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*Town of Port Hedland*

Appendix 4 - RPAS Operational  
Procedures (Library)

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# General

## 0.1 Applicability

The RPAS Operational Procedures (Library) is available to all people conducting activities under the authority of the Remotely Piloted Aircraft Operators Certificate (ReOC). The Chief Remote Pilot is responsible for maintaining this document.

The document contains:

- a section that contains general and specific operational procedures
- a section for each RPAS type operated under the authority of the ReOC
- appendices containing supporting documentation such as, but not limited to: copies of authorisation forms, briefing material, training syllabi, JSA, risk assessment, RPAS time in service log and defect and maintenance logs

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 this document may be a hard copy or electronic document or included by reference to an external source.

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

## 0.2 Distribution Control

The Chief Remote Pilot shall annually review the contents of this document to ensure the relevance and currency of all procedures. A record of the review shall be made in the revision log of the Chief Remote Pilot's copy of the manual indicating that the review has been completed and indicating whether any amendments were required as a result of the review.

## 0.3 Amendment Procedure

This is a living document that contains procedures and information relevant to the safe operation of RPAS. The procedures and information detailed will be approved and controlled by the Chief Remote Pilot. Persons working under the authority of this ReOC will be advised of any changes to this document, including the inclusion of any new procedure or information.

Where in the light of operating experience, errors are found in procedures or information these deficiencies will be reported to the Chief Remote Pilot.

Unless otherwise directed by CASA, all changes to this document will be accepted and approved by the Chief Remote Pilot.

## 0.4 Revision Log

<b>Date</b>	<b>Affected sections</b>	<b>Summary of revision</b>	<b>Authorised by</b>
16.02.21	All	New issues based on CASA template 060217	Grant VOSS

# Section 1 – Company Procedures

## 1.1 Specialised Operations

### 1.1.1 Normal Procedures

Each flight request is to be authorised by the Chief Remote Pilot. A record of all flights is to be kept. Approval may be given via means of electronic transmission providing a record is kept.

#### Pre-Flight Procedures

- The client to provide details of the operation required
- The client to be briefed on practicalities and legal requirements

#### General Instructions Covering All Types of Operations

- RPAS to be operated in accordance with Town of Port Hedland operations manual.

#### Job Planning

- A JSA will be assessed and validated prior to the commencement of job
- Appropriate resources will be utilised to mitigate risks and to effectively undertake job requirements
- Risk Control sheet will be completed for special operations
- Chief Pilot will approve flight after all necessary steps undertaken

#### Flight

- Employees must utilise RPA specific, company supplied checklists whether in electronic or hard copy form
- Weather conditions checked
- Spotters and crew briefed on operation
- Take-off and landing areas cleared, and appropriate signage put in place
- It is the Remote Pilots responsibility to ensure the aircraft is airworthy prior to any flight. Remote Pilots are to use company supplied checklist and may refer to the RPA flight manual if required
- Pre-flight (Appendix 10) and post flight (Appendix 11) checklists onsite and completed
- Failsafe and return to home set up
- Check radio communication is suitable and operational
- Battery check prior to flight

### 1.1.2 Inflight Handover/Takeover

In normal operations, the handover of RPA controls from one Remote Pilot to another whilst the RPA is in flight is not permitted. If the remote pilot becomes aware of any situation during flight that necessitates the handover of control to a second pilot to ensure the safety of any person, (e.g. Pilot becomes incapacitated, Emergency, training) the following shall apply.

RPA shall be flown to nearest open area free of obstruction

Stable hover with GPS lock shall be maintained

2<sup>nd</sup> pilot is to be qualified and type endorsed

Pilot in command shall inform 2<sup>nd</sup> pilot as to the situation requiring handover

Positive communication between pilots to confirm 2<sup>nd</sup> pilot has VLOS

Physical handover of controls in neutral configuration whilst RPA in stable hover

Positive communication between pilots, "You have control", "I have control".

2<sup>nd</sup> pilot to land immediately

In any situation, the Pilot in command must risk assess whether its beneficial to handover control or conduct an emergency landing.

### 1.1.3 Emergency Procedures

#### 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

#### Fly away or visual loss of RPA

Where an RPA is experiencing loss of control or is visually lost, all attempts shall be made to regain control or initiate the Return to Home procedure. Should these attempts fail perform a combined stick movement to shut-down the motors with due regard for the location of the RPA so as not to increase the risk of collision with persons or property. The Remote Pilot will shout warning to people or use radio where necessary. The shut-down timing is crucial to control the RPA termination point within a safe area before the aircraft has the possibility to fly beyond the area of operation into areas over people/property etc. In the event of an uncontrolled Fly Away, the RPA will be deemed unserviceable pending inspection by the Maintenance Controller.

#### GPS Failure, Loss of Orientation

Follow the procedures as previously mentioned for Fly Away while monitoring the RPA heading to look for correct Return to Home flight path. Any incorrect flight behaviour during Return to Home procedure will be terminated and switching to Attitude Mode immediately and fly the RPA to a safe landing area. Any differing directional control where the stick input is mismatched to the RPA heading shall be accounted for by compensating the stick movement accordingly. Where the RPA is uncontrollable follow the motor shut-down procedures as described previously in Fly Away. The RPA will be deemed unserviceable pending inspection by the Maintenance Controller.

#### Incident Management

Accidents and incidents can be classified as minor or major. All accidents or incidents that cause 3rd party property damage, injury or death are classified as major and must be reported to local emergency services and the ATSB immediately. The ATSB website at [www.atsb.gov.au/aviation](http://www.atsb.gov.au/aviation) provides the best contact and procedure details. For minor incidents which have not caused any 3rd party damage or injury but may potentially attract media attention it is advised to notify the CASA RPAS office at [rpas@casa.gov.au](mailto:rpas@casa.gov.au) in order to make them aware of any potential media information request. When the ATSB is contacted a written report will be forwarded to the ATSB as soon as possible after an accident and within 72 hours of an incident.

#### Motor Failure

In the event of a motor failure, all attempts should be made to bring down the RPA immediately in a safe area. Follow procedures below referring to Crash. The RPA will be deemed unserviceable pending inspection by the Maintenance Controller.

### Collision, Crash and Damaged Aircraft

Where a collision or crash occurs priority shall be given to reduce any further damage or injuries to persons or property. Attempts shall be made to shut down motors via the transmitter as soon as possible, Battery power shall be disconnected, and the scene preserved. The RPA shall be immediately inspected for potential of a damaged battery to monitor the potential of a battery fire. The RPA will be deemed unserviceable pending inspection by the Maintenance Controller. Public shall be restricted access to area until deemed safe. If the aircraft has crash landed, and the Remote Pilot is aware of the location, the Remote Pilot must obtain permission from the applicable landowner prior to retrieving the aircraft. If the landowner does not give the Remote Pilot permission to enter private property to retrieve the RPA, the Remote Pilot must inform the Chief Pilot who will contact the Police and ask the Police to retrieve the RPA on behalf of Town of Port Hedland. If the aircraft has crash landed and the pilot is not able to locate the aircraft, the pilot using footage from the last transmission, will try and determine the location of the crash site to retrieve the aircraft.

### Serviceability and Assessment of the Aircraft

- DJI PHANTOM 4 RTL
- Defect and Maintenance Log Form
- Refer to fellow Remote Aircraft Pilots for second opinion prior to organising a service through DJI

### Battery Fire

- Smother the battery fire with sand and monitor the fire until exhausted while drenching the battery and surrounding area with water and or fire extinguisher/s as applicable to the surrounding hazards.
- WARNING – LiPo batteries can burn intensely and emit toxic fumes! Water can be used to put out the resultant fire caused by the battery but the battery itself can burn under water! Contact fire fighters if required DIAL 000.
- NEVER charge LiPo batteries unattended as this procedure creates a higher risk of battery fire. LiPo batteries can catch fire if the correct charging procedures are not followed or if they are damaged for example in a crash.
- In the event of a battery catch fire during flight, the RPA controller should fly the RPA to the safe landing area and land as soon as fast as possible. If it is not safe to do this the RPA controller should perform a combined stick movement to shutdown the motors with due regards for the location of the RPA so as not to increase the risk to persons or property.

### Data Link Loss

- The CRP 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.

Emergency Contacts

Ambulance	000
Police	000
SES	132 500
DFES	133 337
WA Water Police	9442 8600
Telstra	13 22 03
Western Power	13 13 51
Main Roads	138 138



#### 1.1.4 Operations within 3NM of Uncontrolled Aerodromes

The relevant air traffic service frequency or frequencies, or the relevant CTAF (as applicable) must be monitored for aircraft traffic 15 minutes before the first launch and then continuously for the duration of the operation of the RPA.

For operations within a Control Zone (CTR) the appropriate air traffic control tower must be contacted by telephone and informed 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.

For operations within a CTR, any transponder fitted to the RPA must not be activated unless specifically requested to do so by air traffic control.

For operations within Class G airspace only unless directed otherwise, the location of the RPA must be transmitted using call sign 'Unmanned RPA' 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.

For operations at a non-controlled aerodrome marked on aeronautical charts or listed in ERSA, the location of the RPA must be transmitted using call sign 'Unmanned RPA' on the relevant CTAF — 15 minutes before the first launch and then at 15-minute intervals for the duration of the operation of the RPA.

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

The operator must ensure that in the period from 15 minutes before the RPA is launched to the time that the RPA lands, at least one person who is trained as an observer in accordance with the operator's 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 Chief Remote Pilot 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.

### 1.1.5 Operations outside of day VMC conditions – Specifically at night

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 visual line of sight at all times.

Operations at night must only be conducted by the Chief Remote Pilot or authorised Remote Pilots named below who have 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 Town of Port Hedland’s operations manual.

Remote pilots authorised for night operations				
Name in full	ARN	Training completion date	Currency end date	Signed
<i>Grant Voss</i>	<i>1115019</i>			

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; all equipment noted below must be checked as part of any pre-flight procedure and should be included within Town of Port Hedland’s RPA maintenance program.

- Serviceable GPS for the purpose of providing accurate data to the GPS hold and GPS return to home 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 pilot in command the RPA’s position in three-dimensional airspace, that is to say distance and bearing from the operator and a height above ground level.
- 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 Pilot in Command.

During the JSA process consideration must be given if rain or if a thunderstorm is observed or reported within 5km of the operational location.

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

As part of the JSA 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 operator's 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 CRP 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.

#### 1.1.6 Operations between 30m and 15m - Non-company personnel

Any operation within 30 metres of non-operational personnel requires the following equipment as a minimum.

The RPA should have:

- a dual parallel redundant battery system with duplicated battery mountings
- demonstrated ability to fly safely with one motor inoperative at the maximum take-off weight for the operation
- GPS hold and return to home function must be operational with a minimum reception of at least 7 GNSS satellites.

As part of the procedure for operation within 30m of non-operational personnel the Chief Remote Pilot must, in addition to all other normal operational requirements, perform a detailed risk assessment that specifically considers the increased risk of operations in close proximity of people. The 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 Chief Remote Pilot 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 Chief Remote Pilot must also consider the overall risk where multiple risk factors have a high score.

Town of Port Hedland acknowledges that they cannot conduct operations below 30m with the current RPA as listed in Section 2, 3 and 4 of this manual.

### **Consent of third parties**

Any operation within 30 to 15m of a person(s) requires the consent of each individual. The Chief Controller should note that a body corporate or any other entity cannot give such consent on behalf of any individual.

When seeking consent from an individual, inform the individual of the CASA regulation as written and any additional risks identified which may be attributed to the operation of the RPA within 30m of a person.

The consent form in Appendix 9 shall be used.

## Section 2 – DJI PHANTOM 4 RTK

### 2.1 DJI Phantom 4 RTK Pre-flight & Post-flight Check

Refer to the Manufacturer's User Manual

[https://dl.djicdn.com/downloads/phantom\\_4\\_rtk/20200721/Phantom\\_4\\_RTK\\_User\\_Manual\\_v2.4\\_EN.pdf](https://dl.djicdn.com/downloads/phantom_4_rtk/20200721/Phantom_4_RTK_User_Manual_v2.4_EN.pdf)

### 2.2 DJI Phantom 4 RTK Maintenance Schedule

Refer to the Manufacturer's User Manual

[https://dl.djicdn.com/downloads/phantom\\_4\\_rtk/20200721/Phantom\\_4\\_RTK\\_User\\_Manual\\_v2.4\\_EN.pdf](https://dl.djicdn.com/downloads/phantom_4_rtk/20200721/Phantom_4_RTK_User_Manual_v2.4_EN.pdf)

### 2.3 DJI Phantom 4 RTK RPAS Maintenance & Operational Manual(s)

Copy of manuals are kept in hard copy in the office or can also be obtained from the web links

[https://dl.djicdn.com/downloads/phantom\\_4\\_rtk/20200721/Phantom\\_4\\_RTK\\_User\\_Manual\\_v2.4\\_EN.pdf](https://dl.djicdn.com/downloads/phantom_4_rtk/20200721/Phantom_4_RTK_User_Manual_v2.4_EN.pdf)

<b>DJI PHANTOM 4 RTK</b>
<u>User manual v2.4</u> <a href="https://dl.djicdn.com/downloads/phantom_4_rtk/20200721/Phantom_4_RTK_User_Manual_v2.4_EN.pdf">https://dl.djicdn.com/downloads/phantom_4_rtk/20200721/Phantom_4_RTK_User_Manual_v2.4_EN.pdf</a>
<u>Quick Start Guide v1.0</u> <a href="https://dl.djicdn.com/downloads/phantom_4_rtk/20190530/Phantom_4_RTK_SDK_Quick_Start_Guide_v1.0_Multi.pdf">https://dl.djicdn.com/downloads/phantom_4_rtk/20190530/Phantom_4_RTK_SDK_Quick_Start_Guide_v1.0_Multi.pdf</a>
<u>Firmware update</u> <a href="https://terra-1-g.djicdn.com/851d20f7b9f64838a34cd02351370894/农业子站/ag410_v02.02.0505.bin">https://terra-1-g.djicdn.com/851d20f7b9f64838a34cd02351370894/农业子站/ag410_v02.02.0505.bin</a>
<u>Online tutorials</u> <a href="https://www.djivideos.com/watch/59d20cd2-8cb3-4d6a-a0ef-30fee22894ae?autoplay=false&amp;poster=">https://www.djivideos.com/watch/59d20cd2-8cb3-4d6a-a0ef-30fee22894ae?autoplay=false&amp;poster=</a>

### 2.4 DJI Phantom 4 RTK Battery Management

Refer to the Manufacturer's User Manual

[https://dl.djicdn.com/downloads/phantom\\_4\\_pro/20170125/flight+battery+safety+guidelines/Phantom+4+Series+Intelligent+Flight+Battery+Safety+Guidelines+Eu.pdf](https://dl.djicdn.com/downloads/phantom_4_pro/20170125/flight+battery+safety+guidelines/Phantom+4+Series+Intelligent+Flight+Battery+Safety+Guidelines+Eu.pdf)

### 2.5 Test Flights

Test flights will be conducted after any maintenance operation on flight control surfaces or associated hinges or attachment points. Flight tests will also be conducted after any firmware or software updates. Contact the Maintenance Controller if there is any doubt as to whether a test flight is required.

#### 2.5.1 Test Flight Requirements

- The test flight location should be a controlled environment, clear of obstacles and suitable for landing quickly in the event of poor dynamics or control difficulty.
- The test flight will consist of a manual launch, a short flight utilising both manual and automated flight, hover and recovery within the flight area.

The test flight will be conducted by a properly licenced, qualified and experienced remote pilot.

## Section 3 Batteries

### 3.1 Battery Management

- Only use an appropriate Lithium Polymer (LiPo) charger to charge the LiPo batteries.
- Always charge LiPo batteries in the balance mode on the charger and never exceed a charge rate of more than one times the batteries capacity (1C).
- Never leave a charging LiPo battery unattended.
- Always ensure LiPo battery on charge is in an appropriate 'LiPo safe bag or case'.
- Never charge a LiPo battery that is warm or hot (i.e. straight after a flight).
- Never charge in hot conditions.
- If a battery becomes swollen during charging, flight operations, or any other time, it must be immediately disconnected and placed in a safe location for observation.
- A swollen battery must never be used again and should be safely discarded.
- If any battery leads or wires are accidentally shorted or connected incorrectly, the battery must be disconnected immediately and placed in a safe location for observation for 20 minutes.
- Never charge LiPo batteries that are attached to the aircraft.
- Only use the correct batteries and (if applicable) charger for the controller

### 3.2 Battery storage

- Store LiPo batteries at room temperature (between 15° and 27°).
- If a LiPo battery is not going to be used within a 4-day period, it should be kept in orange mode instead of fully charged.
- The controller battery can be safely stored in the controller always
- It is possible to transport or temporarily store batteries in warm temperatures such as that of a vehicle, however this should be limited to no more than 2 hours at a time.

### 3.3 Battery replacement

- A LiPo battery must be replaced when a pack loses 20% of its rated capacity.
- Swollen or damaged battery packs must be replaced
- Battery packs that have been involved in a significant crash should be replaced regardless of their condition.
- Batteries ready for disposal should be discharged using a LiPo charger (Discharge to 3V per cell). Once completed, batteries should be put into LiPo safety pack and disposed of according to local battery disposal requirements.

### 3.4 Battery charging procedure

- Charge LiPo batteries in Balance mode on the charger at a maximum rate of 1C.
- Batteries should be charged using the supplied charger. Battery and cell health data can be found within the supplier computer software.

### 3.5 Battery register and log

- Battery condition, usage and recharge cycles must be logged.

## APPENDIX 1 - Flight Authorisation Form

Task		
Date	Location	RPAS System
Task Description		
RP	2 <sup>nd</sup> RP	Observer / Crew

Operation details		
Local Area Frequencies	Emergency Contact Number	
Notes (special operational procedures, permissions, etc.)		

Flight Authorisation		
Chief Remote Pilot		Date
Remote Pilot		Date

## APPENDIX 2 - Pre-Operational Briefing

The following briefing is to be given by the Remote Pilot to all persons involved in the RPAS operation. The Remote Pilot is also responsible to ensure the emergency contact telephone numbers are to hand.

Action	✓
Overview of the mission 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 remote pilot 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	

*Any additional requirements for this operation must be added*



## APPENDIX 3 - Policy and Procedure Training Syllabus

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

- Manuals
- Specific procedures including briefing requirements
- Conduct of Job Safety Assessments (JSA) and Risk Management
- Maintenance procedures and authorisations
- Safety and risk management strategies and WH&S
- Crew co-ordination and support crew duties
- Read, understood and signed the Operations manual
- Read, understood and signed the Operational Health and Safety manual

Remote Pilots must demonstrate an understanding of:

- The CASA regulations and where to obtain them
- Weather forecasts and where to obtain
- NOTAMs and where to obtain
- Aeronautical charts and where to obtain
- The Risk Assessment and JSA suite
- Applicable aircraft and its systems
- Company emergency requirements
- Flight radio usage
- Company security procedures
- Any other items as required by Chief Remote Pilot or Board of Directors

# APPENDIX 4 - 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

## 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
- ◆ Non-normal procedures
- ◆ Safety

## APPENDIX 5 - Job Safety Assessment

Company		Date	
Task	Location	Check the following and address as needed	
✓ Sketch of area (if necessary)		Maps and charts available and checked	
		Weather, within limits for RPA and operation	
		Airspace classification and requirements	
		NOTAMs	
		Possibility of public moving into area	
		Footpath/right of way	
		Landing area including alternate	
		Ability to maintain 30M of public	
		Obstructions (buildings, trees) (‘Return to Home’ height setting)	
		Possible interference (Powerlines/antennas)	
		Ability to maintain visual line of sight	
		Remote Pilot’s ability matches location/task	
		Permission of any landowners	
		Privacy	
		Local restrictions/by laws	
Signage placement			
Jobs specific threat and error management			
RP	Signature		
Crew			
Comments:			

## APPENDIX 6 - RPAS Time in Service Log

RPAS Type / Serial Number or Identifier \_\_\_\_\_

Date	Pilot	Pre flight inspection completed (Initials)	Post flight inspection completed (Initials)	Operation summary	Time in service this operation	Total time in service
Brought forward						

## APPENDIX 7 - Defect and Maintenance Log

Defect Number	Description of defect or maintenance required	Name Signature Date	Rectification	Name Signature Date

## APPENDIX 8 - 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

##### 2.1 Pre-flight preparation

The remote pilot confirms that:

- (a) the RPA meets the equipment requirements for an N-VLOS flight.
- (b) a risk assessment is completed taking into account night visual conditions.

##### 2.2 Night Operations

- (a) Perform all normal manoeuvres under N-VLOS conditions using either manual control or an AFMS.
- (b) Orient and navigate the RPA efficiently and safely at distance.
- (c) Maintain an effective lookout for other aircraft and take appropriate action to maintain separation and prevent conflict.

##### 2.3 Night Landing

- (a) 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

#### Flight test requirements

- 1.1 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 clause 2 and competency, in the units of competency mentioned in clause 3, by performing manoeuvres with an aircraft in the category he or she wishes to operate, within the accuracy/tolerances specified clause 3.
- 1.2 For subclause 1.1, a sustained deviation outside the applicable flight tolerance is not permitted.

- 1.3 For Schedule 3, if sufficient cross-wind 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.
- 1.4 Note that flight tests elements for VLOS approval may be combined into a single test or conducted over a number of flights.

### **Knowledge requirements**

- 2.1 The applicant must demonstrate his or his knowledge of the privileges and limitations of the rating and of the following topics to the Chief Remote Pilot:
  - (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) Describe 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.

### **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 AFCS as applicable
- (c) Under manual or automated control is able to 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**

#### **2. Flight at night Theory test**

- 2.1 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:
  - (a) Under bright lights
  - (b) In an otherwise dark area.
- 2.2 Define 'night' for aviation purposes.
- 2.3 Describe the aircraft equipment requirements for an N-VLOS.
- 2.4 Describe the considerations for carrying out an N-VLOS flight at a non-controlled aerodrome.
- 2.5 Describe the additional considerations for coping with equipment failures at night.

#### **3 Human Performance**

- 3.1 Explain the relevant human performance and physiological limitations for the conduct of RPAS operations at night.
  - 3.1.1 Describe dark adaption of the eye and how long the eye takes to fully adapt to night conditions.

3.1.2 Describe the why lights have a red filter during night operations.

#### **4 Risk Assessment – Night Operations**

4.1 Describe and list any special precautions a remote pilot might take for a night operation.



## APPENDIX 9 - Non-Company Personnel Consent Form

### Consent For Operation Near Non-Company Personnel

**Regulation Relating to this Operation (CASR 1998):**

*“101.245 Operation near people*

*(1) Subject to subregulations (2) and (3), a person must not operate an RPA within 30 metres of a person (the **second person**) who is not directly associated with the operation of the RPA.*

*Penalty: 10 penalty units.*

*(1A) An offence against subregulation (1) is an offence of strict liability.*

*Note: For **strict liability**, see section 6.1 of the Criminal Code.*

*(2) Subregulation (1) does not apply if the second person is standing behind the RPA while the RPA is taking off.*

*(3) Subregulation (1) does not apply if:*

*(a) the RPA is a very small RPA, small RPA or medium RPA; and*

*(b) the second person has consented to the RPA operating within 30 m of him or her; and*

*(c) the RPA is operated no closer than 15 m of him or her.*

*(4) Subregulation (1) does not apply if:*

*(a) the RPA is an airship; and*

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

*(5) Subregulation (1) does not apply if the person holds an approval under regulation 101.029 for the purposes of this subregulation.”*

**I agree that I understand the above regulations surrounding the operation of an RPA within 30m of myself. Associated risks have been explained to me by the RPA operator. I hereby provide my consent for an RPA to be operated within 30m but no closer than 15m to myself.**

Full Name	Signature	Date

## APPENDIX 10 - Pre Flight Checklist

Item	Description																		
Safety equipment	Signage																		
	Barriers																		
	PPE																		
Location check	Safe take-off / landing site																		
	Alternate landing site																		
	Obstructions																		
	Public																		
	Animals																		
	Vehicles																		
	Other hazards																		
Propellers	Meteorological conditions																		
	Condition																		
	Tightness																		
	Dents leading edges																		
	Cracks or signs of stress																		
	Correct orientation																		
	Motors	Check for free movement																	
No abnormal movement																			
Check for abnormal noise																			
Frame	Screws located and tight																		
	Check for cracks or damage																		
	Check for security																		
Undercarriage	Check for security																		
	Check for damage																		
Battery	Charged																		
	Condition checked																		
	Inserted correctly																		
	Wires checked for damage																		
	Compartment lid closed																		
Lights	Check for function																		
Transmitter	Check levers and switches																		
	Aerial check for damage																		
	Aerial in position for flight																		
	Battery charged																		
	Screen securely fitted																		
	Screen adequate power																		
	Screen programmed correctly																		
	Sufficient space on storage																		
Payload (if fitted)	Check for correct function																		
	Check for damage																		
	Confirm secure																		
	Confirm in correct mode																		

## APPENDIX 11 - Post Flight Checklist

Item	Description																			
Landing	Camera Off																			
	Disarm RPA																			
	Disarm Remote Controller																			
	Power off additional equipment																			
	Disconnect Battery																			
	Lens cover on																			
	Gimbal lock on																			
	Pack up landing mat																			
Propellers	No cracks or roughness																			
	No cross threading																			
	Serviceable lugs																			
Motors	Check for free movement																			
	Check for heat																			
	No cracks or damage																			
	Seated securely																			
Frame	Screws located and tight																			
	Check for cracks or damage																			
	Check for security																			
Battery	Not overheated																			
	Not swollen																			
	No punctures or dents																			
	Terminals clean																			
General	Wipe RPA body and propellers																			
	Blow dust out of components and motors																			
	Securely pack RPA for transport																			
	Ensure all equipment cleared from site																			
Office	Upload video footage																			
	Clear media cards and storage																			
	Document flight performance details																			
	Complete flight log book																			
	Recharge and log battery usage																			
	Organise necessary maintenance																			