Procedure Title	Drone Operations Manual
Parent Policy	Drone Safety Management Procedure
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Procedure Owner	Chief Remote Pilot (CRP)
Category	Operational
Status	Active
Version Number	2
Content Enquiries	anthony.marsh@monash.edu 0438 435 857
Aviation Reference Number (ARN)	Monash University - 213404
Scope	This procedure applies to all staff, students operating RPA for Monash University activities under the authority of Monash's RPA Operators Certificate (ReOC), both on and off Monash Campuses. **NOTE:** This manual does not apply to operations conducted outside of the authority of Monash's ReOC, including an 'excluded category' and 'micro RPA' operations. This procedure does not include operations outside of Australia. Where international operations occur, the licensed Remote Pilot (RP) must adhere to local aviation legislation and regulations and seek advice from the Monash CRP. If local regulations do not exist, the Civil Aviation Safety Regulations (CASR) should be followed by way of best practice. The Drone Operations Manual provides procedures to comply with the requirements in Part 101 of the Civil Aviation Safety Regulations 1998 (CASR Part 101). Additional responsibilities related to RPA usage may be stipulated thorough CASA communications with the CRP and communicated to stakeholders or documented in an update to this manual or related procedures utilised by Monash University.
Purpose	To detail the roles, responsibilities and actions required to manage all RPA operations conducted by or on behalf of Monash University.

Contents

1. Overview

1.1. Compliance Declaration

Monash RPA users are registered on the Monash University RP database located within AVCRM. As part of the RP registration process, all RPs are required to acknowledge that they have received the instructions, procedures and data contained in this manual, in addition to acknowledging that the contents of this manual have been devised to ensure the safety and standardisation of RPA operations conducted by Monash University. By completing the registration process, the RP agrees to abide by the instructions contained in this manual at all times.

1.2. Applicability

This manual contains instructions, procedures and information for the operation and management of Remotely Piloted Aircraft Systems (RPAS), and all persons involved in the operation of RPAS.

Monash's CRP is responsible for maintaining this document. This document contains:

- A section that contains general and specific operational procedures
- A section for each RPAS type operated under Monash's ReOC

Appendices containing supporting documentation, such as but not limited to copies of authorisation forms, briefing materials, training syllabi, job safety assessment (JSA), risk assessment, RPAS time in service log, as well as defect and maintenance logs.

The specific section for each RPAS includes the following information:

- Maintenance information, such as pre/post flight checks, maintenance schedules, maintenance manuals for RPA/ground station/camera etc
- RPAS operational information, such as RPAS user manuals for RPA/ground station/camera, specific emergency procedures and battery handling

Monash's CRP is responsible for ensuring that all information required to safely conduct an operation is available to all persons operating under this ReOC. Monash's CRP keeps a record of each RP's compliance declaration.

For night operations, Monash uses the accepted procedures (Appendix C) developed by CASA in accordance with (IAW) the generic night approval CASA 01/17 – Approval – operation of RPA at night.

Nothing in this manual takes precedence over the aviation regulations or permits unsafe operation.

1.3. Distribution Control

All staff, students and contractors seeking to undertake RPA activities must utilise the latest version of the RPA Operations Manual which is accessible via the Monash University OH&S Website and Monash's RPA Manager Platform, AVCRM. Any amendments to the RPA Operations Manual will be promulgated to all RPs via AVCRM.

The CRP will always keep the manual up to date, notifying all internal users and CASA of any amendments by AVCRM. If CASA subsequently indicates that an amendment is not acceptable, then any action and/or changes required by CASA shall be followed and/or implemented as soon as reasonably practicable.

Copies of any manual not accessed directly from the Monash University OH&S website or AVCRM are not controlled and must not be used as a basis for controlling operations, unless it has been verified that the uncontrolled copy is the same as the current version of the manual. The CRP shall review the Operations Manual annually to ensure the relevance and currency of all procedures. A

record of the review is included in the revision log of this manual. If an amendment is required, the latest copy will be uploaded and distributed via AVCRM and the OHS website.

1.4. Amendment Procedure

This is a living document that contains Monash's procedures and information relevant to the safe operation of RPAS. Persons operating under this ReOC will be advised of any changes to this document, including the addition of any new procedure of information via AVCRM or the OHS website.

Where in light of operating experience, errors or deficiencies are found in this manual or in the way that operations are conducted, recommendations for amendment action shall be submitted to the CRP.

All changes (other than typographical corrections) to this manual or subordinate documents, including appendices to this manual, must be notified to CASA no later than 21 days after the day the change occurred.

1.5. Abbreviations and Acronyms

AGL	Above Ground Level
AIP	Aeronautical Information Package
ALA	Authorised Landing Area
ALARP	As Low as Reasonably Practicable
AROC	Aeronautical Radio Operator Certificate
ATSB	Australian Transport Safety Bureau
ATC	Air Traffic Control
BVLOS	Beyond Visual Line of Sight
CAA	Civil Aviation Act
CASA	Civil Aviation Safety Authority
CASR	Civil Aviation Safety Regulations
CRP	Chief Remote Pilot
ERSA	En Route Supplement Australia
EVLOS	Extended Visual Line of Sight
HLS	Helicopter Landing Site
IAW	In Accordance With
JSA	Job Safety Assessment
MC	Maintenance Controller
MOS	Manual of Standards
NM	Nautical Miles
NOTAM	Notice to Airmen
OHS	Occupational Health & Safety
OLS	Obstacle Limitations Surfaces
R&D	Research & Development
RePL	Remote Pilot Licence
ReOC	Remotely Piloted Aircraft Operators Certificate
RP	Remote Pilot (or UAV Controller)
RPIC	Remote Pilot in Command
RPA	Remotely Piloted Aircraft (same meaning as UAV)
RPAS	Remotely Piloted Aircraft System (same meaning as UAS)
RTI	RePL Training Instructor
RPS	Remote Pilot Station
SORA	Specific Operations Risk Assessment
SRP	Senior Remote Pilot
SRTI	Senior RePL Training Instructor
TEM	Threat and Error Management
UAS	Unmanned Aircraft System (same meaning as RPAS)

UAV	Unmanned Aerial Vehicle (same meaning as RPA)
UOC	Unmanned Aerial Vehicle Operators Certificate
VLOS	Visual Line of Sight
VMC	Visual Meteorological Conditions

1.6. Definitions

A comprehensive list of Monash OHS definitions is provided in the Definitions tool. Definitions specific to this procedure are provided below.

ANCA: Aviate Navigate Communicate Administrate: conducted during flight to assist with continued safety of flight – priority of actions (used in solo RPAS operations).

CANCA: Communicate (internally to crew) Aviate, Navigate, Communicate (externally to airspace controlling authority), Administrate (used in crewed environment).

Controlled aerodrome: An aerodrome to which a determination under regulation 5(1)(b) of the Airspace Regulations 2007 has been made.

Defect: Any confirmed abnormal condition of an item whether this could eventually result in a failure. In addition to imperfections that may impair the structure, composition, or function of the RPAS, the scope of this definition also includes any intermittent failure, spurious warning, or fault in the operation of a RPAS that may cause it to deviate from its manufacturer's specifications.

Documented practices and procedures: For a certified RPA operator, means the written practices and procedures of the operator, as existing or in force from time to time, that have been approved in writing by CASA.

Error: An action or inaction by an operational person that leads to deviations from organizational or the operational person's intentions or expectations.

HLS or helicopter landing site: Means an area of land or water, or a defined area on a structure, intended to be used wholly or in part for the arrival, departure and surface movement of helicopters.

Movement area: That part of the aerodrome to be used for take-off, landing and taxiing of aircraft, consisting of the manoeuvring area and the aprons.

Relevant airspace: Each of the following:

- No-fly zone of a non-controlled aerodrome 3NM from the movement area
- No-fly zone of an HLS 1.5 NM diameter

Relevant event: A manned aircraft is within relevant airspace, including when the aircraft is in the course of approaching, landing at, taking off from, or manoeuvring on the movement area of the aerodrome.

Risk mitigation: The process of incorporating defences or preventive controls to lower the severity and/or likelihood of a hazard's projected consequence.

Visual meteorological conditions (below 400ft AGL): Visibility greater than 5000 m and clear of cloud.

2. General Administration

2.1. RPAS Administration and Authorisation

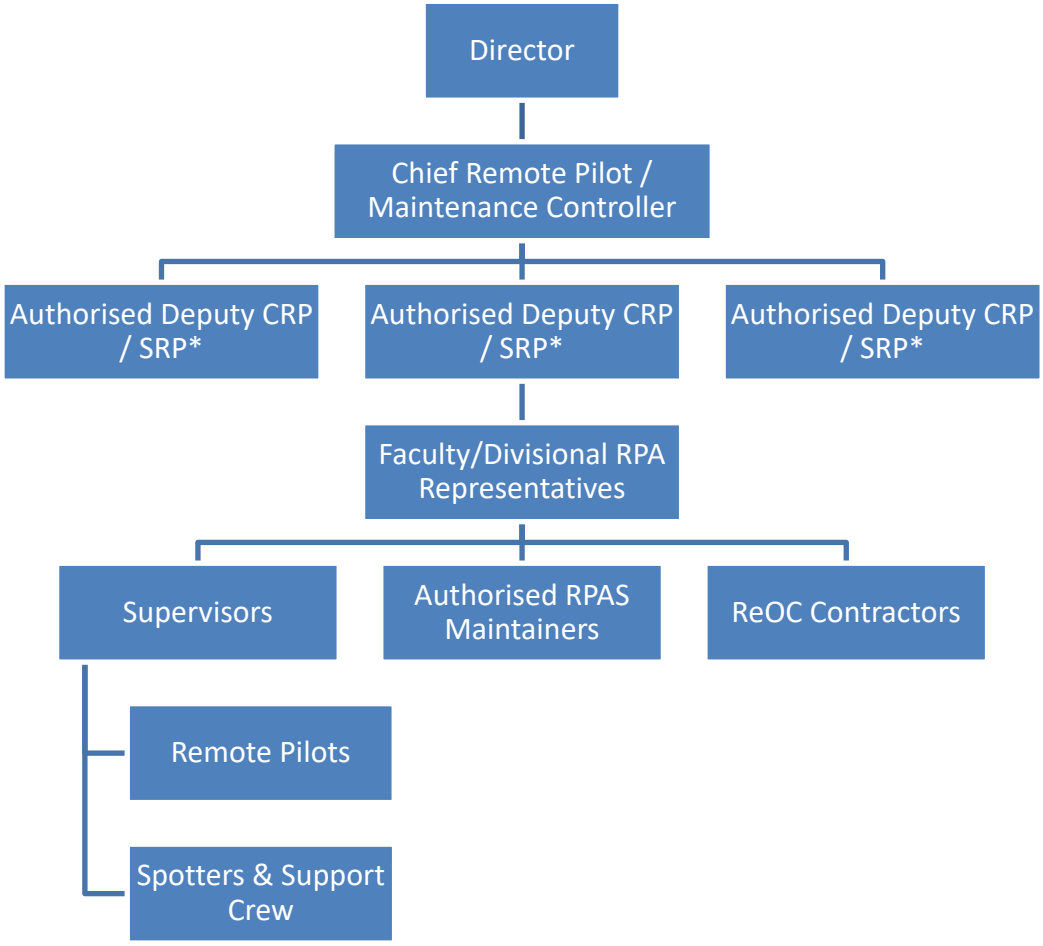
Monash University is an educational and research institution and Australia's largest university. Monash University utilises RPAS across of all its Australian campuses and in locations across the country, for undergraduate coursework, research, and internal maintenance and operational activities.

2.2. Statement of Compliance

All Monash's aerial operations using RPAS will be conducted in accordance with the conditions and limitations placed on the ReOC. A copy of the approved ReOC is included at Appendix B of this manual.

2.3. Organisational Structure

RPA operations at Monash University are managed within the Buildings and Property Division (BPD). This division is responsible for the university's Occupational Health and Safety (OHS).



Nominated Personnel in the positions of Director, CRP and MC are included in Schedule 1.
* As authorised by the CRP from time to time.

2.4. Accountabilities & Responsibilities

A comprehensive list of OHS responsibilities is provided in the document OHS Roles, Committees and Responsibilities Procedure. The specific responsibilities with respect to RPAS safety management are provided below.

2.4.1. Accountabilities of Director

The Director is accountable for safety and corporate compliance. They will provide the necessary resources so that all operations and maintenance can be conducted to meet Monash University's obligations, goals and objectives including finance and human resources. The Director is accountable to ensure the currency of this ReOC and will ensure that any operation conducted on behalf of the university is conducted under the control and authority of the CRP (or authorised deputy) and/or Maintenance Controller (MC) as identified on this ReOC.

The Director is required to advise CASA of any of the following

- Changes to Monash University's name or registered address
- Resignation, removal or extended leave of CRP or MC
- Nomination of a new CRP or MC
- Changes to the financial status of the operator (bankruptcy, liquidation, etc.)
- Respond to safety related surveys or questionnaires

Additionally, the Director is responsible for engaging and consulting with Monash University RPA stakeholders during the appointment of the CRP or MC.

2.4.2. Responsibilities of Chief Remote Pilot

The CRP is responsible for all operational matters and RP training affecting the safety of operations.

The role and responsibilities of the CRP are to:

- Develop and maintain the Monash University ReOC, including:
    - Drone Operations Manual (this document)
    - RPAS Maintenance Manuals
    - RPAS Flight Manuals
- Oversee all RPAS activities conducted within or by Monash University
- Ensure that operations are conducted in compliance with this procedure, the Civil Aviation Act and the Regulations
- Maintain a record of qualifications held by each RP
- Monitor and maintain operational standards and supervise RP(s)
- Ensure the Monash University ReOC operational status is maintained through the provision of safe systems of work
- Train, authorise and review the decisions of Deputy Chief Remote Pilot (DCRP) / Senior Remote Pilots (SRPs) as appropriate. Note, that the CRP is ultimately responsible and accountable for all decisions made by the DCRP under delegation
- Investigate all RPA incidents and instances of RPAS non-compliance utilising the Monash University Safety and Risk Analysis Hub (S.A.R.A.H) for incident and hazard reporting
- Ensure all RPA operations are risk managed and provide advice and support to RPs conducting RPA operations
- Maintain a complete and up-to-date reference library of operational documents as required by CASA for the class of operations conducted

- Develop applications for approvals and permissions where required to facilitate operations
- Develop checklists and procedures relating to flight operations
- Be the point of contact with CASA
- Notify CASA prior to any change to this manual or its schedule as required
- Audit selected RPA operations in accordance with Monash University OHS procedures

2.4.3. **Responsibilities of Deputy Chief Remote Pilot(s) / Senior Remote Pilot(s):**

- Assist the CRP in meeting their responsibilities as listed under the authority of the CRP, within the scope and limits of their respective delegation.
- Participate in RPA investigations related to RPAS non-compliance and incidents, including the potential incorrect use of the DCRP delegation, at the request of the CRP.
- Act as a conduit for communications/updates between the CRP and divisional RPA representatives / RPs are appropriate.
- Participate in upskilling and knowledge transfer activities.

2.4.4. **Responsibilities of Maintenance Controller**

The MC is responsible for ensuring the maintenance of RPAS in accordance with the manufacturer specifications.

The role and responsibilities of the MC are to:

- Control all RPAS maintenance, either scheduled or unscheduled
- Keep records of personnel permitted to perform maintenance on RPA including details of their training and qualifications
- Develop, enforce and monitor RPAS maintenance standards
- Maintain a record of RPAS defects and any unserviceability
- Ensure that specialist equipment items including payload equipment are serviceable
- Maintain a thorough technical knowledge of RPAS operated under this ReOC
- Ensure maintenance activities are conducted in accordance with the procedures detailed in the relevant RPAS section of the RPAS Operational Procedures (Library) or related documentation
- Provide advice and support to pilots and faculty/divisional RPA Representatives to ensure aircraft are maintained and fit for purpose
- Investigate all significant defects in the RPAS

2.4.5. **Responsibilities of Faculty/Divisional RPA Representatives**

Due to the size, complexity and range of activities at Monash University, each faculty/division that conducts regular RPA operations must have an RPA representative.

The RPA Representative is responsible for:

- Having local oversight over their specific areas' RPA operations and for conducting activities in accordance with Monash University processes and procedures
- Ensure all area RPs follow the requirements outlined in this manual and related procedures

- Ensure all area flights incorporate Monash University's OHS risk management practices to ensure safe RPA operations
- Identify training needs to RPs and secure required funding within their respective faculty/division
- Report all non-compliance and incidents relating to RPAS operations to the CRP
- Participate in RPA investigations related to RPAS non-compliance and incidents at the request of the CRP
- Participate in upskilling and knowledge transfer activities as appropriate

2.4.6. **Responsibilities of Supervisors**

All supervisors coordinating RPA operations must:

- Ensure pre-flight planning and risk management of RPA operations are consistent with the level of risk associated with the activity
- Ensure the completion and approval of a flight specific risk assessment using the Monash University S.A.R.A.H and standardised templates
- At the request of the CRP, participate in RPA incident investigations

2.4.7. **Responsibilities of Remote Pilot in Command**

For the purposes of this manual a RP includes a holder of a 'Remote Pilot Licence' or 'UAV Controllers Certificate', collectively referred to as an RePL throughout this manual.

The RP of an RPA is responsible for:

- Holding and maintaining a valid RePL for the type and class of RPA being operated
- Conducting all flights and acting in accordance with these procedures
- Adhering to any advice, information or instruction stipulated by the CRP with RPA flights and the RPAS, including items identified during pre-flight planning activities
- The safe operation of the RPA
- Reporting all RPA incidents to the CRP and (if applicable) the Faculty/Divisional RPA Representative
- Document flight incident reports via S.A.R.A.H
- Maintain and update RP and RPA logbooks after each operation
- At the request of the CRP, participate in RPA incident investigations
- Complying with applicable regulatory requirements and supporting documents such as the Aeronautical Information Package (AIP)

2.4.8. **Responsibilities of Spotters and Support Crew**

All spotters and support crew involved in RPA operations must:

- Act in accordance with the procedures set out in this manual and related procedures
- Adhere to the instructions of the CRP or RP in Command
- Assist the RP in Command to ensure RPA operations do not impact on people, property or aircraft near or within the area of operations
- Not operate the RPA

- At the request of the CRP, participate in RPA incident investigations

2.4.9. **Monash University OHS**

Monash University OHS must:

- With the assistance of the CRP, ensure the Drone Operations Manual and associated tools and guidance are maintained and available via the OHS website.
- Provide prompt advice and guidance on OHS associated issues related to RPA operations.

2.5. General Operating Standards

2.5.1. **Fitness for Duty**

Monash University is committed to providing an environment that ensures the optimal performance of any person(s) operating under this ReOC.

RPs or any other person involved in RPAS operations are required to consider their fitness for duty prior to undertaking any duty, including but not limited to the following:

- General well-being
- Adequately rested
- Alcohol consumption
- Drugs and medication use
- Adversely affected by stress
- Mental fitness

Alcohol consumption

RPs or any other person involved in RPAS shall not perform their duties whilst under the influence of alcohol. Alcohol must not be consumed less than 8 hours prior to RPAS operations or during any period of an operation. As a 'safety-sensitive aviation activity,' operational person(s) may be randomly tested for alcohol and other drugs and are required to conform with any drug and alcohol testing requirements as directed by CASA.

Drugs and medication use

RPs or any other person involved in the operations of RPAS shall not perform their duties whilst having consumed, used, or absorbed any drug, pharmaceutical or medicinal preparation or other substance in any quantity that will impair their ability to perform their duties.

All persons must not perform any task if their performance can be adversely affected by medication (prescription or non-prescription). It is their responsibility to advise the CRP about any medication that they are taking that may negatively impact on their performance.

No person is permitted to perform any tasks whilst under the influence of illegal drugs.

Fatigue management

When authorising any operation, the CRP and RP must ensure the potential for fatigue is minimised. This includes consideration of travel time to a location, the complexity and duration of an operation, the time of day, and other environmental conditions that can impact on the performance of a person.

Persons working under the authority of this ReOC must not conduct RPAS activities if, considering the circumstances of the operation, they have reason to believe that they are suffering from, or are likely to suffer from, fatigue that may impair their performance.

Persons working under the authority of this ReOC must immediately report fatigue-related concerns to the CRP who will take appropriate action to remedy the situation.

2.5.2. **Transportation of Dangerous Goods (RPA Operations Only)**

Parts of the RPAS may be classified as dangerous goods and may present a significant risk during transportation.

Depending on the type, role or configuration of an RPAS, the following goods could be considered as dangerous:

- LiPo batteries and fuel cells
- Internal combustion engines
- Fuel, chemicals, poisons and their containers and dispensers
- Magnetising materials
- Pyrotechnics, flares and firearms

Full disclosure must be made to the carrier prior to the consignment or carriage of dangerous goods. The CRP will ensure that the carrier's instructions in relation to the transport and applicable packaging requirements for dangerous goods are complied with.

2.5.3. **Remote Pilot Administration**

Qualifications

All RPs must hold a valid RePL issued by CASA for the type and rating of RPA being operated on behalf of Monash University.

Remote Pilots to maintain logbooks

RPs are required to have a personal RPA logbook. It is their responsibility to ensure that all flight details are recorded in their logbook and kept current.

RPs are required to keep a documented record of all their RPA operations conducted on behalf of Monash University via the RPA Manager logbook functionality.

Flight logs must detail:

- Flight location, date, purpose of activity and actual hours flown
- Details of any Supervising RPs (name, contract details etc., if conducting education and training activities)
- RPA and equipment/configuration used for the flight
- S.A.R.A.H risk assessment reference number (if applicable)

Additionally, RPA flight time must be separated into the following operations:

- RPA flight at night
- RPA flight within visual line of sight
- RPA flight extended beyond visual line of sight

- RPA flight beyond visual line of sight

Lastly, for any flight time in simulated operation of an RPAS, including the type of RPAS operations performed, the CRP must check and countersign the RP logbooks prior to commencing operations. The CRP will also conduct regular checks of the logbooks, at least semi-annually.

Remote Pilots to be competent

RPs are required to be familiar with this manual and any policies and procedures.

The CRP is responsible for ensuring that RPs and all other persons are competent prior to conducting operations.

2.5.4. Flight Conduct

All flights must be authorised by the Chief Remote Pilot

Each RPA operation must be authorised by the CRP or an authorised DCRP (acting within the scope and limits of their delegation), via a flight request submitted through AVCRM.

The CRP is responsible for the operational standards and supervision of RPs.

Flight planning and RPA Flight Request

RPs are required to submit an RPA Flight Request via AVCRM. The CRP uses the information provided on this request, in addition to flight plans and pre-flight information to determine the adequacy of flight planning, suitability of safety risk controls and activity compliance with CASA requirements. The plan must include as a minimum:

- A satellite photo or map of the area where the RPA operation will be conducted
- Proposed RPA flight paths and/or zones, take-off, landing and emergency zones (as appropriate)
- Required pedestrian barriers, signs and demarcation zones
- Flight segregation measurements that adherer to the SOCs
- RP and support crew information and contact details

RPs are encouraged to provide as much information as possible to avoid possible delays.

Persons permitted to operate RPA

Only those persons checked in accordance with Section 6 of this Manual and authorised by the CRP may operate an RPA. Authorised RPs are listed on the Monash RPA Manager.

Handover/takeover procedures

In normal operations, the handover of RPA controls from one RP to another whilst the RPA is in flight must be approved by the CRP in accordance with the Handover/Takeover Procedures detailed in section 3.7 of this manual.

Remote Pilot briefing including emergency procedures

Where an operation involves more than one person, the RP must provide an operational briefing to each person involved in the operation. The operational briefing must provide details of the actions and responsibilities of everyone involved in the operation.

Use of checklists

Several checklists exist to ensure the safe operation of RPAS. These checklists include, but are not limited to:

- RPAS Risk Assessment
- Operational Briefing
- Pre-Flight Checklists – RPA, ground station and role equipment specific
- Post-Flight Checklists – RPA, ground station and role equipment specific

Where a checklist has been developed, all operations and activities must be conducted in accordance with the checklist. Risk Assessments, JSAs and Checklists will be managed via AVCRM.

2.6. RPAS Documentation and Instructions

As the RPAS includes a number of unique operational requirements, each element has an interface with other elements in the RPAS. The main elements of the RPAS are:

- The RPA
- The RPA ground station
- The role specific software
- Aircraft launch and recovery equipment
- The payload and role equipment
- Ancillary operational equipment

Each element of the RPAS is operated IAW the manufacturer's instructions as contained or reference in the supporting operational and maintenance documents for each RPAS configuration.

If differences exist between the manufacturer's instructions and the operator's operational or maintenance procedures, the procedures that provide a higher safety standard always prevail.

If any person conducting operations identifies a difference between the operator's and manufacturer's procedures, they must report the difference to the CRP / MC (as appropriate).

2.7. RPAS Serviceability Prior to Operation

Pre-flight and post flight checks are mandated for all operations. RPs must record the completion of these checks in the Flight Log on AVCRM. All defects found in the RPAS must also be recorded on the Defect/Maintenance Log in AVCRM.

RPs must ensure that all defects or outstanding maintenance actions detailed in the Defect/Maintenance Log have been addressed prior to operation of the RPAS.

2.8. Method of Recording Hours in Service and Defects

RPs must ensure that 'time in service' is recorded in the RPAS Aircraft Flight Log and all defects and maintenance are recorded in the RPAS Maintenance and Defect Log. Section 5 of this manual

details the procedures for recording of RPAS defects and maintenance requirements. Time in service is the time between motor(s) start up to motor(s) shutdown.

2.9. Maintenance Control of RPAS

The maintenance control of all RPAS is the responsibility of the operator. Each RPAS operated under the ReOC of Monash is identified in Appendix A.

2.10. Generic Risk Register

Monash is required to develop a generic risk register before any operation is conducted. The generic risk register is reviewed annually, and effective additional controls implemented into Monash's RPAS practices/procedures. When it is deemed that a risk is expired or obsolete, they are removed from the register. The generic risk register is available on AVCRM.

2.11. Aeronautical Radio Usage

Operations where an aeronautical radio is required:

- Within 3 NM of the movement area of a controlled aerodrome at any height
- Above 400 ft in controlled airspace
- When operating an RPA that has a MTOW >2kg in controlled airspace
- When directed by CASA

The RP must monitor the applicable air band frequency for all operations.

The CRP will determine for each operation whether a radio is required as part of the Flight Authorisation and JSA.

If the carriage and use of a radio is required, the operation is only permitted if the RPs and/or spotters hold one of the following Radio qualifications (minimum) prior to operating:

- An aeronautical radio operator certificate
- A flight crew licence
- An air traffic control licence
- A military qualification equivalent to a licence mentioned in items (b) or (c)
- A flight service licence

Procedures for the use of radios are detailed in Appendix E.

The CRP must not authorise an operation unless the requirements of this section have been met.

2.12. Accident and Incident Reporting

All persons must report any incident or near miss to the CRP.

Certain incidents and accidents that relate to RPA operations must also be reported to the Australian Transport Safety Bureau (ATSB). The CRP is responsible for notifying the ATSB of these events. The events are categorized as either an Immediately Reportable Matter (IRM) or Routinely Reportable Matter (RRM) IAW the AIP ENR 1.14 as detailed below.

Immediately Reportable Matters	Routinely Reportable Matters
• Make a report as soon as is reasonably practicable by telephone on 1800 011 034 • Follow up with a written report within 72 hours	• Submit a written report within 72 hours

In the event that an operation results in an immediately or routinely reportable matter, the CRP and RPIC must take reasonable steps to preserve any flight planning and operational data, telemetry logs and RPAS components which may assist in validating the cause of the incident.

2.13. Record Keeping Requirements

The following records must be kept for a minimum seven (7) years, in accordance with Chapter 10 of the Part 101 MOS:

- RPAS operational record
- RPAS operational release
- RPAS operational log
- RPAS technical log, and
- Records of qualifications and competency

If an electronic record is created, Monash will ensure it is unalterable after the record has been made. The CRP confirms record keeping requirements for each operation.

2.14. Transportation of Dangerous Goods

Carriage of Dangerous Goods by RPAS is not permitted unless approved by CASA on the ReOC.

RPAS are subject to the requirements of the dangerous goods legislation, which are covered in Section 23 of the CAA 1988 and in Part 92 of the Regulations.

RPAS are not permitted to carry dangerous goods unless compliance with Section 23 of the CAA and Part 92 of the CASR.

3. Procedures

3.1. General Procedures

All operations are carried out within the limitations and conditions as detailed in this manual or any other permission, exemption or approval issued by CASA. Appendix C of this manual contains all current permissions, exemptions and approvals held by the operator.

Monash's feasibility process is covered from Section 3.1.1 to 3.1.8.

3.1.1. Compliance with CASA legislation

The first step of Monash's feasibility process is to determine whether the operation can be conducted in compliance with the aviation legislation, which also takes into consideration all applicable Federal, State or Territory legislation.

In determining whether an operation is in compliance with such legislation, the CRP considers the following:

- Are operations in accordance with the conditions listed on the ReOC of Monash or other regulatory Approval, Permission, or Exemption?
- Will operations be conducted above 400 ft AGL?
- Will operations be conducted in controlled airspace or restricted airspace?
- Will operations be conducted within 3 NM of any aerodrome (including any HLS or ALA listed in ERSA)?
- Will operations be conducted within the approach and departure path of a runway or over a movement area?
- Will operations be conducted over a populous area?
- Will operations be conducted closer than 30 metres from any person (including subjects) who is not directly involved in the operation of the RPAS?
- Will operations be conducted beyond VLOS?
- Will operations be conducted at night, in cloud, or in conditions other than Day VMC?
- Are operations prohibited by any other Local, State or Federal Regulation?
- Will operations create a hazard to another aircraft, another person or property?

3.1.2. **Third-party Considerations**

The RP always conducts pre-operational stakeholder engagement to identify third parties that may be affected by its operations and takes the necessary precautions to reduce risk to said third parties. Monash operations with complete respect for third parties, including:

- Property/landowners, including lessees
- The general public
- Public not involved in RPAS operations
- Organisations that may be affected by the operation

3.1.3. **Job Safety Assessment**

A JSA (Appendix I) must be performed by the RP during the feasibility planning phase to determine whether the operation is viable regardless of the number of flights at the same location.

As a minimum, the JSA includes:

- Gathering the necessary maps and charts (either hard copy or electronic) for the area
- Determining the weather is suitable for the RPAS and the operation
- Reviewing the Notice to Airmen (NOTAM) related to the operations area
- The possibility of a person moving into the area of operation or landing area during flight
- Footpaths, or other rights of way
- Suitable take-off and landing areas (including alternate landing areas)
- Ability to maintain 30 m separation from the public
- Obstructions (buildings, trees etc.)
- Possible radio interference (power lines, antennas etc.)
- Ability to maintain visual line of sight
- RP's ability matches location/task
- Permission from landowner
- Privacy considerations

- Local restrictions, bylaws
- Need for signage

3.1.4. **Validation of JSA**

For an initial JSA a number of assumptions are made about the proposed operation, the RP validates them at the location prior to any operations (e.g., forecast weather/wind, location of persons etc.). RPs must record any of the following on the JSA:

- Variations that exist to the initial JSA assumptions
- New risks or hazards that have been identified at the location
- New risks or hazards that may occur during the operations at the location

The completed JSA is returned to the CRP who keeps it as a record of the operation for a period of at least seven (7) years.

3.1.5. **Approval, Permission or Exemption**

The CRP is responsible for applying to CASA for any aviation related Area Approval, Permission and/or Exemption required for an RPAS operation. Such requests are always accompanied by an appropriate safety case and risk assessments to support the proposed operation.

Appendix C of this manual contains all valid approvals, permissions and/or exemptions that permit operations under the authority of the ReOC.

3.1.6. **Threat and Error Management (TEM)**

Monash managed any threat by:

- Adhering to maintenance requirements and standards
- Complying with operational requirements
- Diligence to the JSA requirements and checks
- Thorough pre-flight inspections
- Application of appropriate site controls

Monash manages any errors by:

- Training and currency of RPs to identify and react to errors in a timely manner
- Prioritising tasks: Aviate, navigate and communicate
- RPAS maintenance and configuration attention
- Employing a no-blame philosophy with regard to incident reporting debriefs

Monash considers TEM in all aspects of standard operating procedures. Risk Assessment is the key activity to identify and mitigate potential issues to standard operations. Job-specific TEM is identified as an item for consideration on the JSA at both the initial and on-site stage.

Common job-specific TEM issues are dealt with in the JSA. Common threats/errors and responses to manage threats and errors include:

- Loss of control and flyaway: toggle controller options (GPS/atti/manual), invoke return to home, radio broadcast
- Low flying aircraft in conflict: abort operations and land, radio broadcast

- Loss of visual line of sight: hover (cease operating the controls), move to be in line of sight
- Crash, damage to RPA and/or battery: the battery may be unstable and explode/catch fire; area shall be monitored for at least 15 minutes prior to recovery

3.2. Hazardous Operations

RPs are responsible for ensuring the RPA is not operated in such a way as to create a hazard to another aircraft, person or property. RPs aim to operate the RPA at least 500 ft vertically or 1500 m horizontally from any airborne conventionally piloted aircraft.

3.3. Risk Assessment

A risk assessment must be conducted for any risk that has not been adequately mitigated by existing risk control measures and procedures. If an assumption made in the initial JSA is no longer valid, or if a RP identified a new risk, these matters are considered and detailed in the JSA.

If a RP is unable to mitigate the risk using an existing procedure or an additional control in the generic risk register, a Risk Assessment must be completed by the RP in accordance with Appendix D of this manual.

3.4. Normal Procedures – General

In addition to the operational procedures detailed for a specific RPA in the relevant user's manual, normal procedures are detailed in Appendix E.

3.5. Normal Procedures – RPAS Type Specific

In conjunction with the normal procedures detailed in this manual, type specific instructions detailed in Appendix F are also completed for all operations. The specific section for each RPAS includes the following information:

Maintenance information, such as pre/post flight checks, maintenance schedules, maintenance manuals for RPA/ground station/camera etc.

RPAS operational information, such as RPAS user manuals for RPA/ground station/camera etc.

3.6. Emergency Procedures – Generic

Procedures for Emergency Operations are detailed in Appendix H. In addition to the Emergency Procedures (EP's) detailed for a specific RPA in the relevant user manual, the procedures detail how an emergency situation is handled by RPAS operational crew. The initial action principle should be used in all cases once the EP action has been completed. That is:

Aviate, Navigate, Communication, Administrate (ANCA) for solo RPAS operations, and Communicate (between crew), Aviate, Communicate (externally to ATC/relevant stakeholder) and Administrate (CANCA used for multi-crew operations).

3.7. Hand-Over Take-Over (HOTO) Procedure

The RP in command and second RP taking over most both agree that the control will be handed over. This is done only in GPS mode, where fitted. After confirming that the aircraft is holding a position in GPS mode without any input, the RPIC says "handing over", and the second RP (intended RPIC) says "taking over". After the confirmation has taken place, the control has passed from the original RP to the second RP.

4. Specialised RPAS Operations

The specialised operations detailed below are conducted subject to authorisation (however described) by CASA, and unless otherwise stated in the authorisation, all other relevant CASA regulations apply.

Operations within the Prohibited or Restricted areas are subject to the approval of the authority controlling the area.

Copies of all permissions, exemptions and approvals held by Monash can be found in Appendix C of this manual.

Unless otherwise authorised by CASA, RPs must ensure the RPA is not operated:

- Within 30 m of personnel not involved in the operations
- At night, in cloud or in conditions other than Day VMC
- Within 3 NM from the movement area of a controlled aerodrome
- Within the approach and departure paths of a controlled aerodrome
- Over the movement area of any aerodrome (as listed in ERSA)
- Beyond visual line of sight or extended visual line of sight
- Above 400 ft AGL
- Over a populous area

If authorisation is granted to operate within these areas, the operation is only permitted if all of the conditions of the relevant authorisation can be met. Specific details of specialised procedures, including any specific training requirements or competency standards for RPs in Appendix G.

For all specialised operations, the CRP is responsible for ensuring that the RPA is equipped and operated with an active fail-safe mode that, in the event of a data-link loss with the RPA or any loss of control of the RPA, will ensure that the RPA:

- Adjusts altitude to the minimum safe level to provide obstacle clearance and minimum potential for collision with other aircraft, in any case not above 400 ft AGL (unless authorised)
- Transits to a predefined safe landing or flight termination area, and
- Lands or otherwise terminates the flight

RPs must ensure that, in the period from 15 minutes before the RPA is launched to the time that the RPA lands, at least one (1) person who is trained as an observer in accordance with this manual:

- Is in a location that enables that person to assist with traffic avoidance
- Has continuous two-way communication with the RP of the RPA

The CRP must conduct a risk assessment for all specialised operations IAW Appendix D prior to authorising the operation. If all risks are satisfactorily mitigated, the CRP must record any special operational requirements on the flight authorisation from prior to authorizing the operation.

4.1. Operations Between 15m and 30m of people

As part of the procedure for operation within 30m of non-operational personnel the RP must, in addition to all other normal operational requirements, perform a detailed RPAS Risk Assessment that specifically considers the increased risk of operations in close proximity of people. The RPAS Risk Assessment is not limited to, but must consider, the following:

- Speed of the machine

- Size of the machine
- Speed of the non-operational personnel
- Non-operational personnel's awareness of the RPA's position at all times
- Flight path in relation to non-operational personnel
- Number of non-operational personnel involved
- Position of controller in relation to RPA and non-operational personnel
- Environment, wind, sun, lighting etc.
- Possibility of GPS shadows or turbulence around buildings
- Available safe options in event of control issues

Once the risks to a particular operation have been identified the RP must implement sufficient strategies to mitigate the risks. Mitigation strategies are not limited to but include the following:

- Safety crew to assist controller
- Restricted flight and duty times
- Use of smaller or lighter RPA
- Restrictions on flight profile
- Reduced maximum wind speed
- Different propellers
- Propeller guards
- Vertical separation
- RPA speed restrictions
- Reduced number of non-operational personnel within 30m of RPA
- Pre-determined plan of action in case of control or other issues

If the risk cannot be mitigated to a value that meets an acceptable level of safety, or it is not possible to comply with a condition within the operations manual and any other instrument issued by CASA, the task should not proceed.

The CRP must also consider the overall risk where multiple risk factors have a high score.

Any operation within 30 to 15m of a person(s) requires the consent of each individual. The RP should note that a body corporate or any other entity cannot give such consent on behalf of any individual. When seeking consent, all individuals should be informed of the CASA regulation, and any additional risks identified by the RP that may be attributed to the operation of the RPA within 30m of a person.

4.2. Operations at Night, in Cloud or in Conditions other than Day VMC

Unless otherwise permitted by a separate instrument of approval from CASA, all operations at night must only be undertaken in class G airspace below 400ft AGL with the aircraft remaining within VLOS at all times.

Operations at night must only be conducted by the CRP or authorised RP registered for night operations on the RP Database, after having completed training and testing in the operation of an RPA at night and who are current on type. Information on training and testing can be found in the RPA/Drone Operations Manual.

Operations at night must only be conducted in conditions that would otherwise be considered VMC. Assessment of any operations should include a detailed review of the forecasted weather conditions on the day to ensure VMC requirements can be met. Additionally, an onsite assessment must be undertaken by the chief remote pilot/remote pilot to ensure the operation will be within VMC. Note, cloud base heights can be difficult to discern at night and can drop rapidly, so extreme caution should be taken where operations are conducted where low cloud base is anticipated.

Operations at night must only be conducted where a Job Safety Assessment has been completed and signed off by the chief remote pilot. All Job Safety Assessments must include an onsite recce which has been conducted in day VMC. This recce should be used to identify any obstacles or hazards that would not be apparent to a pilot flying at night such as powerlines or building antenna's etc.

All take-off and landing areas must be illuminated to near daylight conditions to assist the pilot in safe take-off and landing.

The RPA must be fitted with the following equipment, and all equipment noted below must be checked as part of any pre-flight procedure and should be included within Monash University's RPA maintenance program.

- Serviceable GPS for the purpose of providing accurate data to the GPS hold and GPS RTH function.
- Telemetry data which indicates a positive satellite lock has been achieved by the RPA. Where the manufacturer does not specify a number of satellites to gain lock then the aircraft shall not fly with less than seven (7) satellites positively acquired.
- Telemetry data which indicates to a base station which is co-located with the RP in command the RPA's position in three-dimensional airspace, that is to say distance and bearing from the RP and a height above ground level. Note, where an RPA uses Above Mean Sea Level (AMSL) data then the operator must have a means to readily convert AMSL data to Above Ground Level (AGL) data.
- Sufficient lighting to ensure positive identification of the RPA once in flight, and to ensure that the orientation and direction of the aircraft can be determined visually by the RP in Command. This might be high output-coloured LEDs fitted to the arms/wing tips of the RPA.

During the RPAS Risk Assessment process, consideration must be given if rain or thunderstorms are observed or reported within 5km of the operational location.

The RP must ensure that the RPA is not flown, within 500 feet vertically and within 1500 metres horizontally of any aircraft.

As part of the RPAS Risk Assessment process, the CRP must consider the safety benefit associated with having at least one person who is trained as an observer in accordance with the Monash University's RPA/Drone Operations Manual:

- Is in a location that enables that person to assist with traffic avoidance; and
- Has continuous two-way communication with the remote pilot of the RPA

The RP must ensure that the RPA is equipped and operated with an active fail-safe mode that will ensure that, in the event of a data-link loss with the RPA or any loss of control of the RPA, the RPA will:

- Adjust altitude to the minimum safe level to provide obstacle clearance and minimum potential for collision with other aircraft, in any case not above 400 feet AGL;
- Transit to a predefined safe landing or flight termination area; and
- Land or otherwise terminate the flight.

4.3. Operations within Controlled Airspace

For operations within Controlled airspace/Control Zone (CTR), the RP will contact the appropriate air traffic control tower by telephone and inform them of the location and intention of the RPA operation at least 15 minutes before the first launch of the RPA, and then again at the end of the operation. Other risk treatments may include monitoring the applicable airspace frequencies, issuing NOTAMs, consulting with other airspace users and the control tower etc.

For operations within a CTR, a RP must not activate a transponder / ADS-B fitted to the RPA unless specifically requested to do so by air traffic control.

When operating within controlled airspace, radio procedures set out in section 1.11 of this manual must be followed by RPs.

4.3.1. Operations within 3NM of a Controlled Aerodrome

Unless otherwise permitted by Airservices, RPs must not operate an RPA within 3NM of the boundary of an aerodrome that has an active ATC service. The CRP is responsible for ensuring that operations are not planned or approved for such areas.

If permission is granted to operate within 3NM of a controlled aerodrome, the operation is only permitted if all the conditions on the relevant permission can be met.

Operation below 400ft AGL in a control zone outside of 3NM of the boundary of an aerodrome that has an active ATC service is permitted provided consideration is given to the risk that may exist with respect to other airspace users. Risk treatments may include radio broadcasts, the issue of NOTAMs, consultation with other airspace users, etc.

The RP will conduct a Risk Assessment for each of these types of operations prior to authorisation of the operation. If all risks are satisfactorily mitigated, the CRP will detail any special operational requirements on the Risk Assessment or Flight Authorisation (via an RPA Flight Request) prior to authorising the operation.

Operations within 3 NM of a controlled aerodrome as defined in ERSA requires approval from Airservices Australia (through CASA), including controlled aerodromes located in restricted airspace. Airservices Australia provides a traffic impact and risk assessment for operations at aerodromes that are controlled by Airservices Australia. Operations within 3 NM of a military controlled aerodrome require a letter of agreement with the local airspace management unit/squadron.

The CRP will send an application to CASA at least 21 days before the intended date(s) of operation. Applications must always focus on a safety-based outcome to satisfy CASA's requirements.

General Procedures

See Appendix G for operations within areas around controlled aerodromes.

Procedures IAW section 4.04 of the Part 101 MOS

Tethered operations

If a tether system is required to conduct an operation, the CRP will authorise that using the flight authorisation form (Appendix I), and it is to be conducted in accordance with the approved procedures in Appendix G.

For indoor operations, RPs must:

- Ensure that a containment area is identified for which it is physically impossible for the RPA to escape and fly away under any circumstance; and, that if the RPA collides with any part of the containment area, no material from the RPA or containment area can move or escape and cause injury to a person outside the area.
- Ensure that they do not infringe any provision of RPA Regulations concerning proximity of an RPA to people within or outside the containment area.

4.3.2. Operations within 3NM of a Non-Controlled Aerodrome

RPs must not operate an RPA within the relevant airspace of a non-controlled aerodrome unless the operation has been authorised by the CRP.

When any RPIC becomes aware that airborne manned aircraft are flying to or from a non-controlled aerodrome (relevant event), they must:

- not launch within the relevant airspace of that aerodrome
- immediately ensure the RPA is safely manoeuvred away from the path of the manned aircraft and land as soon as safely possible
- cease operation of the RPA until the manned aircraft has either cleared the area or has landed at the non-controlled aerodrome.

Note: However, the operator may continue to operate if the RPA operation is indoors, or, tethered in accordance with sub-section 9.05(3) of the Part 101 MOS. Procedures for these operations are within appendix G.

To provide greater situational awareness, all RPs must monitor an aviation radio on the applicable air traffic frequency, and, unless directed otherwise, to transmit the location of the RPA using call sign 'Unmanned' (then call sign) on the appropriate air traffic frequency 15 minutes before the first launch and then at 15-minute intervals for the duration of the operation of the RPA. These frequencies are also monitored for the times previously stated.

4.4. Operations in the Approach and Departure Paths of an Aerodrome

4.4.1. Controlled Aerodrome

RPs are responsible for ensuring the RPA is not operated at any altitude in the approach or departure path of a controlled Aerodrome (as defined in section 4.05 of the Part 101 MOS). The CRP is responsible for ensuring that operations are not planned or approved for such areas. If the operation has been authorised by CASA, procedures can be found in Appendix G.

4.4.2. Non-Controlled Aerodrome

RPs may operate an RPA in the approach or departure paths of a non-controlled aerodrome, provided a relevant event is not taking place and the CRP has authorised the operation. If the RP becomes aware of a relevant event, the instructions in section 3 of this manual must be followed.

4.5. Operations over the Movement Area of an Aerodrome

RPA must not be operated over the movement area of an aerodrome. If the operation has been authorised by CASA, procedures can be found in Appendix G.

4.6. Operations in Prohibited, Restricted or Danger Areas

4.6.1. Prohibited and Restricted Airspace

RPs are responsible for ensuring the RPA is not operated in restricted or prohibited airspace unless otherwise permitted by the authority controlling the airspace. All operations are conducted in accordance with any conditions imposed by the controlling authority. The CRP is responsible for ensuring that operations are not planned or approved for such areas without the permission of the controlling authority.

Where permission has been obtained to operate in restricted or prohibited airspace, the CRP details the conditions of this approval on the JSA prior to authorising the operation.

4.6.2. Danger Areas

RPs must ensure that consideration is given to specific risks associated with identified danger areas. The CRP must conduct a risk assessment prior to any operation within a danger area.

4.7. Operations above 400ft AGL

Unless otherwise permitted by CASA, the RP must ensure the RPA is not operated above 400ft AGL. The CRP is responsible for ensuring that operations are not planned or approved for such areas. If permission is granted to operate above 400ft AGL, the operation is only permitted if all the conditions of the relevant permission can be met. Procedures for operations above 400ft can be found in Appendix G.

4.8. Operations over Populous Areas

Unless otherwise permitted by CASA, the RP must ensure the RPA is not operated over a populous area. The CRP is responsible for ensuring that no operation is planned or approved for such areas until approval from CASA has been obtained.

A populous area is defined as an area that has a sufficient density of population for some aspect of the operation, or some event that might happen during the operation (in particular, a fault in, or failure of, the aircraft) to pose an unreasonable risk to the life, safety or property of somebody who is in the area but is not connected with the operation.

If permission is granted to operate over a populous area, the operation is only permitted if all the conditions of the relevant permission can be met. Procedures for operations over a populous area can be found in Appendix G.

4.9. EVLOS Operation

Monash may conduct EVLOS operations if the operation has been authorised by CASA, procedures for which can be found in Appendix G.

4.10. BVLOS Operation

Monash may conduct BVLOS operations if the operation has been authorised by CASA, procedures for which can be found in Appendix G.

4.11. Dropping or Discharging Items

The RP is responsible for ensuring nothing is dropped or discharged from an RPA in a way that creates a hazard to another aircraft, a person, or property. Procedures for dropping or discharging items from an RPA can be found in Appendix G.

5. RPAS Maintenance

5.1. Scope of Maintenance

Monash has maintenance schedules (Appendix F) that provide for the routine repair, servicing and testing (preventative maintenance) of the RPAS.

The maintenance schedules consider the mechanical, avionic, and computer-based systems (including software and firmware) associated with the:

- RPA and their power sources, such as batteries, fuel cells etc
- RPAS support equipment, including transmitter/receiver equipment, radio devices, and any other item of plant or equipment associated with the operations or use of the RPA

- RPA role equipment and their fittings, such as cameras, electronic sensing devices etc.

5.2. Maintenance to be in Accordance with Schedules

All maintenance carried out on RPAS is scheduled in accordance with the manufacturer's specifications where that information exists and is relevant.

If a manufacturer does not provide details concerning the scheduling of maintenance, or the information is not relevant, the MC must have:

- Developed a schedule for the maintenance based on best practice standards and document it in a RPAS maintenance schedule
- Placed the item 'on condition' IAW section 5.4 below

The MC is responsible for ensuring that, where maintenance schedules have been developed for an RPAS, this schedule is located on AVCRM.

5.3. Variation of Maintenance Schedules

If the existing maintenance schedule is deemed deficient, the MC is responsible for varying the maintenance scheduling to ensure the ongoing reliability of the RPAS.

The MC must not permit the maintenance schedule to be of a lesser standard than the manufacturer's specifications. All variations to the maintenance schedule are recorded on AVCRM.

5.4. 'On Condition' Maintenance

All components of an RPAS, including those on a maintenance schedule, are subject to ongoing 'on condition' monitoring through Pre-flight and Post-flight inspections.

The Pre-flight and Post-flight inspections conducted are used to identify damage, wear, malfunction or unserviceability, and any defects found during these inspections. These are recorded on the Defect and Maintenance Log in AVCRM.

The MC is responsible for monitoring the failure rate of each RPAS component that is 'on condition' or subject to a maintenance schedule to ensure the schedule is effective in minimising unserviceable items and operational disruptions.

5.5. Minimum Requirements for Maintenance Schedules

The maintenance schedules include the following items for each RPAS:

- Pre-flight Inspection Checklist
- Post-Flight Inspection Checklist
- Periodic/Post-Maintenance Checklist

The content of these checklists is detailed in each specific RPAS section (Appendix F).

5.6. Maintenance Procedures

5.6.1. Maintenance Instructions

All maintenance on RPAS must be carried out in accordance with manufacturer's instructions for that specific aircraft type. The manuals are listed in Appendix F.

5.6.2. Repair or Replacement of Components

Components must be repaired or replaced when they show signs of unserviceability, abnormality or damage unless the damage is insignificant to the operation of the RPAS (e.g., scratches or cosmetic damage).

5.6.3. Firmware/Software Updates

Control system software is only updated after the version has been confirmed stable. A post-maintenance test flight, in a controlled and safe location, is always conducted as part of the maintenance activity whenever a software or firmware update is applied.

Should an issue arise with new software / firmware version, the component is rolled back to the previous stable version before the RPAS is used in commercial operations. A notification is then sent to the MC to inform other operators using the same software update.

Records of firmware or software updates must be documented in the maintenance log and include details of any test flights and version numbers relevant to the update.

5.7. Maintenance Authorisation

5.7.1. Maintenance Personnel to be Authorised

The MC may authorise the following persons to conduct maintenance on RPAS:

- RPs who have completed the induction programme (LIMITED to maintenance tasks listed in 4.3.2)
- Manufacturers of RPAS items and their approved service agents
- Organisations and service providers assessed by the MC as competent to provide RPAS maintenance services.

5.7.2. Remote Pilot Maintenance Authorisation

RPs who have completed the induction programme are authorised to conduct the following maintenance:

- Replacement of propellers
- Pre-flight and post-flight inspections
- Replacement and charging of batteries
- Fitting and removal of payloads and role equipment

5.8. Defects

All defects identified in any part of an RPAS (RPA, transmitter/receiver, role equipment etc.) must be recorded as soon as they are identified and prior to further operation of the RPAS.

During operations, RPs can only rectify those defects that they have been authorised to repair. All other defects must be treated as ‘open’ until the MC has assessed and rectified the defect.

The MC must be immediately notified when a defect is identified in the field that cannot be rectified by the RP. In these situations, the MC consults with the RP on the action that will be taken to remedy the defect.

In situations where a defect cannot be rectified, RPs must suspend the RPAS operation and notify the client of the situation. Under no circumstances is an aircraft to be operated if there is an open RPAS defect.

5.9. Recording of Defects and Maintenance

It is the responsibility of all people involved in the operation of an RPAS to report defects as they occur and record any maintenance, they have conducted on the RPAS.

Defects and maintenance are recorded on the Defect and Maintenance Log (Appendix I). All open defect items are closed prior to flight.

RPs are responsible for forwarding the Defect and Maintenance Logs to the MC as follows:

- For open defects – as soon as practicable
- For defects rectified by the RP – as soon as possible upon return to the operating base

It is the responsibility of the MC to review all defects and, where necessary, adjust the RPAS Maintenance Plan to enhance the serviceability of RPAS components and improve the reliability of RPAS operations.

The MC is required to file the Defect and Maintenance Log for each element of the RPAS and keep this record for seven (7) years after the last day the RPA was operated.

Note: The Pre/Post Flight Check is recorded on the RPAS Time in Service Log rather than the Defect and Maintenance Log.

5.10. RPAS Time in Service Log

RPs must use the RPAS Time in Service Log (Appendix I) to record details of the flight times and the Pre/Post-Flight Checks conducted on each RPA.

When an RPAS Time in Service Log becomes full, RPs must transfer the cumulative total of flight hours to a new RPAS Time in Service Log and forward the completed RPAS Time in Service Log to the MC.

The MC must file the RPAS Time in Service Log for each RPA and keep this record for seven (7) years after the last day the RPA was operated.

For RPA that have a maximum gross weight above 25 kgs, individual in-service times for engines, motors, rotors and propellers must be recorded.

5.11. Flight Tests

Following all maintenance and before final sign-off for completion of a maintenance task, the person carrying out the maintenance or another person nominated by the MC is responsible for carrying out a flight test of the aircraft to verify that it operates correctly in all available modes.

Flight test requirements for each RPAS type are developed by the MC in consultation with the CRP to take into account the capabilities, operating modes and tasking of the RPAS.

Details of the flight test requirements for each RPA are detailed in the relevant RPAS section in Appendix F.

All RPAS test flights are to be authorised by the CRP and logged.

6. ReOC Crew Induction / Internal Training

Training requirements include general training with regards to this manual, RPAS equipment, and specific operational activities that the person will be involved in, such as specialised operations. All crew operating are obliged to undergo induction training prior to being involved in RPAS operations.

6.1. Persons Permitted to Conduct Training

The CRP and person(s) nominated by the CRP (as noted on AVCRM) are permitted to provide internal training. The CRP ensures that appropriate measures of competency are in place to ensure the effectiveness of training that has been provided.

6.2. Record Keeping

The CRP is responsible for keeping all records of all training and proficiency checks (including flight tests) conducted by and on any person involved in operations. All training records must be kept for a minimum of seven (7) years.

6.3. Induction and Type Training Requirements

All RPs must complete the following induction training prior to commercial operations:

- Policy and procedure training IAW Appendix J
- RPAS type training as specified in Appendix K on the types of RPA that the RP is to operate

6.4. Remote Pilot Training for Specialised Operations

Training requirements for specialised operational activities (e.g., above 400ft AGL operations, BVLOS etc.) are detailed in Appendix G. Monash's Specialised Operations are detailed in Section 4 of this manual.

6.5. Remote Pilot Night VLOS Training Requirements

All RPs must complete Night VLOS training IAW Appendix L prior to operating an RPA in any night VLOS operations.

6.6. Senior Remote Pilot Training Requirements

The CRP is responsible for the training and evaluation of the SRP IAW Appendix M. An evaluation is conducted annually to ensure proficiency and competency of the SRP.

The CRP maintains a record of the training and evaluation conducted in the RPs training records.

6.7. Senior Remote Pilot Training Requirements

All RPs must complete theory and practical training annually, IAW Appendix J and K respectively.

The CRP maintains a record of the training and proficiency checks in the RPs training records.

An evaluation conducted on an SRP IAW section 6.6 satisfies the requirements under this section.

7. Tools

All tools are available via the Monash University OHS Website.

8. Records

Records of RPA operations must be retained for as shown below. Additional items may be required to be documented at the request of the CRP.

CASA Forms	***Form 101-01*** Application for Remote Pilot Licence (RePL), initial and variation ***Form 101-02*** Application for RPA Operators Certificate (ReOC), initial issue and variation ***Form 101-03*** Application for ReOC (Renewal) ***Form 101-04*** Application for ReOC Nominated Personnel (CEO, CRP & Maintenance Controller) ***Form 101-09*** Application for RPA Flight Authorisation / Approval / Permission

9. Document History

Version	Date of Issue	Changes made to document
1	February 2020	RPA Operations Manual, v1 (Initial)
2	March 2022	Merge with Procedures Library (new format), AVCRM updates, RPA fleet

10. Appendices

Appendix A. Schedule 1 – RPAS Operating Types and Nominated Personnel

RPAS Operating Types

Make	Model	Type	Serial / Registration
DJI	Phantom 4	Multi Rotor	07DDD5K0B10354
Home built	Mainframe Mk3	Powered Lift	CASA-26VRYF
Home built	Mainframe Mk4	Powered Lift	CASA-34XFHG
Home built	Mainframe Mk5	Powered Lift	CASA-67CCFW
Home built	Mentor	Aeroplane	CASA-86LFQF
Home built	Local Hawk	Aeroplane	CASA-56DNWW
Home built	Hex	Multi Rotor	CASA-48GJST
DJI	Inspire 1 v1	Multi Rotor	W13DCA08020082
DJI	Matrice 300 RTK	Multi Rotor	1ZNBJA700C00UR
DJI	Matrice 600 Pro	Multi Rotor	M80DFF08030096
DJI	Phantom 4 Pro v2	Multi Rotor	11UDH14R700409
DJI	Phantom 4 Pro v2	Multi Rotor	11UDH17R700540
DJI	Phantom 4 MS	Multi Rotor	11UCF7J0A50334
DJI	Phantom 4 RTK	Multi Rotor	0V2CFBU0A30108
DJI	Phantom 4 RTK	Multi Rotor	0V2CFC40A30122
Quaternium	Hybrix .20	Multi Rotor	MDDP-HYB
DJI	Phantom 4 Pro v1	Multi Rotor	0AXCE6T0A30799
DJI	Phantom 4 Pro v2	Multi Rotor	0AXDDCL0A20251
DJI	Phantom 4 Pro v2	Multi Rotor	11UDH13R700624
DJI	Mavic Pro	Multi Rotor	08QUE7710101FN

DJI	Phantom 4	Multi Rotor	0AXCE7D0B31365
DJI	Mavic 2 Zoom	Multi Rotor	0M6DF97001JSJ5
DJI	Phantom 4 RTK	Multi Rotor	0V2DGC5RA30661

Nominated Personnel

Nominated Position	Name	ARN	Date Form 101-04 Approved
Director	Paul Barton	1059499	22/01/2020
Chief Remote Pilot	Anthony Marsh	773428	22/01/2020
Maintenance Controller	Anthony Marsh	773428	22/01/2020

Appendix B. Copy of Monash University's RPA Operator's Certificate

Australian Government
Civil Aviation Safety Authority

RPA OPERATOR'S CERTIFICATE (ReOC)

Number CASA.ReOC.1387 Revision No: 2

This certificate is granted pursuant to regulation 101.335 of the *Civil Aviation Safety Regulations 1998* (CASR) to:

MONASH UNIVERSITY

ARN: 213404

The holder of this certificate is certified as a Remotely Piloted Aircraft (RPA) operator and is authorised to operate the RPA described in the attached schedules subject to any limitations and conditions in those schedules.

This certificate is effective from 25 August 2021 and will expire on 31 August 2024.

K. Blair

Karen Patricia Blair
National Manager Regulatory Services
Regulatory Oversight Division

Delegate of the Civil Aviation Safety Authority

25 August 2021

SCHEDULE 1

AUTHORISED RPA

The certificate holder is authorised to conduct operations of the RPA specified in this Schedule in the territories indicated.

RPA Category	Size	In Aust.	Into & Out of Aust.	RPA Type	RPAS Aerial Work	RePL Training
Aeroplane	Up to 25kgs	✓	×		✓	×
Multi-rotor	Up to 25kgs	✓	×		✓	×
Powered Lift	Up to 25kgs	✓	×		✓	×

SCHEDULE 2

PART 1 - GENERAL CONDITIONS

The operator must comply with the following conditions:

1. The number and type of each RPA operated under this RPA Operator's Certificate (ReOC) must be identified in, and operated in accordance with, Schedule 1 of the holder's Operations Manual.
2. The nominated personnel accepted under this ReOC must be identified in accordance with Schedule 1 of the holder's Operations Manual.
3. The authorised RPA operated under this ReOC must not be flown at any altitude within 3 nautical miles of a controlled Aerodrome listed in En Route Supplement Australia (ERSA) or as designated by Airservices Australia, unless the Certificate holder obtains the written permission of CASA for that operation.

   (Note: This permission is in addition to any permission which the operator may need to obtain under sub regulation 101.075 of the Civil Aviation Safety Regulations 1998).

Appendix C. Permissions, Exemptions and Approvals

Below is a list of Monash's permissions, exemptions and approvals. Copies are also available on AVCRM.

Australian Government
Civil Aviation Safety Authority

Instrument number CASA 01/17

I, SHANE PATRICK CARMODY, Acting Director of Aviation Safety, on behalf of CASA, make this instrument under regulations 11.056 and 101.029 and subregulation 101.095 (1A) of the *Civil Aviation Safety Regulations 1998*.

[Signed S. Carmody]
Shane Carmody
Acting Director of Aviation Safety

22 February 2017

Approval — operation of RPA at night

1 Commencement

This instrument commences on the day of registration.

2 Repeal

Instrument CASA 103/16 with unique identifier F2016N00022 is repealed.

3 Application

This instrument applies to the operation of an RPA, other than a large RPA, by a person who holds a certificate as an RPA operator (the ***operator***).

4 Definitions

In this instrument:

authorised remote pilot means the operator's chief remote pilot, or a person authorised by the operator's chief remote pilot to operate the RPA in accordance with clauses 8 and 9 of Schedule 1.

RPAS Sample Operations Manual means the RPAS Sample Operations Manual published by CASA as existing at the time when his instrument commences.

Note At the time when this instrument commences, the RPAS Sample Operations Manual published by CASA, with Revision Date 06 Feb 17, can be found at: https://www.casa.gov.au/files/sampleoperationsmanualdocx.

5 Approval

(1) The operator is approved to operate the RPA at night.

(2) An authorised remote pilot is approved to operate the RPA at night.

6 Conditions

(1) The approval in subsection 5 (1) is subject to the conditions mentioned in Schedules 1 and 2.

(2) The approval in subsection 5 (2) is subject to the conditions mentioned in Schedule 2.

Instrument number CASA 01/17 Page 1 of 3 pages

Authorised Version F2017N00016 registered 24/02/2017

Schedule 1 Conditions — operator

1 The operator must have documented practices and procedures, that are approved in writing by CASA or by a Manager or Team Leader of CASA with responsibility for regulatory oversight of RPA operations, for training and testing of individuals in relation to operating RPA at night.

Note At the date of this instrument, the Manager and Team Leader of CASA with responsibility for regulatory oversight of RPA operations are the National Assurance Manager and the RPAS Team Leader in Safety Assurance Branch, Aviation Group.

2 For clause 1, the practices and procedures mentioned in the RPAS Sample Operations Manual for training and testing of individuals in relation to operating RPA at night are taken to be approved by CASA.

Note Practices and procedures for training and testing of individuals in relation to operating RPA at night include those in Part C, Section 3.5.1 (Remote Pilot Training for Specialised Operations) of the RPAS Sample Operations Manual and Appendix 8 (Night VLOS Training Syllabus) of the RPAS Operational Procedures (Library), which is Appendix 4 of the RPAS Sample Operations Manual.

3 The operator must have documented practices and procedures, that are approved in writing by CASA or by a Manager or Team Leader of CASA with responsibility for regulatory oversight of RPA operations, for:

(a) making records detailing the training and testing undertaken by authorised remote pilots; and

(b) retention of those records.

4 For clause 3, the practices and procedures mentioned in the RPAS Sample Operations Manual for making and retention of records detailing the training and testing undertaken by personnel involved in RPA operations are taken to be approved by CASA.

Note Practices and procedures for making and retention of training and testing records include those in Section 3.2 (Record Keeping) of the RPAS Sample Operations Manual.

5 The operator must have documented practices and procedures, that are approved in writing by CASA or by a Manager or Team Leader of CASA with responsibility for regulatory oversight of RPA operations, for risk assessment and mitigation processes for operation of RPA at night.

6 For clause 5, the practices and procedures for risk assessment and mitigation mentioned in the RPAS Sample Operations Manual are taken to be approved by CASA.

Note Practices and procedures for risk assessment and mitigation include those in Section 4.2 (Feasibility Check and Job Safety Assessment (JSA)) and Appendix 3 (Risk Assessment) of the RPAS Sample Operations Manual.

7 A copy of this instrument must be included in the operator's documented practices and procedures.

Note For operators using the RPAS Sample Operations Manual, a copy of this instrument and a copy of any other written correspondence with CASA which indicates that the operator is approved to operate under this instrument should be included in Appendix 2 (Permissions, Exemptions and Approvals).

8 The operator must ensure that the RPA is operated by only:

(a) the operator's chief remote pilot; or

(b) a person authorised by the operator's chief remote pilot.

9 Before authorising a person to operate the RPA, the operator's chief remote pilot must be satisfied that the person:

(a) holds a remote pilot licence that authorises the person to operate the RPA; and

(b) has the knowledge and practical abilities to operate the RPA; and

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(c) has been approved by the operator to operate the RPA in accordance with the operator's documented practices and procedures and this instrument; and

(d) either:

(i) has received appropriate training and testing in relation to the operation of the RPA at night; or

(ii) will only operate the RPA while receiving training or taking a test in operating RPA at night.

10 Before any operation under this approval, the operator must ensure that a risk assessment is carried out by the operator's chief remote pilot in accordance with the documented practices and procedures mentioned in clause 5.

Schedule 2 Conditions — operator and authorised remote pilot

1 The operator and an authorised remote pilot must comply with a request from CASA for CASA to test the pilot on the pilot's knowledge and practical abilities to operate the RPA in accordance with this instrument.

2 The operator and the authorised remote pilot must ensure that the launch and landing and recovery areas are illuminated so that the position of the RPA can be established and maintained by the authorised remote pilot by visual reference.

Note For example, the areas may be illuminated by portable lighting or airfield lighting.

3 The operator and the authorised remote pilot must ensure that the RPA is fitted with all of the following:

(a) serviceable equipment for a GPS hold and return to home function;

(b) serviceable equipment for a GPS lock with a minimum of 7 GPS satellites.

4 The operator and the authorised remote pilot must ensure that the RPA displays orientation lighting when the RPA is in flight.

Note For example, the orientation lighting may consist of LED lights on the front and rear arms of a multi-rotor RPA.

5 The operator and the authorised remote pilot must ensure that ground station software is used to enable the authorised remote pilot to assess the RPA's position.

6 The operator and the authorised remote pilot must not operate the RPA outdoors:

(a) in rain; or

(b) if thunderstorms are observed or reported within 5 kilometres of the location of the proposed operation.

Authorised Version F2017N00016 registered 24/02/2017

Australian Government
Civil Aviation Safety Authority

Instrument number CASA 96/17

I, SHANE PATRICK CARMODY, Director of Aviation Safety, on behalf of CASA, make this instrument under the regulation 11.245 of the *Civil Aviation Safety Regulations 1998*.

[Signed S. Carmody]
Shane Carmody
Director of Aviation Safety

17 October 2017

Direction — operation of certain unmanned aircraft

1 Duration

The instrument:

(a) commences on the day after registration; and

(b) is repealed at the end of 30 September 2020.

2 Definitions

Note In this instrument certain terms and expressions have the same meaning as in the *Civil Aviation Act 1988* and the regulations. These include: ***aerodrome***, *AGL*, ***authorisation***, ***controlled aerodrome***, ***micro RPA***, ***model aircraft***, ***movement area***, ***remote pilot licence***, *RPA* and *RPA operator*.

(1) In this instrument:

helicopter landing site means an area of land or water, or a defined area on a structure, intended to be used wholly or in part for the arrival, departure and surface movement of helicopters.

non-controlled aerodrome means a place that is:

(a) a helicopter landing site not located at a controlled aerodrome; or

(b) an aerodrome that is not a controlled aerodrome.

(2) In this instrument, awareness that a manned aircraft is operating to or from an aerodrome is taken to exist where a reasonable person ought to have been aware that a manned aircraft is operating to or from the aerodrome.

3 Application

This instrument applies to the operation of unmanned aircraft of all kinds, except operation mentioned in subregulation 101.005 (3) of CASR.

4 Directions relating to the operation of unmanned aircraft near controlled aerodromes

(1) I direct that a person must not operate an unmanned aircraft within 3 nautical miles of the movement area of a controlled aerodrome.

Note The designation of controlled aerodromes is made in the *Determination of airspace and controlled aerodromes etc*, as in force from time to time, which is a legislative instrument revised and reissued by CASA approximately every 6 months. Controlled aerodrome information in the Determination in force at any particular time is also published by Airservices Australia in the *Designated Airspace Handbook*.

(2) The direction in subsection (1) does not apply to the operation of an unmanned aircraft in accordance with any of the following:

(a) an authorisation (however called) or exemption granted under CASR that permits operation of the aircraft within 3 nautical miles of the movement area of the aerodrome;

(b) the approval of an approved area under regulation 101.030 of CASR;

(c) if the aircraft is an RPA operated by the holder of a remote pilot licence — the privileges and limitations associated with:

(i) the licence; and

(ii) the certification of the RPA operator that is conducting the operation.

(3) The direction in subsection (1) does not apply to the operation of a micro RPA, tethered balloon or kite, unmanned free balloon, rocket or fireworks.

5 Directions relating to the operation of unmanned aircraft near aerodromes that are non-controlled aerodromes

(1) I direct that a person must not launch an unmanned aircraft within 3 nautical miles of the movement area of a non-controlled aerodrome if the person is aware that a manned aircraft is operating to or from the aerodrome.

(2) If a person controlling an unmanned aircraft within 3 nautical miles of the movement area of a non-controlled aerodrome becomes aware that an aircraft is operating to or from the aerodrome, I direct the person controlling the unmanned aircraft to:

(a) immediately ensure that the unmanned aircraft is safely manoeuvred away from the path of the manned aircraft; and

(b) land the aircraft as soon as safely possible.

(3) The directions in subsections (1) and (2) do not apply to the operation of an unmanned aircraft conducted in accordance with any of the following:

(a) an authorisation (however called) or exemption granted under CASR that permits operation of the aircraft within 3 nautical miles of the movement area of the aerodrome;

(b) the approval of an approved area under regulation 101.030 of CASR;

(c) if the aircraft is an RPA operated by the holder of a remote pilot licence — the privileges and limitations associated with:

(i) the licence; and

(ii) the certification of the RPA operator that is conducting the operation.

(4) The directions in subsections (1) and (2) do not apply to the operation of a micro RPA, tethered balloon or kite, unmanned free balloon, rocket or fireworks.

6 Directions relating to the operation of unmanned aircraft higher than 400 ft AGL

(1) I direct that a person controlling an unmanned aircraft must not operate the aircraft higher than 400 ft AGL.

(2) The direction in subsection (1) does not apply to the following:

(a) the operation of a tethered balloon or kite in accordance with Subpart 101.D of CASR;

(b) the release of an unmanned free balloon in accordance with Subpart 101.E of CASR;

(c) the operation of a rocket in accordance with Subpart 101.H of CASR;

(d) the operation of an unmanned aircraft in accordance with:

(i) an authorisation (however called) or exemption granted under CASR that permits operation of the aircraft higher than 400 ft AGL; or

(ii) the approval of an approved area under regulation 101.030 of CASR;

(e) the operation of an RPA by the holder of a remote pilot licence in accordance with the privileges and limitations associated with:

(i) the licence; and

(ii) the certification of the RPA operator that is conducting the operation;

(f) the operation of a model aircraft in accordance with a written approval given by CASA for the purposes of this paragraph.

7 Directions relating to the operation of unmanned aircraft in the area of emergency operations

(1) I direct that a person controlling an unmanned aircraft must not operate the aircraft over an area where a fire, police, or other public safety or emergency operation is being conducted.

(2) The direction in subsection (1) does not apply to the extent that a person in charge of the emergency operation approves the operation of the unmanned aircraft.

8 Directions relating to the operation of RPA near people

(1) I direct that a person controlling an RPA must ensure that the aircraft is not operated less than 30 m from a person unless the person has duties essential to the control or navigation of the aircraft.

(2) For subregulation (1), the distance of 30 m is measured in every direction from the point on the ground directly below the aircraft.

(3) The direction in subregulation (1) does not apply:

(a) to the operation of an RPA in accordance with an authorisation (however called) or exemption granted under CASR that permits operation of the RPA less than 30 m from another person; or

(b) if:

(i) the RPA is an airship; and

(ii) the airship approaches no closer to the second person than 10 m horizontally and 30 ft vertically.

9 Directions relating to the operation of a single RPA or model aircraft

(1) I direct that a person controlling an RPA or model aircraft must only operate 1 aircraft at a time.

(2) The direction in subregulation (1) does not apply to the operation of an RPA or model aircraft in accordance with an authorisation (however called) or exemption granted under CASR.

Authorised Version F2017L01370 registered 19/10/2017

Appendix D. RPAS Risk Assessment

Refer to Monash University's OHS Risk Management Procedure.

A Risk Assessment Matrix (Level of Risk) has been provided by CASA and has been included here as guidance for when completing the RPAS Risk Assessment in S.A.R.A.H. This is to be used with caution as the RPAS category does not align well with the other categories. RPAS risks should therefore be defined by the monetary loss (refer Cost/Property Damage category) or the next most relevant category – e.g., the total loss of a $5,000 RPA would have a consequence of 2, if assessed in isolation from other outcomes.

	Consequence					
	0	1	2	3	4	5
People	No injury	Minor injury that does not require medical treatment	Minor injury that requires first aid treatment	Serious injury causing hospitalisation or multiple medical treatment cases	Permanent injury or disability (including blinding) that may result in hospitalisation of at least one person	One or more deaths, multiple severe injuries or permanent total disability
RPAS	Any element of the RPAS is degraded but task unaffected	A failure not serious enough to cause RPAS damage but which will result in unscheduled maintenance or repair or incomplete task	Minor RPAS damage resulting in damage to components, incomplete task and future unserviceability of RPAS	Significant RPAS damage but repairable	Complete loss of or destruction of a RPAS component (RPA, camera transmitter, sensor, etc.)	Loss of all RPAS elements
Reputation	Small delay, internal inconvenience only	May threaten an element of the service resulting in the task or objective being delayed	Risk does not violate any law and can be easily remedied. It has some effect on reputation and/or external stakeholders	Risk does not violate any law and can be easily remedied. It has some residual effect on reputation and/or external stakeholders and while reputation is damaged it is recoverable	Risk violates a law but can be remedied. It has a residual effect on reputation and/or external stakeholders and may result in damage to reputation	Risk violates a law and is unable to be remedied. It has a significant impact on reputation and/or external stakeholders and will result in loss of reputation
Cost / Property Damage	Negligible	Less than $1,000	More than $1,000 less than $10,000	More than $10,000 less than $100,000	More than $100,000 less than $1,000,000	Loss or damage exceeding $M1

Airspace	No aviation airspace safety implicatio n	Minor breach of aviation safety regulations or RPA Area Approval	Serious issues of compliance with aviation safety regulations, RPA Area Approval or operations resulting in potential avoiding action by a manned aircraft but no collision	Serious issue of compliance with aviation safety regulations or operations or the loss of separation resulting in the potential for a collision with a manned aircraft, but the manned aircraft can land with no serious injuries or fatalities	Potential for aviation safety incident/s involving multiple life-threatening injuries, or fatalities, to less than 10 people	Potential for multiple fatal aviation safety incidents causing multiple fatalities, to 10 or more people
Equitable access of airspace	No effect on access to airspace users	Some users of the airspace may perceive or experience airspace inequality resulting in between 5 to 10-minute delay or minor detour	Some users of the airspace may perceive or experience airspace inequality resulting in more than 10-minute delay or major detours	Most users of the airspace will experience airspace inequality resulting in long delay (>30 minutes) or major detours	All users of the airspace will experience airspace inequality resulting in long delay (>30 minutes) or major detours	Airspace users are prohibited from operating in the airspace causing significant disruptions to operations and financial cost

Likelihood	Almost Certain	5	>1 in 10	Is expected to occur in most circumstances
	Likely	4	1 in 10 – 100	Will probably occur
	Possible	3	1 in 100 – 1000	Might occur at some time in the future
	Unlikely	2	1 in 1000 – 10000	Could occur but considered unlikely or doubtful
	Rare	1	1 in 10000 - 100000	May occur in exceptional circumstances
	Extremely Rare	0	< 1 in 100000	Could only occur under specific conditions and extraordinary circumstances

Consequence

			0	1	2	3	4	5
Likelihood	Almost Certain	5	5	6	7	8	9	10
	Likely	4	4	5	6	7	8	9
	Possible	3	3	4	5	6	7	8
	Unlikely	2	2	3	4	5	6	7
	Rare	1	1	2	3	4	5	6
	Extremely Rare	0	0	1	2	3	4	5

Untreated Risk Scores

8,9,10 (Extreme risk) - Task is not permitted. Risk controls are required to ensure residual risk is acceptable.

6,7 (High risk) - Task is not permitted. Risk controls are required to ensure residual risk is acceptable.

4,5 (Medium risk) - Task may proceed, however, risk must be reduced to 'as low as reasonably practicable' (ALARP).

1,2,3 (Low risk) - Task may proceed.

Appendix E. Normal Procedures

General

In addition to the operational procedures detailed for a specific RPA in the relevant user's manual, the procedure for Normal Operations at Monash University is detailed below.

1. Flight Authorisation

Complete flight authorisation form located in Appendix I and submit to the CRP with the initial JSA/planning documents. Confirm the CRP has authorised the operation prior to continuing and have the flight authorisation on-site (paper/electronic copy).

2. JSA Validation (On-site)

Validate the hazards identified during the job planning process by confirming there are no new risks identified. This may also require the risk control worksheet to be validated. JSA and risk worksheet located in Appendix I.

3. Pre-Operational Briefing

If the operation requires more than one person, conduct a pre-operational briefing IAW Appendix I.

4. Set Up Operational Area

Identify the landing and take-off areas, place all signs / cones out in most likely areas where public will approach at a distance of at least 30 metres. Place firefighting equipment and first aid kit in known location. Clear landing / take-off areas by removing obstructions or laying down launch pad.

5. Weather Check and NOTAMS

Check current and forecast weather conditions related to the operation via NAIPS. Ensure VMC minima can be achieved. If any NAIPS, NOTAM or AIS briefings were produced for the operation, these are kept on file for seven (7) years.

6. Assembly

Assemble RPAS and equipment required to conduct operation. Inspect RPAS IAW manufacturers requirements and confirm serviceability.

7. Prepare for Flight

Move the RPAS to the landing / take-off areas. Set the spotters (if required) to their assigned locations and confirm positive communication. Confirm airband radio frequencies correct and conduct general area broadcast if required.

8. Pre-flight Checklist

Conduct the pre-flight checklist located in the RPAS specific instructions. Confirm clear air for launch, confirm go / no-go criteria. Announce take-off.

9. Controllability Check

Check each control input gives the correct response from the RPA immediately after take-off and before transiting.

10. Radio Communication

Maintain listening watch on applicable frequency and broadcast every 15 minutes during operation.

11. Pre-landing Checks

Confirm direction of approach to landing area, inform crew, confirm approach and landing area is clear from hazards. Confirm correct system configuration for landing, Announce landing. If in doubt of a safe approach or landing, conduct a ‘go-around’ and land at alternate site if required.

12. Post-flight Checks

Conduct the post-flight checks located in the RPAS Specific Instructions after each operation. Contact any controlling authority and advise them if the RPA is on the ground as applicable. Conduct general area broadcast notifying the end of operations.

13. Post-flight Administration

Record any defects and update time in service log for aircraft. Record any battery management requirements IAW this manual and/or the specific RPAS instructions. Record flight hours in RP logbooks. Disassemble RPAS and pack up operational equipment and area for departure.

Appendix F. RPAS Type Specific Procedures

RPAS user manuals, maintenance schedules/instructions, pre-flight / post-flight checklists and other relevant documentation is available on AVCRM.

Appendix G. Specialised Procedures

EVLOS – Reserved

BVLOS – Reserved

Tether – Reserved

Appendix H. Emergency Procedures

The following procedures must be following in the event of an emergency. The RP must ensure that any response to an emergency does not add additional risks, giving priority to risk to people.

1. Communication and Internal Reporting

In the event of an emergency, the RP should contact 000 (triple zero) in the first instance if police, fire or ambulance are required. The RP shall then contract the CRP and seek guidance. The operational briefing shall list any additional emergency contacts and instructions for a specific operation.

2. RPA Malfunction and Critical Failures

In the event of an RPA malfunction, the RP shall troubleshoot using the troubleshooting instructions and corrective actions provided in the manufacturer's manual or instructions. If no such guidance exists for a particular issue, the RP shall use their best judgement (based on experience and training) to rectify the problem, undertaking the following actions as a minimum, checking for signs of the cause of issue and identifying possible rectifications:

- Alert crew of the malfunction/failure and update periodically as appropriate
- Check RPA health status/indicators
- Check controller status – including connectivity, battery, and input response (possibly frozen)
- Check RPA controllability – is it responding to inputs in a predictable manner
- Attempt the RTH function if GPS available
- Switch to a non-GPS flight mode and attempt to RTH manually or land in a safe location/manner
- If still unable to RTH or perform a controlled landing, every attempt should be made to manoeuvre the RPA to a safe location (away from people/property/aircraft) and a ‘controlled crash’ initiated – effectively eliminating thrust with the minimal lateral possible.

Where time permits, the RP should contact the CRP for additional guidance.

If the RPA has suffered a critical failure (e.g. IMU or GPS failure), the RP shall use their judgement to respond to the issue, taking into account the specific RPA failure modes and responses as detailed in the manufacturer's manuals or instructions. If the RP is unable to safely return the RPA but maintains some control, they shall make best effort to complete a 'controlled crash', to limit the risk from the impact of the RPA with the ground.

Examples of RPA malfunctions may include:

- Loss of GPS – Switch to a non-GPS mode and RTH manually
- Loss of control surface – RTH if possible, otherwise controlled crash where safe to do so
- Fly-Away – In reality ‘fly-aways’ should never happen and are normally due to poor preparation or RPA health. If you do experience or suspect a fly-away, the RP shall first toggle flight mode to a non-GPS mode, as the RPA may be chasing a poor GPS signal. If this is not successful and the GCS is still connected, the RP shall:
    - Attempt the RTH function
    - If this is unsuccessful, maintain VLOS for as long as possible and note the trajectory, speed, endurance etc. of the RPA – take ‘screenshot’ of latest telemetry information if possible
    - Change ground position to keep VLOS where safe to do so
    - If the RPA exceeds VLOS, it is considered lost and the lost procedure applies.

3. Post-Crash Procedure

If an RPA suffers from a crash, the RP shall first determine the nature and severity of the crash with particular attention given to any batteries. Considerations include:

- Is the ‘crash location’ visible or out of sight – estimate the location based on trajectory, prevailing wind, telemetry data etc. Use this information to note the estimated location prior to setting out to approach the crashed RPA.
- Given the possibility of a damaged battery, ensure that you take a fire extinguisher with you to the crash location, these are in all company vehicles.
- When approaching the crashed site, take note of terrain, vegetation, wildlife, waterways and other environmental aspects that may pose a risk to you. Only proceed to the crash site if it is safe to do so.
- Upon locating the crashed RPA, ensure you disable the power source, recover/inspect/isolate the battery (e.g. place it in a LiPo bag and monitor) and take photos of the crash scene for records

If it is deemed that the crash is minor (e.g. hard landing resulting in no or only cosmetic damage), the RP shall make a note for the 'RPA Defect and Maintenance Log', but may be able to continue to operate the RP after conducting a pre-flight inspection and any additional checks required after consultation with the CRP and in consideration of any maintenance procedures listed in the OEM manual and Operations Manual. If the crash is not minor, the RPA shall be deemed 'unserviceable' regardless, with a defect entry made in the 'RPA Defect and Maintenance Logbook'. The RPA shall not be flown until the defect has been rectified and cleared by the Maintenance Controller or their delegate.

4. RPA Lost Procedure

If an RPA becomes lost, the RP shall make a note of the last known location (ground station coordinates and/or visual reference). If safe to do so, the RP shall use whatever means they have available to locate the RPA. If the loss of the RPA poses any risk to safety, the RP shall inform the emergency contacts immediately. If the RPA is found the RP shall determine the extent of the damage, as in 2.3.3 above.

Any additional information relating to the incident (e.g. what was happening in the lead up to the loss of the RPA) shall be recorded. If the RPA is not recovered, the CPR must inform the landowner and insurance provider, in addition to any other reporting requirements.

5. Manned Aircraft Enters Vicinity of RPA

Separation between the RPA and manned aircraft is of the highest priority and importance. In the instance that a manned aircraft enters the vicinity of the RPA operation, the RP must:

- Top priority must be given to manoeuvring the RPA to a safe location/height as to avoid conflict with the manned aircraft, this would include landing immediately where safe to do so.
- Attempt to contact the manned aircraft to inform them of your presence and that you have acted to deconflict with them.
- Do not re-launch the RPA until you are confident that the risk of conflict has been eliminated, e.g. the aircraft has departed the area and it is unlikely that they or other aircraft will return in a way that will pose a hazard to aircraft and/or lack of sufficient separation – Refer to Operations Manual for additional information.

6. RPA Communications Lost

If the radio link between the ground station and the RPA is lost during flight, the RPA shall be configured to RTH within 60 seconds. The RP must therefore ensure that the RTH location (ideally the take-off location) is free from obstructions, thereby permitting safe automatic flight/landing to this location without unnecessary risk to the RPA or people/property on the ground.

If radio loss is experienced, that RP shall:

- Attempt to re-establish the link,
    - Move GCS antenna location and ensure LOS between GCS and RPA
    - Restart GCS application
    - Power cycle controller
- If this is unsuccessful, the RP should wait until the RTH function is activated and continue to try to re-establish a communications link. If regained, this makes intervention possible on landing

- If the link is regained successfully, the RP shall consider the likelihood of repeat communications loss. If it is expected that this will continue or the link will otherwise be unreliable, the RP shall terminate the flight and investigate the cause, consulting the Maintenance Controller / CRP as required.

7. Aborted Take-Offs and Landings

If at any point the RP becomes aware that the RPA is not 'ready' for a take-off or landing (e.g. obstruction, poor health indication, people/aircraft enter area etc), they must immediately abort the action in a safe manner.

- Aborted take-off – Simply cut the throttle and abort the launch, or land immediately after take-off in a safe manner if already launched.
- Aborted landing – Depending on what stage of the landing you decide to abort the landing, ensure the RPA is returned to a safe mode, reassess the ability to perform a landing and repeat as appropriate. This may require an alternative landing location in the instance that the original location is no longer suitable. The exact procedure for an aborted landing is RPA specific and the RP shall refer to the flight manuals for specific instructions. In simple terms, a multi-rotor would simply cease to descend and potentially move laterally if there was an obstruction/hazard at the landing site. An aeroplane would typically climb back to circuit height and orbit above the landing area, until a new landing is planned and executed.

8. Emergencies Specific to Night VLOS Operations

The most likely emergency scenario specific to night operations is the loss of lighting, both on the RPA and at the landing area. In the event that RPA lighting is lost, the RP shall use other queues, e.g. noise, unlit visual of the RPA and telemetry information, to determine the position/orientation of the RPA and return it to land. Given the RP will have reduced visibility of the RPA (if any) in this scenario, it is advised that the make very small movements, e.g. fly at walking pace, so to reduce the risk of a collision with objects such as trees, buildings, powerlines etc.

If the landing area lighting fails, thereby reducing or eliminating the ground illumination, the RP shall attempt to provide an alternate source of lighting. Depending on the task, this may be achieved by several methods, for example car headlights, portable lighting (torch phone) etc. If lighting is regained, the RP shall assess the likelihood that it can be sustained, and where unlikely, cease operations immediately to ensure the safe return of the RPA. If the RP is unable to illuminate the landing site after a lighting failure, they must take great care in landing the RPA in reduced lighting conditions, having regard to the position, orientation, speed, obstacles/obstructions, location of operational personnel and so on. In any case, movements shall be slowed to walking pace to increase the possible reaction time of the RP to manoeuvre the RPA.

Given the sensitivity of eyes to light in low-light/night conditions, the RP shall consider the possibility of unintentional lighting that may 'startle' them or otherwise interfere with the safe operation of the RPA, e.g. vehicle headlights, direct torch light, other external lighting e.g. street and flood lights etc. It is advisable, although not mandatory, to consider the use of red lights for operational lighting - e.g. when reviewing checklists, flight documentation, briefings etc, as this reduces strain on the eyes and helps improve vision at night.

9. Injured Persons

First aid shall be given to treat any injuries received and transport to hospital shall be made using medical services where proximity allows. Monash OH&S must be informed of any such injuries.

10. Incident Management / Reporting

Incidents can be classified as minor or major. As a rule of thumb all incidents that cause third party property damage, injury or death are classified as major and must be reported to local emergency services and the ATSB immediately, via the CRP. The ATSB website at www.atsb.gov.au/aviation provides the best contact and procedure details.

Reports must be made in accordance with Section 5.4.4 of the RPA/Drone Operations Manual. The RP in Command must have an emergency contact list available to them including contact details for the CRP, ATSB and relevant local authorities. The CP shall contact the CRP in the first instance.

Appendix I. Forms

Many of the operational forms are available on AVCRM and are required to be completed as part of a job application.

- **Flight Authorisation (AVCRM)**
- **Pre-Operational Briefing**

Action	✓
Overview of the operation as planned	
Any specific tasking for crew member (e.g. person tasked with observing for people straying into the area of operation)	
Possible issues and identification of hazards associated with the mission including planned action	
How the RP will communicate any problem and/or subsequent action	
Identification of alternate landing area	
Identification of a safe zone	
Action following an incident	
Notes/comments specific to mission	
Emergency contact numbers	

- **Job Safety Assessment (AVCRM)**
- **Risk Assessment Worksheet (AVCRM)**
- **Time in Service Log (AVCRM)**
- **Defect and Maintenance Log (AVCRM)**
- **Policy and Procedure Training Syllabus – Appendix J**
- **RPA Type Training Syllabus – Appendix K**
- **NVLOS Training Syllabus – Appendix L**

Appendix J. Policy and Procedure Training Syllabus

Monash provides this training to any person who is proposing to act in any capacity as crew operating under Monash's ReOC. Each person undergoes training, and the CRP signs them off in the following areas:

- Knowledge of the Drone Operations Manual
- Knowledge of Normal operations:
    - Planning requirements (NAIPS, flight plans, NOTAMS etc.)
    - Forms required for general operations
    - Briefing requirements IAW pre-op briefing form
    - Roles and responsibilities of assigned crew position
    - Emergency procedures
- Conduct of JSAs and Risk Management
- Maintenance procedures and internal authorisations
- Safety and risk management strategies and WH&S
- Crew co-ordination and support crew duties (to include Crew Resource Management CRM and Aviation Risk Management AVRM training-recommended)
- Specialist operations training (night VLOS, tethered ops, RPAS operations within 3 NM from towered aerodrome, BVLOS, EVLOS etc.)
- Crew actions and applicability to the Civil Aviation Safety Regulations (CASR) 1988 Vol 3 Part 101.

Appendix K. RPAS Type Training Syllabus

Ground / Theory

- Description of RPAS and components
- Handling of RPAS and transportation
- Handling and charging of LiPo batteries
- Assembly/disassembly of the system including camera
- Detailed explanations on the use of the transmitter and operating frequencies, limitations
- Flight controls, sound, and light signals
- Manual and reversionary modes
- Pre-flight inspection
- Problem solving, fault analysis
- Pre- and post-flight procedures
- Crew management and responsibilities
- Crew co-ordination (standard phraseology)
- Use of operating software
- Use of ancillary equipment

Flight Exercises

- Range check
- Take-off and landing
- Practical flight exercises (normal automatic control)
- Practical flight exercises (backup manual control)
- Automatic safety features
- Camera operation
- All Emergency procedures (may talk through on relevant EPs that cannot be simulated safely during flight)
- Specialised RPAS training (night VLOS, EVLOS, BVLOS as applicable)
- Safety

Appendix L. Night VLOS Training Syllabus

N-VLOS-DS: Night visual line of sight - Description of training

1. Unit description

   This unit describes the skills and knowledge required to operate an RPA at night-time.

2. Elements and performance criteria

   a. Pre-flight preparation

      The RP confirms that:

      i. The RPA meets the equipment requirements for an N-VLOS flight.

      ii. A risk assessment is completed considering night visual conditions.

   b. Night Operations

      i. Perform all normal manoeuvres under N-VLOS conditions using either manual control or an AFMS.

      ii. Orient and navigate the RPA efficiently and safely at distance.

      iii. Maintain an effective lookout for other aircraft and take appropriate action to maintain separation and prevent conflict.

   c. Night Landing

      i. Lands the RPA safely and without damage within N-VLOS tolerances.

3. Range of variables

   a. Various payloads and RPA configurations.

   b. Operations both in dark conditions and under artificial illumination.

   c. Various weather conditions.

4. Underpinning knowledge of the following:

   a. RPA equipment requirements.

   b. Human performance considerations.

   c. Night operation considerations.

   d. Knowledge of rules and considerations under artificial illumination.

   e. N-VLOS operational requirements for operations at a controlled or non-controlled aerodrome (if required).

N-VLOS-P: Night visual line of sight - Practical

1. Flight test requirements

A person operating under a night visual line of sight (N-VLOS) approval must demonstrate his or her knowledge of N-VLOS flight requirements as set out in subclause 2.2 and competency, in the units of competency mentioned in subclause 2.3, by performing manoeuvres with an aircraft in the category he or she wishes to operate in, within the accuracy / tolerances specified in subclause 2.3.

For subclause 1.1, a sustained deviation outside the applicable flight tolerance is not permitted.

For subclause 2.3, if sufficient crosswind conditions do not exist at the time of the flight test, then, providing the examiner is satisfied the applicant's achievement records indicate that competency has been achieved during training, the element may be excluded from the flight test.

Note: Flight tests elements for VLOS approval may be combined into a single test or conducted over several flights.

2. Knowledge requirements

The applicant must demonstrate his or his knowledge of the privileges and limitations of the rating and of the following topics to the CRP:

a. RPA requirements for night flight.
b. Additional considerations for RPA flight at night (compared to a flight during the day).
c. Applicable rules and considerations for flight at night under bright lights.
d. Knows the definition of 'night' for aviation purposes.
e. Describes the considerations for carrying out an N-VLOS flight at a controlled or non-controlled aerodrome (if applicable).
f. Understands some of the visual illusions and human performance limitations that may eventuate with N-VLOS flight.

3. Practical flight standards

a. Ensures the aircraft is fit to fly and equipped for night flight.
b. Competently conducts all normal manoeuvres at night competently manually or with an automated mode as applicable.
c. Under manual or automated control, can orient and navigate the aircraft efficiently and safely at a distance from the control station.
d. Maintains an effective look-out for other aircraft and takes appropriate action to maintain separation and prevent conflict.

N-VLOS-T: Night visual line of sight - Theory

1. Flight at night Theory test

a. Enumerate the additional considerations needed to operate and RPA during an N-VLOS flight (compared to a flight during the day) under the following conditions:
    i. under bright lights
    ii. in an otherwise dark area.
b. Define 'night' for aviation purposes
c. Describe the aircraft equipment requirements for an N-VLOS
d. Describe the considerations for carrying out an N-VLOS flight at a non-controlled aerodrome
e. Describe the additional considerations for coping with equipment failures at night.

Human Performance

Explain the relevant human performance and physiological limitations for the conduct of RPAS operations at night:

a. describes dark adaption of the eye and how long the eye takes to fully adapt to night conditions
b. describes why lights have a red filter during night operations

Risk Assessment – Night Operations

Describe and list any special precautions a RP might take for a night operation.

Appendix M. Senior Remote Pilot (SRP) Training and Authorisation

Unit description

This unit describes the skills and knowledge required to be appointed as an SRP.

Experience requirement

To be determined by the CRP from time to time.

Training

Monash's SRP training covers the following areas:

- Drone Operations Manual
- CASA legislation
- Basic aeronautical knowledge
- Aeronautical information products (maps/charts, ERSA, AIP)
- Weather interpretation
- RPAS limitations
- Communication with CASA
- Risk management understanding and procedure

Assessment

Monash's SRP assessment is made up of the following items:

a. Scenario activity

A standard RPAS operation which may or may not require permission from CASA. The scenario should be presented as a complex operation in which multiple risks need to be identified and mitigated against. This scenario will be developed as required.

b. Exam questions

A minimum of 15 questions are created and cover each of the following key areas:

- Roles and responsibilities of SRP
- Part 101 Vol 3 of the Civil Aviation Safety Regulations (CASR 1998)
- Part 101 Manuals of Standards
- Aeronautical publications
- Interpreting VTC, including symbols, area frequencies, aerodromes, airspace class and vertical limits, and PRD areas
- Decode terminal area forecast and NOTAM
- VMC conditions
- ERSA
- Monash RPAS procedure(s)

- Knowledge of risk identification
- Risk management process
- RePL categories
- Emergency procedures

A list of approved Senior Remote Pilots is maintained on AVCRM.

Delegation

If required for an SRP to act in the role of CRP, a suitable handover of critical information and conditions must be conducted. The CRP may, at any time, revoke the delegation of their roles and responsibilities. The form used to delegate the role of CRP can be found below:

SRP Delegation Form

Start date of delegation				
End date of delegation				
Restrictions on delegation				
Any other specific requirements				
SRP Name		Sign/Date		
CRP Name		Sign/Date		
Handover/takeover brief				
Applications in progress and status				
Current/Upcoming tasks				
Internal training to be conducted				
RPAS serviceability				
Ancillary equipment serviceability				
Remote pilots/crew status				
Additional items	(May add extra lines and items if required at the time of delegation)			

Audit procedure

Delegations must be reviewed every 6 months for appropriateness and to ensure SRPs are aware of their obligations under delegation.