

Town of Port Hedland Operations Manual

AUTHORITY

This Operations Manual provides procedures to comply with the requirements in Part 101 of the Civil Aviation Safety Regulations 1998 (CASR Part 101) and is provided for the sole use and guidance of the operational personnel of:

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General

0.1 Applicability

This manual contains instructions for the operation and management of Remotely Piloted Aircraft Systems (RPAS) and all persons involved in the operation of RPAS that are controlled under the authority of Town of Port Hedland Remotely Piloted Aircraft Operator's Certificate (ReOC).

0.2 Distribution Control

Upon commencement, each person engaged in an operational capacity will be given read-only access to the Operations Manual suite which is kept on the OPERATOR'S intranet. The staff member's name and email address will be added to the distribution list maintained by the Chief Remote Pilot to ensure they receive future amendment updates via email. Once the staff member has read the manual they must email the Chief Remote Pilot confirming that they have read the content and agree to maintain RPAS in accordance with the manual.

The Chief Remote Pilot shall keep these confirmation emails on file.

The Chief Remote Pilot will keep the manual up-to-date at all times, notifying employees and CASA of any amendments by email. These emails will require a confirmation email from employees confirming receipt of the amendment. The Chief Remote Pilot will keep the confirmation emails on file. These confirmation emails will be regarded as an undertaking by the staff member that they have read the amendment and will operate RPAS in accordance with the manual. If CASA subsequently indicates that a particular 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 intranet 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 (intranet) edition of the manual.

The Chief Remote Pilot shall annually review the Operations Manual to ensure the relevance and currency of all procedures. A record of the review shall be made in the controlled copy on the intranet indicating that the review has been completed and indicating whether any amendments were required as a result of the review.

0.3 Compliance Requirement

The instructions, procedures and information contained in this manual have been devised to ensure the legality, safety and standardisation in the conduct of operations. They are to be observed by all operating personnel. Personnel are reminded of their obligation to comply with the Civil Aviation Act, Regulations and Orders and such directives, aeronautical information and notices as issued in CASA and Airservices Australia publications.

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

0.4 Amendment Procedure

Where in the light of operating experience, errors are found in the manual or deficiencies in the manner in which operations are conducted, recommendations for amendment action shall be submitted to the Chief Remote Pilot.

All changes to 'Schedule 1 – RPAS Operating Types and Nominated Personnel' must be notified to, and accepted by, CASA. Changes to correct typographical errors or changes to subordinate documents, including Appendices to this manual, may be accepted and approved by the Chief Remote Pilot.

0.5 Revision Log

Date	Affected sections	Summary of revision	Authorised by
16.02.21	All	New issue based on CASA template 060217	Grant VOSS

0.6 Abbreviations, Acronyms and Definitions

AGL	Above Ground Level
AIP	Aeronautical Information Package
ALA	Authorised Landing Area
ATSB	Australian Transport Safety Bureau
ATC	Air Traffic Control
BVLOS	Beyond Visual Line of Sight
CASA	Civil Aviation Safety Authority
CRP	Chief Remote Pilot
ERSA	En Route Supplement Australia
EVLOS	Extended Visual Line of Sight
HLS	Helicopter Landing Site
JSA	Job Safety Assessment
MOS	Manual of Standards
NM	Nautical Miles
NOTAM	Notice to Airmen
NVLOS	Night Visual Line of Sight
RePL	Remote Pilot Licence
ReOC	Remotely Piloted Aircraft Operators Certificate
RP	Remote Pilot (or UAV Controller)

RPA	Remotely Piloted Aircraft (same meaning as UAV)
RPAS	Remotely Piloted Aircraft System (same meaning as UAS)
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

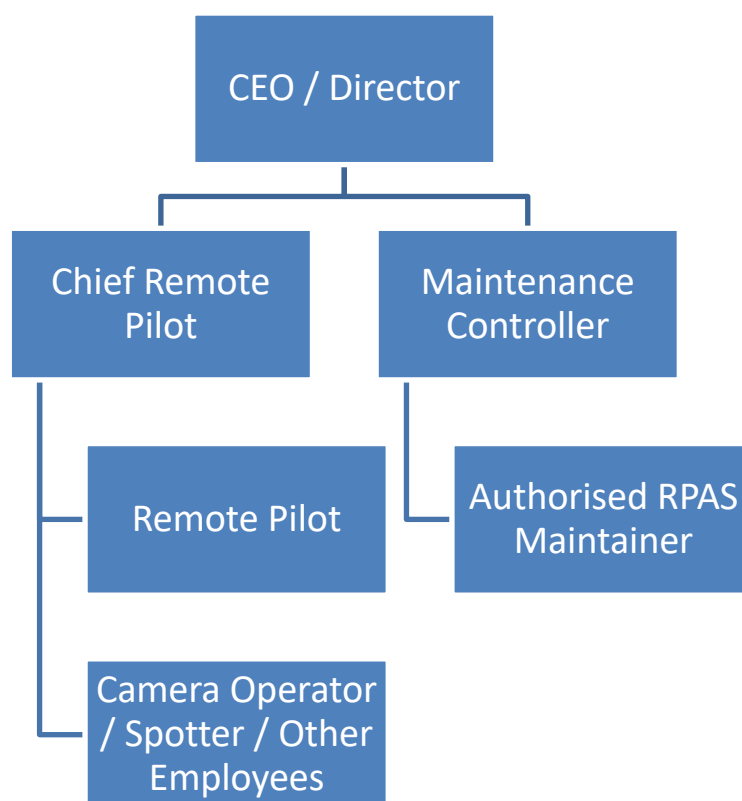
PART A – Operations

1.1 Profile

1.2 Statement of Compliance

All aerial operations using RPAS will be conducted in accordance with the conditions and limitations placed on the Remotely Piloted Aircraft Operator's Certificate (ReOC). A copy of the approved ReOC is included at Appendix 1 of this manual.

1.3 Organisational Structure



Nominated Personnel in the positions of CEO/Director, Chief Remote Pilot and Maintenance Controller must be included in Schedule 1 of this manual.

1.4 Accountabilities & Responsibilities

1.4.1 Accountabilities of CEO/Director

The CEO/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 company obligations, goals and objectives including finance and human resources. The CEO is accountable to ensure the currency of the ReOC and will ensure that any operation conducted on behalf of the company is conducted under the control and authority of the Chief Remote Pilot and/or Maintenance Controller as identified on the ReOC.

The CEO/Director is required to advise CASA of any of the following:

- changes to the company's name or registered address
- nomination of a new Maintenance Controller or Chief Remote Pilot
- changes to the financial status of the operator (bankruptcy, liquidation, etc.)
- respond to safety related surveys or questionnaires

1.4.2 Responsibilities of Chief Remote Pilot

The Chief Remote Pilot is responsible for all operational matters and Remote Pilot (RP) training affecting the safety of operations.

The role and responsibilities of the Chief Remote Pilot are to:

- ensure that operations are conducted in compliance with 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) who work under the authority of the ReOC
- 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.

1.4.3 Responsibilities of Maintenance Controller

The Maintenance Controller is responsible for ensuring the maintenance of Remotely Piloted Aircraft Systems (RPAS) in accordance with the manufacturer specifications.

The role and responsibilities of the Maintenance Controller 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 operating under the authority of the ReOC

- ensure maintenance activities are conducted in accordance with the procedures detailed in the relevant RPAS section of the RPAS Operational Procedures (Library)
- investigate all significant defects in the RPAS.

1.4.4 Responsibilities of Remote Pilot in Command

For the purposes of this manual a 'Remote Pilot' includes a holder of a 'Remote Pilot Licence' or 'UAV Controllers Certificate'.

The Remote Pilot of a RPA is responsible for:

- conducting flight in accordance with these procedures
- the safe operation of the RPA
- acting in accordance with these procedures
- complying with applicable regulatory requirements and supporting documents such as the AIP.

1.4.5 Responsibilities of Camera Operators, Spotters and Others

All camera operators, spotters and other persons involved in the operation of RPAS controlled under the authority of the ReOC are required to comply with the procedures set out in this manual and any lawful direction given to them by a UAV controller or Remote Pilot in command.

1.5 General Operating Standards

1.5.1 Fitness for Duty

The operator is committed to providing an environment that ensures the optimal performance of any person working under the authority of this ReOC.

Remote Pilots or any other person involved in the operations of RPAS are required to consider their fitness for duty prior to undertaking any duty under the authority of this ReOC, including but not limited to the following:

- general well being
- adequately rested
- alcohol consumption
- drugs and medication use
- adversely affected by stress
- mental fitness.

1.5.1.1 Alcohol consumption

Remote Pilots or any other person involved in the operations of RPAS under the authority of this ReOC 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) working under the authority of this ReOC 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 and the Town of Port Hedland.

1.5.1.2 Drugs and medication use

Remote Pilots 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 under the authority of this ReOC.

All persons working under the authority of this ReOC 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 Chief Remote Pilot about any medication that they are taking that may negatively impact on their performance.

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

1.5.1.3 Fatigue management

When authorising any operation, the Chief Remote Pilot 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 working under the authority of this ReOC.

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 Chief Remote Pilot who will take appropriate action to remedy the situation.

1.5.2 Transportation of Dangerous Goods

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 Chief Remote Pilot will ensure that the carrier's instructions in relation to the transport and applicable packaging requirements for dangerous goods are complied with.

1.5.3 Remote Pilot Administration

1.5.3.1 Remote Pilot qualifications

All Remote Pilots working under the authority of the ReOC must hold a valid UAV Controllers Certificate or a Remote Pilot Licence issued by CASA for the type and rating of RPA being operated on behalf of the operator.

1.5.3.2 Remote Pilots to maintain log books

Remote Pilots are required to have a personal Remotely Piloted Aircraft (RPA) log book. It is their responsibility to ensure that all flight details are recorded in their log book and kept current.

1.5.3.3 Remote Pilots to be competent

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

The Chief Remote Pilot is responsible for ensuring that Remote Pilots and all other persons working under the authority of this ReOC are competent prior to conducting commercial operations.

1.5.4 Flight Conduct

1.5.4.1 All flights must be authorised by the Chief Remote Pilot

Each RPAS operation must be authorised by the Chief Remote Pilot and recorded on a Flight Authorisation Form (Appendix 1 of the RPAS Operational Procedures (Library)).

The Chief Remote Pilot is responsible for the operational standards and supervision of Remote Pilots who are working under the authority of the ReOC.

1.5.4.2 Persons permitted to operate RPA

Only those persons checked in accordance with Part C of this Manual and authorised by the Chief Remote Pilot may operate an RPA under the authority of the ReOC.

1.5.4.3 Handover/takeover procedures

In operations where the handover of control is required between Remote Pilots, the operation must be approved by the Chief Remote Pilot in accordance with the Handover/Takeover Procedures detailed in the RPAS Operational Procedures (Library).

1.5.4.4 Remote Pilot briefing including emergency procedures

Where an operation involves more than one person, the Remote Pilot must provide a safety brief to each person involved in the operation. The safety briefing must provide details of the actions and responsibilities of everyone involved in the operation (refer Appendix 2 of the RPAS Operational Procedures (Library)).

1.5.4.5 Use of checklists

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

- Job Safety Assessment (JSA) - Appendix 5 of the RPAS Operational Procedures (Library)
- Pre-Operational Briefing Checklist - Appendix 2 of the RPAS Operational Procedures (Library)
- Pre-Flight Checklists – RPA, ground station & role equipment specific
- Post-Flight Checklists - RPA, ground station & role equipment specific.

Where a checklist has been developed all operations and activities must be conducted in accordance with the checklist.

PART B – Operating RPAS

The Remote Pilot Aircraft System (RPAS) includes a number of elements, each with their own unique operational requirements. Each element has an interface with the other elements in the RPAS and as such, these inter-relationships need to be considered. The main elements of a RPAS are as follows:

- the RPA
- the RPA ground station
- aircraft launch and recovery equipment
- the payload and role equipment.

2.1 Source of RPAS Operating Instructions

Each element of the RPAS must be operated in accordance with the manufacturer's instructions as contained or referenced in the supporting operational and maintenance documents for each RPAS configuration.

2.2 RPAS Operational Procedures (Library)

The RPAS Operational Procedures (Library) is available to all people conducting activities under the authority of the ReOC. The Chief Remote Pilot is responsible for maintaining the library.

The RPAS Operational Procedures (Library) contains:

- a section that contains general and specific operational procedures
- a section for each RPAS type operated under the authority of the ReOC

The specific section for each RPAS will include 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.

Information included in the RPAS Operational Procedures (Library) may be a hard copy or electronic document, or included by reference to an external source.

The Chief Remote Pilot must ensure that all information required to safely conduct an operation is available to the Remote Pilot. Where online information is used, the Chief Remote Pilot will consider the availability of online connections prior to the authorisation of the operation.

2.3 Precedence of Manuals

If differences exist between the manufacturer's instructions and the operator's operational or maintenance procedures, the manufacturer's procedures will be followed unless the operator's procedure provides a higher safety standard.

If any person conducting operations under the authority of this ReOC identifies a difference between the operator's and manufacturer's procedures, the difference must be reported to the Chief Remote Pilot / Maintenance Controller (as appropriate).

2.4 RPAS Serviceability Prior to Operation

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

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

2.5 Method of Recording Hours in Service and Defects

Each Remote Pilot is responsible for ensuring that 'time in service' is recorded in the RPAS Aircraft Flight Log and all defects and maintenance is recorded in the RPAS Maintenance and Defect Log. Section F 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.

2.6 Maintenance Control of RPAS

All RPAS operated under the authority of this ReOC will be operated under the maintenance control of the operator. Each RPA operated under this ReOC is identified in Schedule 1.

PART C – Internal Training

The training requirements for those persons working under the authority of the ReOC include consideration of their general training needs with regards to this Operations Manual, RPAS equipment, and specific operational activities that the person will be involved in, such as specialised operations.

3.1 Persons Permitted to Conduct Training

The Chief Remote Pilot and person(s) nominated by the Chief Remote Pilot are permitted to provide internal training. The Chief Remote Pilot will ensure that appropriate measures of competency are in place to ensure the effectiveness of training that has been provided.

3.2 Record Keeping

The Chief Remote Pilot is responsible for ensuring records are kept of all training and proficiency checks (including flight tests) that are conducted on any person involved in operations under the authority of the ReOC. Unless otherwise specified in the MOS, all training records will be kept for a minimum of seven years.

3.3 Remote Pilot Induction Training Requirements

Remote Pilots must complete the following induction training prior to commercial operations:

- Policy and Procedure training in accordance with Appendix 3 of the RPAS Operational Procedures (Library)
- RPAS type training as specified in Appendix 4 of the RPAS Operational Procedures (Library) on the types that the Remote Pilot is to be authorised to fly.

3.4 Remote Pilot Type Conversion Training Requirements

Remote Pilots who have not completed training on a particular type of RPAS must complete RPAS type training (Appendix 4 of the RPAS Operational Procedures (Library)) prior to operating a RPA in any commercial operation conducted under the authority of this ReOC

3.5 Remote Pilot Training for Specialised Operations

Training requirements for specialised operational activities (e.g. night time operations, BVLOS, etc.) are detailed in the 'RPAS Operational Procedures (Library)'. Specialised Operation may include but are not limited to:

- night time VLOS operations
- operations within controlled airspace
- operations above 400ft AGL
- BVLOS operations.

3.5.1 Remote Pilot Night VLOS Training Requirements

Remote Pilots must complete Night VLOS training in accordance with Appendix 8 of the RPAS Operational Procedures (Library) prior to operating a RPA in any night time VLOS operations conducted under the authority of this ReOC.

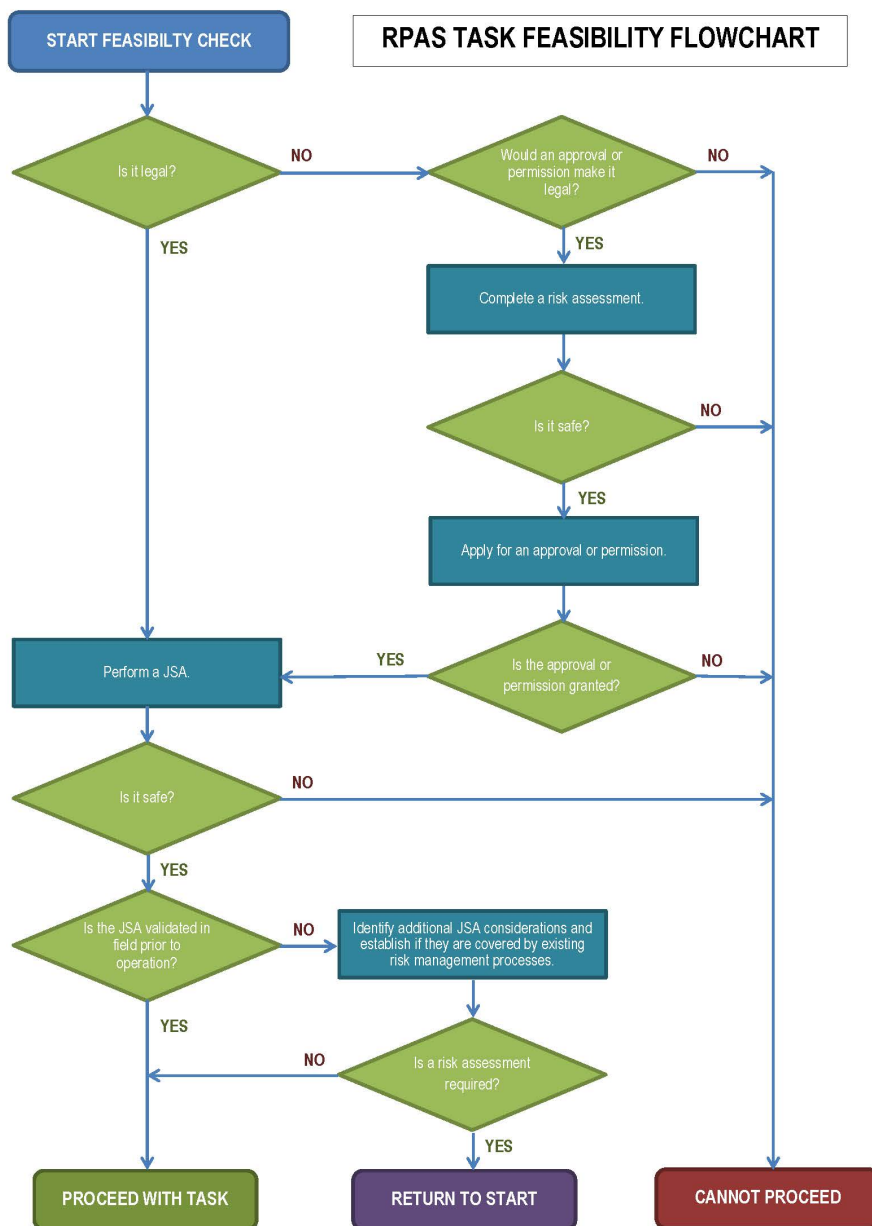
PART D - Operations

4.1 Limitations and Conditions

All operations must be carried out within the limitations and conditions as detailed in this manual, the RPAS Operational Procedures (Library) (which is appendix 4 to this Manual), or any other permission, exemption or approval issued by CASA. Refer to Appendix 2 of this manual for all permissions, exemptions and approvals held by the operator.

4.2 Feasibility Check and Job Safety Assessment (JSA)

Before a task can be carried out a feasibility check must be performed to ensure it is within the scope of the ReOC. The following flowchart represents the process to be followed to determine if a task may proceed.



4.2.1 Will the operation be compliant with CASR Part 101?

The first step of the feasibility process is to determine whether the operation can be conducted in compliance with the aviation legislation. Consideration should be given to all applicable Federal, State or Territory legislation.

In determining if an operation would be conducted in compliance with such legislation, the following matters must be considered, where applicable:

- are operations in accordance with the conditions listed in the schedule for the ReOC or other regulatory Approval, Permission, or Exemption?
- will operations be conducted greater than 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 or 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?

4.2.2 Approval, Permission or Exemption

The Chief Remote Pilot is responsible for applying to CASA for any aviation related Area Approval, Permission and/or Exemption required for an RPAS operation. In general, these requests will be supported by an appropriate safety case and risk assessments to support the proposed operation.

4.2.3 Perform a JSA

A JSA (refer Appendix 5 of the RPAS Operational Procedures (Library)) must be performed during the feasibility planning phase to determine if the operation is viable. Note: the JSA may be applicable to a number of flights at the same location.

As a minimum, the JSA must consider the following:

- gathering the necessary maps and charts (either hard copy or electronic) for the area
- determining the weather is suitable for the machine 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
- footpath, or other rights of way
- suitable take-off and landing areas (including alternate landing area)
- ability to maintain 30m separation from the public
- obstructions (buildings, trees etc.)
- possible radio interference (power lines, antennas etc.)
- ability to maintain visual line of sight

- Remote Pilot's ability matches location/task
- permission from land owner
- privacy
- local restrictions, bylaws
- need for signage.

4.2.4 Validation of the JSA

The initial JSA will make a number of assumptions about the proposed operation that must be validated by the Remote Pilot at the location prior to any operations (forecast weather/wind, location of persons, etc.). The Remote Pilot must record on the JSA any:

- 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 must be returned to the Chief Remote Pilot who will keep it as a record of the operation for a period of at least seven years.

4.2.5 Is a Risk Assessment Required?

A risk assessment is required 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 the Remote Pilot identifies a new risk, these matters must be considered and detailed in the JSA.

If the Remote Pilot is unable to mitigate the risk using an existing procedure, a Risk Assessment must be completed in accordance with Appendix 3 of this manual.

4.3 Threat and Error Management

Threat and Error Management (TEM) is a consideration for all aspects of RPAS operations. A threat is defined as an event (in relation to the environment or the aircraft) or an error (from another aircraft, air traffic control or maintenance) occurring outside the influence of persons operating under the authority of this ReOC.

Threats shall be managed by:

- adhering to maintenance requirements and standards
- compliance with operational requirements
- diligence to the JSA requirements and checks
- thorough pre-flight inspections
- application of appropriate site controls.

An error is defined as an action or inaction that leads to a deviation from persons operating under the authority of this ReOC or organisational intentions or expectations. Error in the operational context is considered as a factor reducing the margin of safety and increasing the probability of adverse events. Prevention of errors is encouraged through the use of checklists, operating procedures, clear communications, pilot training and currency. Management of errors is achieved through:

- training and currency to identify and react to errors in a timely manner
- prioritising tasks: aviate, navigate and communicate
- RPAS maintenance and configuration attention
- no-blame philosophy with regard to incident reporting debriefs.

TEM is considered in all aspects of standard operating procedures. The Risk Assessment is the key document 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 considered to manage threats and errors are:

- 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.

4.4 Normal and Non-normal Operations

4.4.1 Normal Operations

The procedure for Normal Operations is detailed in the RPAS Operational Procedures (Library). In addition to the operational procedures detailed for a specific RPA in the relevant user's manual, the Normal Operations procedure details how a normal operation will be conducted by the RPAS operational crew including:

- JSA validation
- take-off, approach, landing and recovery procedures
- post-flight procedures (including mission debrief)
- reporting (technical, flight log, defect, etc.).

4.4.2 Non-normal Operations

The procedure for Non-normal Operations is detailed in the RPAS Operational Procedures (Library). In addition to the emergency procedures detailed for a specific RPA in the relevant user's manual, the Non-normal Operations procedure details how an emergency situation will be handled by the RPAS operational crew including:

- immediate response to loss of control situations
- post-crash procedures
- lost aircraft procedures
- emergency contact and reporting requirements
- accident and incident reporting.

4.4.3 Specialised Operations

The specialised operations detailed below may be conducted subject to authorisation by CASA. Operations within Prohibited or Restricted areas are subject to the approval of the authority controlling the area. Copies of all permissions, exemptions and approvals held by the operator can be found in Appendix 2 of this manual.

4.4.3.1 Operations within 3NM of aerodromes

Remote Pilots must not operate an RPA within 3NM of an aerodrome (including any HLS or ALA listed in ERSA) unless the operation has been authorised by the Chief Remote Pilot. An additional approval is required from CASA for any operations:

- within 3NM of an aerodrome that has an active ATC service (section 4.4.3.2);
- in the approach or departure paths of an aerodrome (section 4.4.3.3); or
- over the movement area of an aerodrome (section 4.4.3.4).

The Chief Remote Pilot will conduct a risk assessment in accordance with Section 4.2.5 of this manual for any risk associated with this operation that has not been mitigated by the procedure for 'Operations within 3nm of Uncontrolled Aerodromes' detailed in the RPAS Operational Procedures (Library).

4.4.3.2 Operations near controlled aerodromes

Unless otherwise approved by CASA, Remote Pilots must not operate an RPA within 3NM of the boundary of an aerodrome that has an active ATC service. The Chief Remote Pilot is responsible to ensure that operations are not planned or approved for such areas.

If permission is granted to operate in the above area, the operation is only permitted if all of the conditions of the relevant permission can be met. Procedures for operating in these areas, including any specific training requirements or competency standards for Remote Pilots, are detailed in the RPAS Operational Procedures (Library).

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 risks that may exist with respect to other airspace users. Risk treatments may include radio broadcast, the issue of NOTAMs, consultation with other airspace users, etc.

The Chief Remote Pilot will conduct a risk assessment for each of these types of operations in accordance with Section 4.2.5 of this manual prior to authorisation of the operation. If all risks are satisfactorily mitigated, the Chief Remote Pilot will detail any special operational requirements on the JSA prior to authorising the operation.

4.4.3.3 Operations in the approach or departure paths of an aerodrome

Unless otherwise permitted by CASA, the Remote Pilot must ensure the RPA is not operated at any altitude in the approach or departure path of an Aerodrome, including any ALA or HLS listed in ERSA. The Chief Remote Pilot is responsible for ensuring that operations are not planned or approved for such areas.

If permission is granted to operate in the approach or departure path of an Aerodrome the operation is only permitted if all of the conditions of the relevant permission can be met. Procedures for operating within the approach or departure path of an Aerodrome including any specific training requirements or competency standards for Remote Pilots will be detailed in the RPAS Operational Procedures (Library).

4.4.3.4 Operations over the movement area of an aerodrome

Unless otherwise permitted by CASA, the Remote Pilot must ensure the RPA is not operated over the movement area of an Aerodrome, including any ALA or HLS listed in ERSA. The Chief Remote Pilot is responsible for ensuring that operations are not planned or approved for such areas.

If permission is granted to operate over the movement area of an Aerodrome the operation is only permitted if all of the conditions of the relevant permission can be met. Procedures for operating over the movement area of an Aerodrome including any specific training requirements or competency standards for Remote Pilots will be detailed in the RPAS Operational Procedures (Library).

Where operations are permitted by CASA, the operations are only permitted if all of the conditions of the relevant permission can be met. Procedures for operating in the movement area of an Aerodrome including procedures for training requirements, competency standards, etc., will be detailed in the RPAS Operational Procedures (Library).

4.4.3.5 Operations at night, in cloud or in conditions other than Day VMC

Unless otherwise permitted by CASA, the Remote Pilot must ensure the RPA is not operated at night, in cloud or in conditions other than Day VMC. The Chief Remote Pilot is responsible for ensuring that operations are not planned or approved for such conditions.

If permission is granted to operate at night, in cloud or in conditions other than Day VMC, the operation is only permitted if all of the conditions of the relevant permission can be met. Procedures for at night, in cloud or in conditions other than VMC including any specific training requirements or competency standards for Remote Pilots, will be detailed in the RPAS Operational Procedures (Library).

4.4.3.6 Operations above 400ft AGL

Unless otherwise permitted by CASA, the Remote Pilot must ensure the RPA is not operated above 400ft AGL. The Chief Remote Pilot 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 of the conditions of the relevant permission can be met. Procedures for operations above 400ft including any specific training requirements or competency standards for Remote Pilots will be detailed in the RPAS Operational Procedures (Library).

4.4.3.7 Operations beyond visual line of sight (BVLOS)

For the purposes of this requirement, visual line of sight is defined as an operation in which the Remote Pilot can maintain direct visual contact with the aircraft, aided only by spectacles or contact lenses (not binoculars or telescopes etc.) to manage its flight and meet separation and collision avoidance responsibilities.

Unless otherwise permitted by CASA, the Remote Pilot must ensure the RPA is not operated BVLOS. The Chief Remote Pilot is responsible for ensuring that operations are not planned or approved for such areas.

If permission is granted to operate BVLOS, the operation is only permitted if all of the conditions of the relevant permission can be met. Procedures for operations BVLOS including any specific training requirements or competency standards for Remote Pilots will be detailed in the RPAS Operational Procedures (Library).

4.4.3.8 Operations over populous areas

Unless otherwise permitted by CASA, the Remote Pilot must ensure the RPA is not operated over a populous area. The Chief Remote Pilot 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 of the conditions of the relevant permission can be met. Procedures for operations over a populous area including any specific training requirements or competency standards for Remote Pilots will be detailed in the RPAS Operational Procedures (Library).

4.4.3.9 Hazardous Operations

The Remote Pilot must ensure the RPA is not operated in such a way to create a hazard to another aircraft, another person or property. Unless otherwise authorised by the Chief Remote Pilot (Flight Authorisation Form), Remote Pilots must ensure the RPA is operated at least 500ft vertically or 1500m horizontally from any airborne manned aircraft.

4.4.3.10 Operations in restricted or prohibited airspace

The Remote Pilot must ensure the RPA is not operated in restricted or prohibited airspace unless otherwise permitted by the authority controlling the airspace. All operations must be in accordance with any conditions imposed by the controlling authority. The Chief Remote Pilot 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 Chief Remote Pilot will detail the conditions of this approval on the JSA prior to authorising the operation.

4.4.3.11 Operations near people

Unless otherwise authorised by the Chief Remote Pilot (Flight Authorisation Form), the Remote Pilot must ensure the RPA is not operated within 30m of any person who is not directly involved with the operation of the RPA persons being filmed or photographed such as actors, athletes, or members of the public, are the subject of an operation. They are not considered as being directly involved in the operation of the RPA and as such, the 30m rule applies.

The Chief Remote Pilot may provide authorisation to a Remote Pilot to operate within 30m but no closer than 15m of a person(s) provided consent has been obtained from that person(s). Authorisation to operate within 30m but no closer than 15m of a person must be in accordance with the procedures detailed in the RPAS Operational Procedures (Library) that cover the risk management of the operation including, operating procedures, risk assessment and the training/competency standards required of Remote Pilots prior to operations of RPA in close proximity to people.

4.4.4 Accident/Incident Reporting

All persons working under the authority of this ReOC must report any accident, incident or near miss to the Chief Remote Pilot.

Certain incidents and accidents that relate to RPA operations must also be reported to the Australian Transport Safety Bureau (ATSB). The Chief Remote Pilot is responsible for notifying the ATSB of these events. The events will be categorised as either an Immediately Reportable Matter (IRM) or Routinely Reportable Matter (RRM) in accordance with the AIP ENR 1.14 as detailed below.

Immediately Reportable Matters	Routinely Reportable Matters
<ul style="list-style-type: none">• Make a report as soon as is reasonably practicable by telephone on 1800 011 034• Follow up with a written report within 72 hours	<ul style="list-style-type: none">• Submit a written report within 72 hours

In the event that an operation results in an immediately or routinely reportable matter the Chief Remote Pilot and Remote Pilot in Command 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.

4.4.5 Dropping or Discharging Items

The Remote Pilot must not cause anything to be dropped or discharged from an unmanned aircraft in a way that creates a hazard to another aircraft, a person, or property.

4.4.6 Use or Application of Dangerous Goods

Activities involving the use or application of dangerous goods which do not form part of the RPA must be specifically approved by the Chief Remote Pilot. These activities may also be subject to State or Federal legislation.

4.4.7 Aeronautical Radio Usage

Good airmanship would generally dictate that the carriage and use of a radio to maintain a radio listening watch is considered the preferable safe mode of operation for all flights.

Some operations will require that a radio listening watch is maintained and in some circumstances that radio calls are made. The Chief Remote Pilot must determine if a radio is required as part of their Flight Authorisation and JSA.

If RPAs are operated where the carriage and use of a radio is required, the operation is only permitted if these requirements can be met. A person operating an aviation radio must hold a relevant qualification issued by CASA. Procedures for the use of radios, including any training requirements or competency standards for Remote Pilots, are detailed in the RPAS Operational Procedures (Library).

Remote Pilots are required to hold a Radio qualification (minimum) prior to operating within controlled airspace, unless the Remote Pilot holds any of the following:

- (a) an aeronautical radio operator certificate;
- (b) a flight crew licence;
- (c) an air traffic control licence;
- (d) a military qualification equivalent to a licence mentioned in paragraph (b) or (c);
- (e) a flight service licence.

The Chief Remote Pilot will not authorise operations within controlled airspace unless the Remote Pilot has any of the above qualifications.

PART E – RPAS Training School

5.1 Reserved

Town of Port Hedland will not be operating as a training school

PART F – Maintenance Control Procedures

6.1 Maintenance Programming

6.1.1 Scope of Maintenance

The primary purpose of maintenance is to ensure the ongoing safety and reliability of RPAS through both preventative maintenance and inspection processes. RPAS must be kept in a good state of order and repair and any reported or observed defects with the RPAS must be investigated and remedied before further operation of the RPAS.

Maintenance schedules provide for the routine repair, servicing and testing (preventative maintenance) of the RPAS.

A maintenance schedule will 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.

6.1.2 Maintenance to be in Accordance with Schedules

All maintenance to be carried out on RPAS will be 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 Maintenance Controller may:

- develop a schedule for the maintenance based on best practice standards and document it in a RPAS maintenance schedule
- place the item 'on condition' in accordance with section 6.1.4 below.

The Maintenance Controller will ensure that where maintenance schedules have been developed for an RPAS, this schedule will be recorded in the relevant RPAS section of the RPAS Operational Procedures (Library).

6.1.3 Variation of Maintenance Schedules

If operational experience identifies that the existing maintenance schedule is deficient, the Maintenance Controller will vary the maintenance scheduling to ensure the ongoing reliability of the RPAS.

The Maintenance Controller must not allow the maintenance schedule to be less onerous than the manufacturer's specifications. All variations of the maintenance schedule will be recorded in the relevant RPAS section of the RPAS Operational Procedures (Library).

The Maintenance Controller will review each schedule periodically to ensure the most current instructions are in use.

6.1.4 'On Condition' Maintenance

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

The Pre-flight and Post-flight inspections are used to identify damage, wear, malfunction or unserviceability, and any defects found during these inspections will be recorded on the Defect and Maintenance Log (Appendix 7 of the RPAS Operational Procedures (Library)).

The Maintenance Controller will monitor 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.

6.1.5 Minimum Requirements for Maintenance Schedules

Maintenance schedules will include the following items for each RPAS operated under the authority of the ReOC:

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

The content of these checklists will be detailed in each specific RPAS section of the RPAS Operational Procedures (Library).

6.2 Maintenance Procedures

6.2.1 Maintenance Instructions

All maintenance carried out on RPAS operated under the authority of the ReOC will be carried out in accordance with any manufacturer's instructions that exist for that maintenance. The instructions will be detailed in each specific RPAS section of the RPAS Operational Procedures (Library).

6.2.2 Repair or Replacement of Components

Components must be repaired or replaced where 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).

6.2.3 Firmware/Software Updates

Avionic and control system software is only to be updated after the version has been confirmed as being stable. A post maintenance test flight, in a controlled and safe location, must be completed as part of the maintenance activity whenever a software or firmware update is applied.

Where an issue arises with new software / firmware version the component is to be rolled back to the previous stable version before the RPAS is used in commercial operations.

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

6.3 Maintenance Authorisation

6.3.1 Maintenance Personnel to be Authorised

The Maintenance Controller authorises the following people to conduct maintenance on RPAS:

- Remote Pilots who have completed the induction programme
- manufacturers of RPAS items and their approved service agents
- organisations and service providers assessed by the Maintenance Controller as being competent to provide RPAS maintenance services.

6.3.2 Remote Pilot Maintenance Authorisation

Remote Pilots who have completed the induction programme are authorised by the Maintenance Controller 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.

6.4 Defects

A *defect* is defined as any confirmed abnormal condition of an item whether or not 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.

All defects identified in any part of the 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, only those defects the Remote Pilot has been authorised to repair may be rectified by the Remote Pilot. All other defects must remain '**open**' until the Maintenance Controller has assessed and rectified the defect.

The Maintenance Controller must be immediately notified when a defect is identified in the field that cannot be rectified by the Remote Pilot. In these situations, the Maintenance Controller will consult with the Remote Pilot on the action that will be taken to remedy the defect.

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

6.5 Recording of Defects and Maintenance

It is the responsibility of all person(s) involved in the operation of RPAS to report defects as they occur and record the maintenance they have conducted on the RPAS.

Defects and maintenance will be recorded on the **Defect and Maintenance Log** (Appendix 7 of the RPAS Operational Procedures (Library)). All open defect items must be closed prior to flight.

Remote Pilots must forward Defect and Maintenance Logs to the Maintenance Controller as follows:

- for open defects – as soon as practicable
- for defects rectified by the Remote Pilot – as soon as possible upon return to the operating base.

The Maintenance Controller will review all defects and where necessary, make adjustments to the RPAS Maintenance Plan to enhance the serviceability of RPAS components and improve the reliability of RPAS operations.

The Maintenance Controller will file the Defect and Maintenance Log for each element of the RPAS, and keep this record for the life of the RPAS element.

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

6.6 RPAS Time in Service Log

The **RPAS Time in Service Log** (Appendix 6 of the RPAS Operational Procedures (Library)) is used by the Remote Pilot to record details of the flight times and the Pre/Post Flight Checks conducted on RPA.

When a RPAS Time in Service Log becomes full, the Remote Pilot will 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 Maintenance Controller.

The Maintenance Controller will file the RPAS Time in Service Log for each RPA operated under the authority of the ReOC and unless specified otherwise in the MOS keep this record for the life of the RPA.

6.7 Flight Tests

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

Flight test requirements for each RPAS type will be developed by the Maintenance Controller in consultation with the Chief Remote Pilot 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 of the RPAS Operational Procedures (Library).

APPENDIX 1 - Copy of RPA Operator's Certificate

APPENDIX 2 - Permissions, Exemptions and Approvals

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.

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
 - (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.

APPENDIX 3 - Risk Assessment

Overview

Risk assessment is an essential part of the risk management strategy and is used to determine what risks will be tolerated, mitigated (controlled), or in some cases, avoided. The process is initiated when:

- an assumption made about risk in the Job Safety Assessment (JSA) is no longer valid
- the JSA identifies a new risk, or
- a new operation is undertaken which requires a permission, approval or exemption from CASA or other State or Federal authorities.

Figure 1 below details the safety risk management process that includes the following key areas:

- communication and consultation
- establishing the context
- risk assessment
- risk treatment
- monitoring and review.

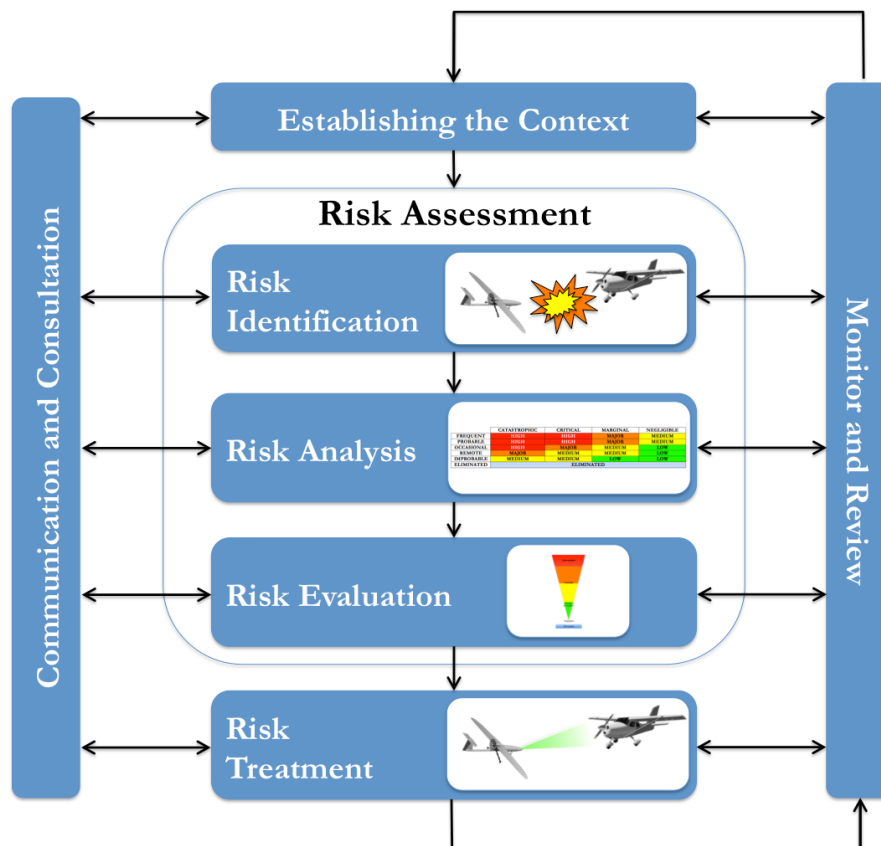


Figure 1 - The safety risk management process (Clothier, 2013)

Communication and Consultation:

Where possible, any person affected by a risk should be identified and consulted with at each stage of the risk management process. The consultation process requires the sharing of information and should provide the genuine opportunity for all people affected by the risk to be part of the decision making process.

Clear, open and transparent consultation is a key element in successful risk management practices.

Establishing the context:

In addition to communication and consultation, the context of a risk should be established in terms of its compliance with legislative standards and operational/organisational environment. The following steps should be undertaken to establish the context:

1. **Topic Objectives** – Clearly articulate the specific objectives of the RPAS activity that will be undertaken, including locations, proposed time of operations, etc.
2. **External Environment** – identify and consider what additional matters may need to be considered. This may include the identity of key stakeholders, legal/regulatory requirements from other State or Federal authorities, technical matters relevant to the risk, other activities or sensitivities that may impact on the risk, etc.
3. **Internal Environment** – identify and consider if there are any special internal requirements that need to be considered, including staff training, human factors, reliability and suitability of equipment etc.
4. **Stakeholders** – all stakeholders that may be impacted on the risk need to be identified. This may include the client, other airspace users, members of the public, public interest groups, owners and occupiers of buildings, and Local, State or Federal authorities etc.

Risk Assessment - Risk Identification:

Risks need to be identified in terms of what, why and how things occur so further analysis of the risk can be undertaken. This step should identify any risks arising from the operating environment and generate a comprehensive list of risks that could impact on those objectives.

For some activities, especially safety related activities; hazard identification is the first step when identifying risks. A 'hazard' can be a situation that poses a level of threat to life, health, property or the environment; or a form of potentially damaging energy.

Risks can be identified using the following tools:

- audits or physical inspections
- accident / incident reports
- brainstorming
- decision trees
- history
- interview / focus groups
- personal or organisational experience
- scenario analysis
- strengths, weaknesses, opportunities and threats (SWOT) analysis
- survey or questionnaires.

Some questions to ask when identifying risks:

- when, where, why, and how are the risks likely to occur?
- what is the source of each risk?
- who is likely to be affected by the risk?

Identified risks will be documented on the Risk Control Worksheet detailed in Table 4 below.

Risk Assessment - Risk Analysis:

The objective of this step is to separate the broadly acceptable risks from those risks requiring subsequent treatment. For each identified risk the existing controls need to be analysed in terms of consequence and likelihood in the context of those controls.

A control is defined as a measure that modifies a risk i.e. reducing the consequence and / or likelihood. Controls include any policy, process, practice, device, people, or other actions which modify risk. The method of analysis to be applied will depend on the particular application, the availability of reliable data and the decision making needs of the activity. Details on risk analysis techniques can be found in *ISO31010:2009 Risk management – Risk assessment techniques*. As appropriate, these techniques may involve the qualitative or quantitative assessment of risk.

The risk assessment matrix is an example of a qualitative tool used to assess consequence and likelihood. Consequence (Table 1) and Likelihood (Table 2) values are used to derive a Risk Rating (Table 3). The numeric rating scale should be applied consistently for each activity evaluated and the detailed consequence descriptions need to be considered in the context of the activity that is being assessed.

Risk Assessment - Risk Evaluation:

An evaluation of each identified risk will be conducted to determine those risks that are acceptable and those that require further treatment. Risks that require further action will be mitigated prior to any RPAS operations. The risks that have been accepted will be noted and monitored in accordance with '**Monitor and Review**' process detailed below.

Existing controls and their effectiveness must be taken into account when analysing the risk to derive a Risk Rating score. Details of this risk analysis will be recorded on the Risk Control Worksheet detailed in Table 4 (below). The analysis will consider the range of potential consequences and how likely they are to occur. Consequence and likelihood are combined to produce an estimated level of risk called the Risk Rating.

Risk Treatment:

In accordance with Table 3 (below), low priority risks (score <4) will be accepted and monitored. Medium risks (score <6), will be reduced to an acceptable level of risk in accordance with 'As Low as Reasonably Practicable' ALARP principles detailed below. Risks with a score of 6 or higher are not permitted to be accepted by the Chief Remote Pilot.

The ALARP criteria will be used to manage risks that have a significant safety consequence. It is acknowledged that although the cost of mitigating a risk is a consideration of the ALARP process, it is secondary to what is required by relevant legal standards and measured against what a 'reasonable person' would do to control the risk in similar circumstances. For this purpose, ALARP is the situation where risk is negligible, or at least at a level where it can be managed by routine procedures.

The importance of insurance is recognised in the risk management process and as such, the operator will ensure that appropriate insurance exists for all RPAS activities that are being undertaken.

For each risk, the risk treatment(s) will be detailed in the applicable part of the Risk Control Worksheet as detailed in Table 4 (below). A new risk assessment will be conducted to determine the suitability of the risk treatment and these details, including a revised risk score, will be entered in the table.

Monitor and Review:

The last step in the Risk Management process is to monitor and review the effectiveness and performance of the risk treatment options, strategies, and the management system and changes which might affect it as follows:

- each step undertaken should be documented to enable effective monitoring and review
- risks and the effectiveness of treatment measures need to be monitored to ensure changing circumstances do not alter the risk priorities
- identification, assessment, and treatments must be reviewed to ensure the risks remain relevant and continue to be managed and that any new or emerging risks are identified and managed.

RISK ASSESSMENT MATRIX - LEVEL OF RISK

Table 1 - Consequence Values

		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 implication	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 is able to 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	

Table 2 - Likelihood

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

Table 3 – Risk Rating

			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			<p>8,9,10 (Extreme risk) - Task is not permitted. Risk controls are required to ensure residual risk is acceptable.</p> <p>6,7 (High risk) - Task is not permitted. Risk controls are required to ensure residual risk is acceptable.</p> <p>4,5 (Medium risk) - Task may proceed, however, risk must be reduced to 'as low as reasonably practicable' (ALARP).</p> <p>1,2,3 (Low risk) - Task may proceed.</p>					

Table 4 – Risk Control Worksheet

Risk No/ ID	Strategic Theme (e.g. operational, legal, financial, resource etc.)	The Risk What can happen and How it can happen	The Consequence	Existing Controls Description and Adequacy (only controls that are currently in place)	Risk Rating			Additional Risk Treatment Strategies (to be implemented to reduce the risk rating to an acceptable level)	Risk Rating after controls		
					L (a)	C (b)	R (a+b)		L (a)	C (b)	R (a+b)

APPENDIX 4 – RPAS Operational Procedures (Library)

Refer to separate RPAS Operational Procedures (Library) document.

SCHEDULE 1 - RPAS Operating Types and Nominated Personnel

(Provide the following information for each type / configuration operated)

Manufacturer	DJI
Model / Type	Phantom 4 RTK
Maximum Take-off Weight	1391g
Identity / Serial Number	

Manufacturer	
Model / Type	
Maximum Take-off Weight	
Identity / Serial Number	

Manufacturer	
Model / Type	
Maximum Take-off Weight	
Identity / Serial Number	

Manufacturer	
Model / Type	
Maximum Take-off Weight	
Identity / Serial Number	

(Provide the following information for nominated personnel)

Nominated Position	Name	ARN	Date Form 101-04 Approved
Chief Remote Pilot	Grant Voss	1115019	
Maintenance Controller	Michael Johnson	1114690	N/A
CEO	Carl Askew	1005597	N/A