ Mobile telephone: _____ Email: _____				
ROC# ² : _____ Operator name ³ : _____ Date ⁴ : _____ Signature: _____				
Operator trading name ³ : _____				
RPA model ⁵ and variant:				
RPS model and variant:				
Types of operation ⁶ :				
Area(s) of operation ⁷ :				
Special limitations ⁸ :				
SPECIFIC APPROVAL	YES	NO	DESCRIPTION ⁹	REMARKS
Dangerous goods	☐	☐		
Low visibility operations				
Approach and landing	☐	☐	CAT ¹⁰ : _____ RVR: _____m DH: _____ft.	
Take-off	☐	☐	RVR ¹¹ : _____m	
Operational Credits	☐	☐	¹²	
RVSM ¹³ ☐ N/A	☐	☐		
EDTO ¹⁴ ☐ N/A	☒	☒	Threshold time ¹⁵ : _____ minutes Maximum diversion time ¹⁵ : _____ minutes	
AR navigation specifications for PBN authorisations	☐	☐	¹⁶	
Continuing airworthiness	☒	☒	¹⁷	
EFB N/A	☒	☒	¹⁸	
Other ¹⁹	☐	☐		

Notes:

1. Telephone and contact details of the authority, including the country code. Email to be provided if available.
2. Insert the associated ROC number.
3. Insert the operator's registered name and the operator's trading name, if different. Insert "dba" before the trading name (for "doing business as").



4. *Issuance date of the operations specifications (dd-mm-yyyy) and signature of the authority representative.*
5. *Insert the Commercial Aviation Safety Team (CAST)/ICAO designation of the RPA make, model and series, or master series, if a series has been designated. The CAST/ICAO taxonomy is available at: <http://www.intlaviationstandards.org/>.*

Note: There could be multiple entries in this section

6. *Very high level (VHL) operations above FL 600, aerial work, long duration flight, commercial transport, etc.*
7. *List the geographical area(s) of authorised operation (by geographical coordinates or specific routes, flight information region or national or regional boundaries), as defined by the issuing authority.*
8. *List the applicable special limitations (e.g. day-only, population density and altitude limitations).*
9. *List in this column the most permissive criteria for each specific approval (with appropriate criteria).*
10. *Insert the applicable precision approach category (e.g. CAT II, III). Insert the minimum RVR in metres and decision height in feet. One line is used per listed approach category.*
11. *Insert the approved minimum take-off RVR in metres, or the equivalent horizontal visibility if RVR is not used. One line per approval may be used if different approvals are granted.*
12. *Reserved for future use.*
13. *“Not applicable (N/A)” box may be checked only if the RPA maximum ceiling is below FL 290.*
14. *Reserved for future use.*
15. *Reserved for future use.*
16. *Performance-based navigation (PBN): one line is used for each PBN AR navigation specification approval (e.g. RNP AR APCH), with appropriate limitations listed in the “Description” column.*
17. *Insert the name of the person/organisation responsible for ensuring that the continuing airworthiness of the RPAS is maintained and the regulation that requires the work, i.e. within the ROC regulation or a specific approval (e.g. EC1321/2014, Part M, Subpart G).*
18. *N/A for RPAS operations.*
19. *Other authorisations or data can be entered here, using one line (or one multi-line block) per authorisation (e.g. special approach authorisation, approved navigation performance).*

**APPENDIX 7****FATIGUE RISK MANAGEMENT SYSTEM REQUIREMENTS**

A fatigue risk management system (FRMS) established in accordance with OPS 4A.355(b), shall contain, at a minimum:

1. FRMS Policy and Documentation**1.1 FRMS policy**

1.1.1 The operator shall define its FRMS policy, with all elements of the FRMS clearly identified.

1.1.2 The policy shall require that the scope of FRMS operations be clearly defined in the operations manual.

1.1.3 The policy shall:

- (a) reflect the shared responsibility of management, remote flight crews, and other involved personnel;
- (b) clearly state the safety objectives of the FRMS;
- (c) be signed by the accountable executive of the organisation;
- (d) be communicated, with visible endorsement, to all the relevant areas and levels of the organisation;
- (e) declare management commitment to effective safety reporting;
- (f) declare management commitment to the provision of adequate resources for the FRMS;
- (g) declare management commitment to continuous improvement of the FRMS;
- (h) require that clear lines of accountability for management, remote flight crews, and all other involved personnel are identified; and
- (i) require periodic reviews to ensure it remains relevant and appropriate.

1.2 FRMS Documentation

The operator shall develop and keep current FRMS documentation that describes and records:

- (a) FRMS policy and objectives;
- (b) FRMS processes and procedures;
- (c) accountabilities, responsibilities and authorities for these processes and procedures;
- (d) mechanisms for ongoing involvement of management, remote flight crew members, and all other involved personnel;
- (e) FRMS training programmes, training requirements and attendance records;



- (f) scheduled and actual duty periods, and flight times as well as rest periods between periods of time-in-position as a remote pilot during a duty period with significant deviations and reasons for deviations noted; and
- (g) FRMS outputs including findings from collected data, recommendations, and actions taken.

2. Fatigue Risk Management Processes

2.1 Identification of hazards

The operator shall develop and maintain three fundamental and documented processes for fatigue hazard identification.

2.1.1 Predictive

The predictive process shall identify fatigue hazards by examining remote crew scheduling and taking into account factors known to affect sleep and fatigue and their effects on performance. Methods of examination may include but are not limited to:

- (a) operator or industry operational experience and data collected on similar types of operations;
- (b) evidence-based scheduling practices; and
- (c) bio-mathematical models.

2.1.2 Proactive

The proactive process shall identify fatigue hazards within current remote flight operations. Methods of examination may include but are not limited to:

- (a) self-reporting of fatigue risks;
- (b) remote crew fatigue surveys;
- (c) relevant, remote flight crew performance data;
- (d) available safety databases and scientific studies; and
- (e) analysis of planned versus actual time worked.

2.1.3 Reactive

The reactive process shall identify the contribution of fatigue hazards to reports and events associated with potential negative safety consequences in order to determine how the impact of fatigue could have been minimised. At a minimum, the process may be triggered by any of the following:

- (a) fatigue reports;
- (b) confidential reports;
- (c) audit reports;



- (d) incidents; and
- (e) flight data analysis events.

2.2 Risk Assessment

- 2.2.1 The operator shall develop and implement risk assessment procedures that determine the probability and potential severity of fatigue-related events and identify when the associated risks require mitigation.
- 2.2.2 The risk assessment procedures shall review identified hazards and link them to:
 - (a) operational processes;
 - (b) their probability;
 - (c) possible consequences; and
 - (d) the effectiveness of existing safety barriers and controls.

2.3 Risk Mitigation

The operator shall develop and implement risk mitigation procedures that:

- (a) select the appropriate mitigation strategies;
- (b) implement the mitigation strategies; and
- (c) monitor the strategies' implementation and effectiveness.

3. FRMS Safety Assurance Processes

The operator shall develop and maintain FRMS safety assurance processes to:

- (a) provide for continuous FRMS performance monitoring, analysis of trends, and measurement to validate the effectiveness of the fatigue safety risk controls. The sources of data may include, but are not limited to:
 - (1) hazard reporting and investigations;
 - (2) audits and surveys; and
 - (3) reviews and fatigue studies;
- (b) provide a formal process for the management of change. This shall include but is not limited to:
 - (1) identification of changes in the operational environment that may affect FRMS;
 - (2) identification of changes within the organisation that may affect FRMS; and
 - (3) consideration of available tools which could be used to maintain or improve FRMS performance prior to implementing changes; and



- (c) provide for the continuous improvement of the FRMS. This shall include but is not limited to:
 - (1) the elimination and/or modification of risk controls that have had unintended consequences or that are no longer needed due to changes in the operational or organisational environment;
 - (2) routine evaluations of facilities, equipment, documentation and procedures; and
 - (3) the determination of the need to introduce new processes and procedures to mitigate emerging fatigue- related risks.

4. FRMS Promotion Processes

FRMS promotion processes support the ongoing development of the FRMS, the continuous improvement of its overall performance, and attainment of optimum safety levels. The following shall be established and implemented by the operator as part of its FRMS:

- (a) training programmes to ensure competency commensurate with the roles and responsibilities of management, remote flight crew, and all other involved personnel under the planned FRMS; and
- (b) an effective FRMS communication plan that:
 - (1) explains FRMS policies, procedures and responsibilities to all relevant stakeholders; and
 - (2) describes communication channels used to gather and disseminate FRMS-related information.



APPENDIX 8

RPAS RECORDER SYSTEMS

The material in this Appendix concerns flight recorders intended for installation in RPAS engaged in international air navigation. Recording of RPAS safety critical data will be conducted in both the RPA, on a RPA-RS, and in the RPS, on a RPS-RS. Crash-protected flight recorders on the RPA comprise one or more of the following systems:

- a flight data recorder (FDR),
- a RPA voice recorder (to record voice communications relayed through the RPA),
- a RPA camera recorder (to record data from on-board cameras),
- a data link recorder (DLR).

Flight recorders installed in a RPS should be suitable to the environment where the RPS is located with respect to environmental conditions, security and emergencies that could affect the integrity of the RPS (e.g. fixed location, mobile, separate facility, inside a building, etc.). Where the RPS is carried on board a vehicle, vessel or another aircraft, the RPS-RS shall include crashworthiness and fire protection.

1. General Requirements

- 1.1 Non-deployable RPA-RS containers shall be painted a distinctive orange colour.
- 1.2 Non-deployable RPA-RS crash-protected flight recorder containers shall:
 - (a) carry reflective material to facilitate their location; and
 - (b) have securely attached an automatically activated underwater locating device operating at a frequency of 37.5 kHz. This device shall operate for a minimum of 90 days.
- 1.3 The RPA-RS shall be installed so that:
 - (a) the probability of damage to the recordings is minimised;
 - (b) there is an aural or visual means for pre-flight checking that the RPA-RS are operating properly; and
 - (c) if the RPA-RS has an erasure device, the installation shall be designed to prevent operation of the device during flight time or crash impact; and
 - (d) a remote flight crew-operated erase function shall be provided at the RPS which, when activated, modifies the recording of a RPAS-RS so that it cannot be retrieved using normal replay or copying techniques. The installation shall be designed to prevent activation during flight. In addition, the probability of an inadvertent activation of an erase function during an accident shall also be minimised.

Note: The erase function is intended to prevent access to RPAS-RS recordings by normal replay or copying means, but would not prevent accident investigation authorities access to such recordings by specialized replay or copying techniques.



- 1.4 The RPA-RS shall be installed so as to be powered by the most reliable power source of the RPA or in the case of RPS, the RPS-RS should also be on the most reliable power source, without jeopardizing service to essential or emergency loads.
- 1.5 The RPAS-RS, when tested by methods approved by the appropriate certificating authority, shall be demonstrated to be suitable for the environmental extremes over which they are designed to operate.
- 1.6 Means shall be provided for an accurate time correlation between the RPAS-RS recordings.
- 1.7 The manufacturer shall provide the appropriate certificating authority with the following information in respect of the RPAS-RS:
- (a) manufacturer's operating instructions, equipment limitations and installation procedures;
 - (b) parameter origin or source and equations which relate counts to units of measurement;
 - (c) manufacturer's test reports; and
 - (d) detailed information to ensure the continued serviceability of the RPAS-RS.
- 1.8 The RPAS-RS has three components: the data recording requirements and equipment needed in the RPA; the recording of C2 Link; and the data recording requirements and equipment needed in the RPS. All the data received and transmitted shall be recorded whether it is flight data, audio or image data used to manage the RPA, or flight data transmitted to the RPA. All recorded data shall be time synchronized with UTC, shall not be encrypted and provided with any documentation needed to extract the data.
- 1.9 The data frame layout documentation should be in electronic format and recorded on the RPS-RS. In addition, if practicable, depending on the size of the RPA, a copy of the data frame layout documentation pertaining to the RPA-RS data should be recorded on the RPA-RS.
- Note: The limitation regarding encryption applies to recorded data and is not intended to limit the use of encryption on systems requiring such protection (e.g. the C2 Link).*
- 1.10 The use and protection of data recordings and, in particular, accessibility to audio and image data used to manage the flight of the RPA shall be regulated. The provisions in Annex 13, 5.2 and Attachment E are applicable during accident and incident investigations, and the provisions in CAR SMS are applicable for safety management considerations. Provisions specific to the protection of RPAS recordings can be found in OPS 4A.075.
- 1.11 The data shall be retained for a minimum period of 30 days from the completion of the flight, or flight segment, on the RPS-RS, but considering the possibility for extended, long-endurance, flights, data retention time should be extended accordingly.
- 1.12 RPA flight data is needed to accurately reconstruct the RPA flight. The RPA, based on its MCTOM, and the RPS shall have capabilities to record flight information. For RPA of a MCTOM of 2250 kg or less, instead of being recorded on the RPA, this flight data may be transmitted throughout the flight for recording by the RPS-RS.
- 1.13 If the RPA is required to carry a RPA-RS in accordance with OPS 4A.415, the RPS shall separately record the flight data to reconstruct the flight from the data received by the RPS.



- 1.14 Data relating to the C2 Link between the RPA and RPS shall be recorded on both the RPA, when required to carry a RPA-RS in accordance with OPS 4A.415, and the RPS in order that the integrity of the C2 Link during the flight can be determined.

2. RPA Recorder System

- 2.1 For RPA having an MCTOM of less than 2250 kg, a RPA-RS is not mandatory. As such, the type and size of the RPA-RS installed on such a RPA should be in relation to the size of the RPA and the type of operations in which it is involved. For RPA having an MCTOM of 2250 kg or more, the same capability of recorder systems as installed on similar size conventional aircraft should be used.
- 2.2 For RPA having an MCTOM of less than 2250 kg, where crash and fire protection standards are impractical, flight data should be recorded in such a way that crash and fire protection provisions are commensurate to the risk of losing the flight data as a result of an accident or serious incident.

3. RPA FUNCTIONS TO RECORD

A RPA is comprised of numerous complex systems which may require more and different functions to be recorded than for conventional aircraft of similar size. For RPA having an MCTOM of 2250 kg or more, the functions that shall be recorded at the RPA, include but are not limited to:

- (a) telecommand (C2 uplink information) and telemetry (C2 downlink information) received at and sent from the RPA via the C2 Link;
- (b) information needed to accurately reconstruct RPA flight path, speed, attitude, altitude and configuration, at a minimum rate of once a second;
- (c) information needed to determine the operating status of RPA systems, to include, at a minimum, flight controls, propulsion, power-supply, navigation and flight modes;
- (d) parameters related to C2 Link operation for determining types of link errors, interruptions or failures;
- (e) information regarding contingency or emergency situations resulting in warning alerts, for example, GPWS failure, detect and avoid (DAA) failure, on-board fire warning, generator failure, etc.;
- (f) images related to any image streaming capability used to manage the RPA.

Note: For RPA having an MCTOM of less than 2250 kg, determination of those parameters or functions which are to be recorded would be based on the type of operation of the RPA.

4. RPS Recorder System

- 4.1 Data recording capabilities in the RPS should not normally be restricted by recording system mass and power limitations such as those that exist in conventional aircraft. As such, recorder capabilities can be expanded and larger amounts of data could be recorded with little to no limitations on the duration of recordings. Furthermore, crash protection for RPS-RS in the RPS may not be required. The recording of “duplicate data” should be considered in order to enable reconstruction of uplink errors in the case where such errors occur during the accident or incident flight. In the case of flight data streaming from the RPA, the RPS-RS should be able to record these large amounts of flight data.



- 4.2 A RPS may control several RPA sequentially during various phases of their flight, and a single RPA may utilise several RPS sequentially over the period of a particular flight. Flight data needs to be recorded in order to reconstruct the air situation display that was used to control each individual RPA. In the case of a RPS sequentially controlling multiple RPA, the data exchanged with each RPA needs to be identifiable in the recorded flight data.
- 4.3 In the case of several RPS controlling a single RPA during its entire flight, data needs to be recorded in order to reconstruct the telecommand (C2 uplink) information that was used to manage the RPA.
- 4.4 The determination of the parameters and the parameter list specifications which are to be recorded should be done in relation to the type of operation in which the RPAS is involved.

5. RPS Functions to Record

- 5.1 The RPS can range from a hand-held device up to a multi-console station. It may be stationary (installed in a shipping container or large operational control centre) or mobile (installed in a vehicle/ship/aircraft). Parameters that should be recorded at the RPS are as follows:
- (a) uplink and downlink parameters received at and sent from the RPS via C2 Link;
 - (b) parameters needed to accurately determine what inputs the remote pilot made to manage the RPA. In cases where the remote pilot has direct attitude control of the RPA, attitude data shall be recorded at an appropriate rate;
 - (c) parameters relating to significant remote pilot actions, for example: C2 Link switchovers, RPS handover initiations/completions/attempts as well as the associated time of their occurrences respectively, the actual state of critical RPS systems including switch/control positions and display settings;
 - (d) parameters needed to accurately reconstruct what was displayed to the remote pilot during the occurrence flight in terms of flight path, speed, altitude, attitude and configuration of the RPA;
 - (e) images related to any image streaming capability used to manage the RPA shall be recorded; and
 - (f) data link communications applications, including digital communications with air traffic management (ATM), having an effect on the navigation and flight profile of the RPA.
- 5.2 To investigate if and how human factors contributed to the outcomes of the occurrence, the operational environment in which the remote pilots work, including the audio and image data used to manage the RPA, shall be recorded.
- 5.3 The RPS environment is equivalent to the flight deck of a conventional aircraft and as such, all audio shall be recorded. This will include the general environment audio and any operational discussions with ATC, other pilots, operations centre/flight dispatch discussions and all telephone calls.
- 5.4 An area microphone should be used to record the general environment audio, and in multi-pilot operations pilot channel segregation of operating personnel should be incorporated.



- 5.5 Non-audio communications should also be recorded. For example, communications such as text messages and communications similar to controller-pilot data link communications (CPDLC) and/or communication, navigation and surveillance (CNS) ATM messages.
- 5.6 Image data from the RPS needs to provide information about non-verbal communications, remote pilot actions and other external distractions that may have contributed to the occurrence. Image data used to manage the RPA will also provide information about what was effectively displayed to the remote pilot in cases where parameters from flight data recordings were not recorded properly. The image data used to manage the RPA would also clarify what the remote pilot saw as captured by an on-board RPA camera and relayed to the RPS via the C2 Link in cases where the RPA is managed by means of video displayed to the remote pilot.

Note: To respect remote flight crew privacy, the RPS area view should be designed, as far as practicable, to exclude the head and shoulders of remote flight crew members whilst seated in their normal operating position.

6. Inspection of RPAS Recorder Systems

- 6.1 The built-in test features for the RPA-RS shall be monitored by automatic checks.
- 6.2 RPA-RS shall have recording inspection intervals of one year. Subject to the approval from the appropriate regulatory authority, this period may be extended to two years provided these systems have demonstrated a high integrity of serviceability and self-monitoring.
- 6.3 Recording inspections shall be carried out as follows:
- (a) an analysis of the recorded data from the RPA-RS shall ensure that the recording system operates correctly for the nominal duration of the recording;
 - (b) the recording of the parameters from a complete flight shall be examined in engineering units to evaluate the validity of all recorded functions. For flights over 2 hours, such a review shall include each phase of flight including a minimum of 30 minutes at cruise or loiter. Particular attention shall be given to parameters from sensors dedicated to the RPA-RS. Parameters taken from the RPA's electrical bus system need not be checked if their serviceability can be detected by other RPA systems;
 - (c) the readout facility shall have the necessary software to accurately convert the recorded values to engineering units and to determine the status of discrete signals;
 - (d) an examination of the images used to manage the RPA, and required to be recorded, shall be carried out by replay of the image recording; and
 - (e) if a system of cameras is installed in the RPA or RPS to record images, this system shall record test images from each RPAS source and from relevant external sources to ensure that all required images meet recording quality standards.
- 6.4 RPA-RS and RPS-RS shall be considered unserviceable if there is a significant period of poor quality data, unintelligible signals, or if one or more of the mandatory functions is not recorded correctly.
- 6.5 The most recent report of the recording inspection shall be made available on request to regulatory authorities for monitoring purposes.



APPENDIX 9

LOCATION OF A RPA IN DISTRESS
(Reserved)



APPENDIX 10

ARTICLE 83 *BIS* AGREEMENT SUMMARY
(Reserved)