

Precision Air Surveys Limited

OPERATIONS MANUAL



PRECISION AIR

Surveys Limited

This document is a combined Safety and Operations Manual, compliant with Volume 1 – Operations Manual as set out in CAP722A, covering all of aspects of Precision Air Surveys Limited utilising small drone aircraft in accordance with the requirements of the UK Civil Aviation Authority's Permission for Commercial Operations.

Document Reference: PAS-OM Version 1.2 – 12 March 2021 Document Author: Simon Judd Accountable Manager: Simon Judd



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Amendment Record

Version	Amendment Date	Amendments Incorporated	Signed Off By
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0.3	18.05.2020	Third Draft	Simon Judd
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1.0	13.07.2020	Submitted Version	Simon Judd
1.1	24.07.2020	PfCO Permission added	Simon Judd
1.2	12.03.2021	Mavic 2 Pro UAV Added	Simon Judd

Acronyms and Abbreviations

Below is a list of abbreviations used in this Operations Manual.

Reference	Full Title
ATC	Air Traffic Controller
ATZ	Aerodrome Traffic Zone
САА	UK Civil Aviation Authority
CTR	Controlled Traffic Zone
GPS	Global Positioning System
MOR	Mandatory Occurrence Report
PfCO	Permission for Commercial Operations
SUA	Small Unmanned Aircraft
VLOS	Visual Line of Sight
RTH	Return to Home
RTK	Real Time Kinematic
РРК	Post Processed Kinematic



Commitment of Accountable Manager

This Operations Manual describes the organisation, aircraft systems, personnel, flight operations and Precision Air Surveys Limited is committed to the safe conduct of all its Small Unmanned Aircraft operations and will ensure that the systems deployed are maintained and prepared in accordance with industry best practice, are operated in accordance with the procedures and bounds of this Operations Manual and within any limitation or condition specified in any UK Civil Aviation Authority (CAA) Permission granted for such commercial operations.

It is accepted that the contents of this document do not override the necessity of reviewing and complying appropriately with any new or amended regulation published from time to time by the CAA addressed by this document.

Signed:

5-400

12 March 2021

Accountable Manager: Simon Judd

Precision Air Surveys Limited

For and on behalf of Precision Air Surveys Limited, a company registered in England & Wales at 4th Floor, Park Gate,161-163 Preston Road, Brighton, East Sussex, BN1 6AF

No: 12564920.

Enquiries regarding the content of this document should be addressed to Precision Air Surveys Limited at 181 Nevill Avenue, Hove, East Sussex, BN3 7NG



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1. INTRODUCTION

Purpose

The purpose of this document is to record the key data associated with the safe operation of any Small Unmanned Aircraft (SUA) with a Maximum Take-Off Mass of up to 20 kg by Precision Air Surveys Limited personnel.

Scope

Precision Air Surveys Limited's traditional business is Aerial Survey & Mapping for the Geomatics Industry. Its customer base will include Land & Civil Engineering companies, with the main emphasis on providing photogrammetric based data, captured with SUA. This data will include but not be limited to, still and moving images, 3D point cloud data and digital terrain models. The work will primarily require aerial missions to be planned and executed, with the SUA, within the built environment and Civil Engineering based construction arena's

Overarching Strategy

Precision Air Surveys Limited is primarily concerned with providing an aerial based geomatics service to existing Survey and construction-based companies. These services will include, but not be limited to, mapping of the built environment, construction-based timeline surveys, inspection surveys and coastal/flood defence surveys.

Precision Air Surveys is also looking at future expansion into additional sectors to provide still and moving imagery in the events and hospitality sectors.

Safety is paramount and Precision Air Surveys Limited has put essential safeguards in place to maintain a safe environment for all involved or connected to Precision Air Surveys Limited SUA operations.

Document Control and Amendment Process

All amendments to this Operations Manual are to be made by Simon Judd and must be recorded in the Amendment Record Page found at the front of this document. Each amendment is identified with a new Version Number, an Amendment Date, and a list of the major Amendments Incorporated. All amendments will be signed off by the Accountable Manager, Simon Judd.

The CAA will be informed of all major updates such as new aircraft or pilots.

All Precision Air Surveys Limited employees will be informed of any changes to this Operations Manual and they must ensure they have access to a current up-to-date version either in electronic or paper format.



Reference	Full Title	Issue Number & Date of Issue
CAP 382	Mandatory Occurrence Reporting Scheme	Tenth Edition – December 2016
CAP 393	The Air Navigation Order 2016 and Regulations	Version 5.6 – 21 March 2019
CAP 722	Unmanned Aircraft System Operations – Guidance	Version 7.3 – 4 th September 2019
CAP 722A	CAP 722A UAS Operations in UK Airspace – Operating	Version 1 - 23 rd July 2019
	Safety Cases.	
CAP 1763	Air Navigation Order 2018 and 2019 Amendments -	Version 2 – 28 February 2019
	Guidance for Small Unmanned Aircraft users	
P4-RTK UM	DJI Phantom 4 RTK User Manual	Version 1.4 – October 2018

Referenced Documents



2. SAFETY POLICY

Policy

Safety is the priority in all Precision Air Surveys Limited activities. The business is committed to implementing, developing and improving strategies, management systems and processes to ensure that all its aviation-related activities uphold the highest level of safety performance and meet national and where appropriate international standards.

Precision Air Surveys Limited's commitment is to:

- a) Comply with and, wherever possible, exceed legislative and regulatory requirements and standards.
- b) Develop and embed a safety culture in all aviation-related activities that recognises the importance and value of effective aviation safety management and acknowledges that safety is always paramount.
- c) Minimize the risks associated with aircraft operations to a point that is as low as reasonably practicable and achievable.
- d) Ensure that externally supplied systems and services that impact upon the safety of operations meet appropriate safety standards.
- e) Ensure that sufficient skilled and trained resources are available to implement safety strategy and policy.
- f) Establish and measure safety performance against realistic objectives and/or targets.
- g) Continually improve its safety performance; and
- h) Conduct safety and management reviews and ensure that relevant corrective action is taken.

Safety Management System

Precision Air Surveys Limited has only implemented the rudiments of a full Safety Management System.

The 'internal' Safety Objectives are:

- Encouraging an environment whereby safety has top priority and is second nature, and
- Increasing the knowledge on safe operations and practices on the part of its customers.

Safety Targets

It is the goal of Precision Air Surveys Limited to operate aircraft without harm, injury or damage to any persons or property. The Precision Air Surveys Limited Remote Pilot will comply with all the safety requirements and limitations of the Permission for Commercial Operations issued by the UK CAA to Precision Air Surveys Limited.

The safety target is No Accidents.



3. ORGANISATION

	Organisation
Organisation Name:	Precision Air Surveys Limited
Organisation Type:	Limited Company
Organisation Registration Number:	12564920
Country of Registration:	England & Wales
Accountable Manager	Simon Berkeley Judd
SUA Operator	Precision Air Surveys
CAA Operator ID	OP-XMK3JZR

Insurance will be in place and the details below updated before commercial operations commence.

Insurer:	CoverDrone
Insurance Policy Number:	CDA22075588GBP
nsurance Expiry Date:	28/07/2021

A copy of the current Certificate of Insurance is enclosed as Appendix A to this Operations Manual.

Precision Air Surveys Limited flies the following SUA: -

SUA:	DJI Phantom 4 RTK
SUA Type:	Multirotor
SUA MTOM:	1.391 KG
SUA Serial No.:	0V2DGC5RA30482

The technical specification for this SUA is attached as Appendix B



DJI Mavic 2Pro



SUA Type: SUA MTOM: SUA Serial No.: Multirotor 0.907kg 163CHBJR0A61FV

The technical specification for this SUA is attached as Appendix B



Structure of Precision Air Surveys Limited

Precision Air Surveys Limited is owned by Simon Berkeley Judd of 181 Nevill Avenue, Hove, East Sussex, BN3 7NG.

Contact Number is: 07968 532279.

Accountable Manager Remote Pilot: Flyer ID: Pilot Competency Assessment: Assessed to operate Aircraft Type: Aircraft Weight Category:

Nominated Personnel Simon Judd Simon Judd FLY-LZBQ3V COP-SU14042061 Multirotor 0-20kg

Responsibilities

The Remote Pilot's responsibilities are:

- Supervising each operation of the SUA.
- Completing the pre-flight risk assessment and mitigating any risks where possible.
- Having confidence that the flight can be conducted safely and the competence to perform that flight.
- Checking that everything is secure on the SUA.
- Ensuring that the aircraft used is airworthy by completing the pre-flight checklist.
- Briefing all crew members prior to a flight to ensure they understand their responsibilities.



- Communicating with client as required to understand the required task.
- Planning each flight in advance and ensuring the right resources are available when required.
- Ensuring that the welfare of themselves or others is not compromised by any planned operations.
- Operating the aircraft within the stated limitations for that aircraft.
- Respecting the limitations stated on the Permission for Commercial Operations.
- Ensuring that he or she is of sound body and mind to operate the aircraft.
- Maintaining flight safety awareness at all times
- Completing all required paperwork such as pilot & aircraft hours, battery log etc. after a flight.
- Maintain currency for each SUA type they are qualified to operate

If present, the Observer's responsibilities are:

- Acting as a link between the Remote Pilot and other crew members.
- Ensuring the Remote Pilot is aware of all relevant developing situations.
- Maintaining constant visual look out for ground and air incursions.
- Ensuring the position of the SUA is always known.
- Keeping the Remote Pilot updated with battery status and other critical flight information.
- Being prepared to activate the 'failsafe' function on the aircraft when required.
- Briefing the pilot after a flight using Threat and Error Management techniques to help the pilot improve his or her competency.
- Deal with public enquiries
- Ensure the take-off and landing site remains secure.

If present, the Payload Operator's responsibilities are:

- Ensuring the camera or sensor is operational. (Fully charged, empty memory card fitted, lens clean)
- Ensuring the camera or sensor is securely mounted. (the Remote Pilot must confirm this also)
- Ensuring the camera or sensor is switched on and operating correctly before activation of the aircraft.
- Ensuring the camera or sensor is switched off and images saved after the aircraft is made safe.
- Ensuring operational safety: it is every crew member's responsibility to alert the observer to any changing situation which may cause threat to any aircraft, property or person present.
- Ensuring the camera or sensor is rotated to the stored position for take-off and landing procedures.

Other Support Personnel

• At times additional personnel may be assigned to fulfil the roles or visual observers, crowd control, technical assistants etc. These additional support personnel will be properly briefed to fulfil their appointed roles.

Areas of Operation

The anticipated areas of operations will be carried out in UK airspace mainly within class G airspace

The work will primarily require aerial missions to be planned and executed, with the SUA, within the built environment and Civil Engineering based construction arena largely in an urban environment, with some work being undertaken in rural and semi-rural areas. Construction based projects will usually, although not always, be carried out over dedicated construction sites.

Types of Operation

The anticipated types of operation are:



- Land Survey work
- Building and asset inspection work
- River and coastal flood defence work.
- Aerial Photography
- Aerial Videography

Operations that are conducted during daylight will be within standard Visual Line of Sight (VLOS) limitations of no more than 400 ft above surface level and at a maximum distance from the Remote Pilot of 500 metres provided the Remote Pilot can see the Small Unmanned Aircraft (SUA) in good Visual Meteorological Conditions.

Prior to all night time operations (where night time is defined as the time from half an hour after sunset until half an hour before sunrise, sunset and sunrise being determined at surface level), a daylight reconnaissance and site safety assessment including aircraft flight-paths within the surrounding area, shall be undertaken to identify, address and record any hazards, restrictions and obstacles. The launch site shall be provided with adequate illumination and the aircraft shall be equipped with adequate lighting. Flights shall only commence when the weather conditions and visibility of the SUA are suitable for continuous VLOS operations.

The minimum separation from people, vessels or vehicles not directly under the control of the Remote Pilot will be 50 metres. The same distance will be maintained from structures not under the control of the Remote Pilot.

Supervision of SUA Operations

The Remote Pilot present during each operation will be responsible for the supervision and safe conduct of that operation.

The Remote Pilot will seek clearance from the Accountable Manager in advance of a flight where a risk is identified as not being in the Low or Moderate categories and cannot be easily mitigated.

An Observer, if present, will be charged with pointing out to the Remote Pilot any unobserved threat or risk that manifests itself during a flight using Threat and Error Management techniques.

Any safety issue that arises will be brought to the attention of the Accountable Manager as soon as practicable after the incident has been recorded.

Accident Prevention and Flight Safety Programme

Precision Air Surveys Limited will comply with the requirements of CAP382, Mandatory Occurrence Reporting (MOR).



Any Incidents or Occurrences will be dealt with by Precision Air Surveys Limited as follows: -

Incident Handling

In the event of any Incident, the severity must be assessed. The following lists should help to identify Minor and Major Incidents: -

MINOR INCIDENTS

- Any unusual or unexpected flight behaviour from the aircraft which does not result in damage or loss
- Any failure of any aircraft system which does not result in damage or loss

MAJOR INCIDENTS

- Any unusual or unexpected flight behaviour from the aircraft which results in damage or loss
- Any significant damage to the aircraft caused by an aircraft system failure
- Any significant danger or damage to persons, possessions or property during Flight Operations
- Any public encroachments or aircraft incursions which required preventative measures to avoid

Incident Logging

All MINOR incidents will be logged in the Aircraft Operating Hours Log as well as the Precision Air Surveys Limited Incident Log. Upon noting a minor incident, the logbook should be checked for similar occurrences. If a minor incident occurs three times, then an investigation should be initiated to identify the cause and consider implementing steps to reduce the likelihood of this incident occurring again.

All MAJOR incidents require an investigation as outlined in the Investigation Procedure section. The Incident Log should also be updated.

Investigation Procedure and Report

Any investigations undertaken by Precision Air Surveys Limited will follow the procedure shown below to generate an Investigation Report with the following contents:

INTRODUCTION

The introduction contains the context for the Incident and confirms the major facts as to the companies and people involved, why they were present and the reason for the flights being carried out.

DESCRIPTION OF EVENTS

This is a factual account of the events leading up to and immediately after the incident as well as the incident itself. Its aim is to provide an agreed basis upon which the analysis is carried out.

Importantly any assumptions should be clearly stated, and all data provided should have its authenticity and derivation stated. If there are doubts, then these should also be clearly articulated so that future analysis can take this into account.

ANALYSIS

The analysis of events sets out to find explanations for what is described in the description of events. Wherever possible the analysis draws upon known concepts, models and physical understanding to ensure that the events as described have a logical explanation.



The analysis should set the scene for any conclusions and provide traceability from the facts to the conclusions in a logical and auditable way.

CONCLUSIONS

The conclusions are derived from the analysis, which themselves are based upon the facts in the description of events or the facts as they pertain to concepts, models and physical understanding exposed within the analysis. A strong conclusion is one where this traceability is good and can stand up to scrutiny.

RECOMMENDATIONS

The aim of the recommendations is to provide the organisations or personnel identified for the report with those items and actions that can lead to a safer operation and which address the shortcomings highlighted through the investigation process.

Mandatory Occurrence Reporting

The UK Air Navigation Order states "Any incident which endangers or which, if not corrected, would endanger an aircraft, its occupants or any other person" is a reportable occurrence. CAP382 now requires that a reportable occurrence is filed on the ECCAIRS European-wide reporting system through the Joint Research Council website at <u>http://www.aviationreporting.eu/aviationreporting</u>.

Incidents involving injury to a person should also be reported by Precision Air Surveys Limited to the Air Accident Investigation Branch by phoning 01252 512299.

Flight Team Composition

Precision Air Surveys Limited will normally be operating alone but will seek assistance in the form of additional observers and/or marshals when operating in urban environments or areas of higher risk or where safety concerns are raised.



Operation of Multiple Types of SUA

Precision Air Surveys Limited remote pilots can only fly one SUA at any one time and simultaneously operating multiple SUA is forbidden as part of this operations manual.

Qualification Requirements

Precision Air Surveys Limited will ensure that all Precision Air Surveys Limited pilots acting as the Remote Pilot of its SUA hold a SUA pilot competency assessment or qualification recognised by the CAA.

Non-commercial use of equipment

Precision Air Surveys Limited will ensure anyone operating Precision Air Surveys Limited aircraft have a valid flyer ID issued by the CAA.

All Precision Air Surveys Limited remote pilots must be at least 18 years of age.

Crew Health

All Precision Air Surveys Limited Remote Pilot and other crew members will be instructed in the 'I'M SAFE' mnemonic and will be trained to use it as a proactive self-assessment tool.

- I Illness Is the pilot suffering from any illness?
- **M Medication** is the pilot currently taking any drugs?
- **S Stress** is the pilot overly worried about other factors in their life?
- **A Alcohol** Has the pilot consumed any alcohol within the last 8-24 hours?
- **F Fatigue** Has the pilot had sufficient sleep or rest?
- **E Eating** Has the pilot had enough hydration and sustenance

It is the responsibility of the individual to determine if they are in a physically and mentally fit condition to participate in Precision Air Surveys Limited operations.

All crew members must be capable of clearly reading a vehicle registration number plate from twenty metres.

Crew members shall not attend a flight operation if they are under the influence of alcohol. No alcohol shall be consumed for the twelve hours immediately prior to flight operations.

Precision Air Surveys Limited flight operation team members should not operate more than ten hours in any twenty-four-hour period.

Precision Air Surveys Limited also has a strict no drugs policy. All Flight Crew members taking prescription drugs should seek professional guidance and advise the Remote Pilot.

Any crew member who begins to feel unwell and are unable to continue with their assigned responsibilities should advise the Remote Pilot or Observer immediately.



Logs and Records

Precision Air Surveys Limited will maintain up-to-date information and operational logbooks for: -

- Aircraft and Pilot Operating Hours
- Battery Charge
- Aircraft Maintenance
- Incidents / Accidents

See Appendix C for examples of these logbooks.

Operator Training Programmes

All Precision Air Surveys Limited pilots acting as Remote Pilot on commercial drone operations will be subject to regular assessment by Simon Judd of Precision Air Surveys Limited on an annual basis for competency and currency.

To maintain currency a pilot must have flown a SUA for more than 2 hours in the previous 3 months and at least thirty minutes on the specific SUA in the preceding four weeks of the planned operation. Qualifying time can be logged on commercial operations, training or test flights.

CAA Permission

A copy of the Permission for Commercial Operations issued to Precision Air Surveys Limited by the CAA is included in this Operations Manual as Appendix D.

4. OPERATIONS



Role Training and Currency

All Precision Air Surveys Limited pilots will have to hold a pilot qualification recognised by the CAA for SUA commercial operations and will be assessed by Simon Judd of Precision Air Surveys Limited as being knowledgeable and competent to fly Precision Air Surveys Limited's SUAs in Precision Air Surveys Limited's potential operating environments.

All Precision Air Surveys Limited pilots will be expected to maintain flying skills currency through hands-on flying with Precision Air Surveys Limited SUAs, other SUAs they have access to or appropriately configured simulators.

In addition to maintaining flying skills, all and any remote pilots employed by or contracted to Precision Air Surveys Limited will be trained and assessed to the following program:

- Pre-Site and On-Site assessment procedures
- Remotely piloted aircraft system assembly procedures
- Pre-Flight and Post-Flight checklist procedures
- Safe power source management
- Safe take-off and landing procedures
- Basic flight manoeuvres
- Emergency procedures

Support personnel will also be trained by a suitable flight team member in the following.

- Air and Ground incursions and correct procedures
- Emergency procedures relevant to the persons role
- Operating procedures relevant to the persons role.

Area of Operation

The anticipated areas of operations will be carried out in UK airspace mainly within class G airspace

The work will primarily require aerial missions to be planned and executed, with the SUA, within the built environment and Civil Engineering based construction arena's largely in an urban environment, with some work being undertaken in rural and semi-rural areas. Construction based projects will usually, although not always, be carried out over dedicated construction sites.

Commercial drone operations conducted in UK airspace will be assessed in advance using comprehensive site risk assessment forms and procedures, see Appendix E.

Operating Limitations and Conditions

All Precision Air Surveys Limited operations will be conducted within the limitations stipulated within CAP393 Articles 94, 94A-G, and 95 and CAP722 or as updated in the PfCO issued by the CAA to Precision Air Surveys Limited.

The standard limitations are:



- Visual Line of Sight (VLOS) in accordance with Article 94
 - \circ $\,$ To a maximum vertically above the surface of 400' (Article 94A) $\,$
 - \circ ~ Up to a maximum distance from the Remote Pilot of 500m ~

providing in both cases the pilot can identify and monitor the SUA

- Not over or within 150m of Open-Air Assemblies of more than 1000 people (Article 95)
- Not within 50m of people not under the control of the Remote Pilot of the SUA although this distance is reduced to 30m during take-off and landing (Article 95)
- Not within 50m of Vehicles, Vessels and Structures not under the control of the Remote Pilot (Article 95)
- Not within the Flight Restriction Zone of a protected aerodrome as stated and defined in articles 94A & 94B

All Remote pilots are advised to sign up to CAA Skywise portal to ensure they remain up to date with Legislation, information notices and Temporary airspace restriction or changes. <u>http://skywise.caa.co.uk/</u>

Methods to Determine the Intended Tasks and Feasibility

For all Precision Air Surveys Limited commercial drone operations, the designated remote pilot will assess the intended task using the Pre-Site and Site Planning Form, see Appendix E. Details captured on the form from the customer will include: -

- Contact Details
- Work Required
- Date and Time Constraints
- Location of Work (Latitude and Longitude if possible)
- Airspace
- Identifiable hazards
- Landowner Details
- Other Nearby Air Users (if known)
- Any Other Relevant Information

A completed Pre-Site and Site Planning Form will be retained for at least one year for future reference if required.

The designated remote pilot will be responsible for determining the method of operation for the intended task, identifying resources and assessing the task's feasibility. If he or she has any reservations he will discuss the reservations with the Precision Air Surveys Limited Accountable Manager before proceeding with the task.

Operating Site Planning and Assessment

As part of the research into task feasibility, the Precision Air Surveys Limited remote pilot will use whatever tools and facilities deemed necessary and available to him. These may include:

- Client Information
- Current and Relevant Aeronautical Charts
- Integrated Aeronautical Information Package United Kingdom
- SkyDemonLight, Altitude Angel and NoFlyDrones- Online Aeronautical Charts
- NOTAMinfo.com to confirm NOTAMs
- Google Earth



• Google Maps]

The task will only go ahead if the remote pilot is satisfied the necessary controls and safeguards can be put in place for a safe operation.

Communications

Contact telephone numbers for the following will be recorded on the Pre-Site and Site Planning Form, which can be found in Appendix E, when possible and before departure to the site:

- Landowner(s)
- Observer and Crew
- Client Contact
- Local Police Station
- Local Hospital
- Local Air Traffic Control (ATC)
- Local Air User Clubs

Where possible, contact will be made with the Landowner(s) and the ATC before any physical site survey in conducted.

ATC Phone numbers can be found on

Civil – <u>http://www.nats-uk.ead-it.com/public/index.php.html</u> > IAIP > Eaip > AD2 > Aerodrome Name

Military - <u>https://www.aidu.mod.uk/aip/</u> > IAP > AD > AD2 > Aerodrome Name > Textual Data

Pre-Notification

Permission is required if a planned flight operation is to take place within the Flight Restriction zone or Runway Protection Zone of a protected aerodrome. The remote pilot will contact the ATC at least twenty-four hours before the planned flight. If Operating in controlled airspace the remote pilot will shall make the decision on whether to contact ATC and notify them of the planned flight in the interests of safety. Contact details for the tower will be recorded on the relevant On-Site Survey Form.

If there is a local air user club nearby the remote pilot will endeavour to contact the club and enquire about any likely activity on the day of the proposed flight operation.



If the planned flight operation is to take place in areas where there is likely to be members of the public, the remote pilot will inform the local police. The contact and telephone number will be recorded on the On-Site Survey Form.

If the flight operation is to take place in a highly populated area, such as a housing estate, a leaflet drop, and/or a door-to-door advisory campaign will be considered at least seven days in advance to advise members of the public of proposed flight operations. Operations in public areas where public address systems are available require a Precision Air Surveys Limited crew member to announce planned flight operations at least one hour before commencement.

All relevant Precision Air Surveys Limited crew members will be advised of a planned flight operation at least twenty-four hours in advance.

Some ATC's will require an NSF approval via https://aup.nats.aero/

Applications for NSFs should be made with a minimum of 14 days notice. Applications submitted less than 7 days in advance of the flight may not be processed.

Site Permissions

The designated remote pilot will obtain permission from all relevant landowners or land occupiers where flight operations are to be conducted. Where possible, permission will be sought in writing. Where it is available in writing a copy of the permission will be carried on site. No flight operations will commence without permission, either written or verbal, from the relevant landowners or occupiers for the main take-off and landing site.

Weather

In the week leading up to any flight operation the designated remote pilot will obtain long, medium and shortrange weather forecasts. Twenty-four hours before the proposed flight operations the remote pilot will determine whether the planned flight operations will go ahead.

Weather and other forecasts, such as solar activity, will be obtained using readily available resources, which may include: -

- UAV Forecast
- BBC Weather

On Site Procedures

Before setting up on-site in accordance with the On-Site Arrival Checklist, see Appendix F, the remote pilot or a designated crew member will carry out the following measurements:

- GPS/GLONASS satellite coverage, a minimum of seven satellites over a good spread will be required for all operations, using an App on a Smartphone, and
- Windspeed at surface level, using a handheld anemometer.

If the remote pilot feels confident that the proposed flight operations can be safely carried out, then the operation can progress, and the remote pilot can complete the On-Site Arrival Checklist.

The remote pilot will then carry out the On-Site Survey, see form in Appendix E, to familiarise him or herself with the local geography of the site. This will be completed by physically walking around the site to identify



any hazards and any identified will be marked on the On-Site Survey Form. Where an Observer is present, the Observer will accompany the remote pilot.

The remote pilot must be satisfied that all risks identified are acceptable and will sign off the On-Site Survey before proceeding to the next stage.

Assembly and Functional Checks

The SUA will be assembled and checked in accordance with the relevant SUA Assembly Checklist,

see Appendix F.

The remote pilot will check the day prior to the flight operation that all necessary software and firmware updates have been completed on the SUA to be flown and if necessary, a test flight has been conducted.

Pre-Flight Checks

The SUA will be prepared for flight by the remote pilot following the Pre-Flight Checklist, see Appendix F.

Flight Procedures

When the remote pilot is satisfied the SUA is ready for launch, he or she will follow the Take Off Checklist, see Appendix F.

During flight, the remote pilot will conduct situational awareness updates with the Observer if present. Situational awareness updates will include:

- SUA position and responsiveness
- SUA battery status
- Horizon scans and airspace assessments including checking the blind spot.
- Landing site incursions
- Alternate landing site incursions
- Air incursions (air users / birds)
- Potential adverse weather changes
- Ground incursions, dangers to the Remote Pilot

Prior to landing, the Remote Pilot will go through the Landing Checklist. see Appendix F.

Post Flight and Between Flight Checks

The SUA will be shut down, made safe and checked in accordance with the Post Flight Checklist,

see Appendix F.

Emergency Procedures

The Emergency Procedures for Precision Air Surveys Limited's SUA are set out in Appendix G.



APPENDICES

Appendix A – Insurance Certificate

Upon receipt of the permission for commercial operation issued to Precision Air Surveys Limited by the CAA, public liability insurance that complies with EC 785/2004 will be in place and a copy of the insurance included in this document before any commercial operations commence.

Sections 3.1, Appendix A are to be updated with the relevant insurance details and documentation at that time.



Coverdrone Policy Schedule

Page 1 of 2



SUMMARY OF INSURANCE COVER

The information in this document is a summary only. For full details of applicable policy cover please refer to the Policy Schedule and Policy Wording.

PART 1	Policy No.	CDA22075588GBP			
	Insurer	Starr International (Europe) Limited (SIEL)			
	Name of Insured	Precision Air Surveys Limited			
	Business of the Insured	Owners and Operators of Unmanned Aerial Systems (UAS)			
	Address	181 Nevill Avenue, Hove, E	ast Sussex, BN3 7NG, Uni	ted Kingdom	
		From	13:48:41 on 11/03/2021		
	Period of Insurance	to	28/07/2021		
		Both days inclusive			
PART 2	Particulars of UAS	rs of UAS			
	(1) Make	(2) Type	(3) Year of Manufacture	(4) Registration Marks	
	IID	Phantom 4 RTK	2020	0V2DGC5RA30482	
	IID	Mavic 2 Pro	2021	163CHBJR0A61FV	
	Non Owned Electronic Equipment	Sum Insured	Not Insured		
PART 3	Standard Uses: Commercial	Special Uses:	None		
PART 4	Operators	Any person approved by the Insured, with a Permission for Aerial work or equivalent approved by the Aviation regulatory body, working in connection with the Insured's business.			
PART 5	Geographical Limits	 Worldwide Excluding: Algeria, Burundi, Cabinda, Central African Republic, Congo, Democratic Republic of Congo, Eritrea, Ethiopia, Ivory Coast, Liberia, Mauritania, Nigeria, Somalia, The Republic of Sudan, South Sudan Colombia, Ecuador, Peru Afghanistan, Jammu & Kashmir, Myanmar, North Korea, Pakistan Georgia, Nagorno-Karabakh, North Caucasian Federal District Iran, Iraq, Libya, Syria, Yemen Any country where the operation of the insured Aircraft is in breach of United Nations sanctions 			



Coverdrone Policy Schedule

Page 2 of 2

PART 6	Limits and Deductibles	(Appropriate boxes to be completed – others to be marked as 'not applicable')	
	(A) Policy Section & Risk	(B) Amounts to be deducted	(C) Limit of Indemnity from which must be deducted the amount in column (B)
	SECTION TWO Liability to Third Parties (Relating to All UAS operated by the Insured)	Bodily Injury Nil Damage to Property You will pay the first GBP 100.00 in respect of damage to property each Occurrence Professional Indemnity The amount of GBP 1,000.00 shall be deducted from each and every claim	Bodily Injury and Damage to Property Combined GBP 5,000,000 each Occurrence and in the aggregate in respect of the Products Liability (Limited to GBP 1,000,000.00 whilst Training) Inclusive of Aviation Liabilities sub-limit GBP 5,000,000 (Limited to GBP 1,000,000.00 whilst Training) (never less than 750,000 SDR's) Civil use of MOD Airfields GBP 7,500,000 Any one Occurrence Professional Indemnity shall not exceed GBP 50,000 in the policy period
	Important	 All sales are provided on a non-advised by policy to be suitable for your requirement 	asis and in purchasing a policy you deem the

Appendix B – SUA Technical Specification

PHANTOM 4 RTK - Details taken from 4 RTK-UM

Appendix

Specifications

Aircraft	
Weight (Battery & Propellers Included)	1391 g
Diagonal Size (Excluding Propellers)	350 mm
Max Ascent Speed	6 m/s (automatic flight); 5 m/s (manual control)
Max Descent Speed	3 m/s
Max Speed	31 mph (50 kph) (P-mode); 36 mph (58 kph) (A-mode)
Max Tilt Angle	25° (P- mode); 35° (A-mode)
Max Angular Speed	150°/s (A-mode)
Max Service Ceiling Above Sea Level	19685 ft (6000 m)
Max Wind Speed Resistance	10 m/s
Max Flight Time	Approx. 30 minutes
Operating Temperature	32° to 104° F (0° to 40° C)
Operating Frequency	2.400 GHz to 2.483 GHz (Europe, Japan, Korea) 5.725 GHz to 5.850 GHz (United States, China)
EIRP	2.4 GHz CE (Europe) / MIC (Japan) / KCC (Korea): < 20 dBm 5.8 GHz FCC (United States) / SBRC (Mainland China) / NCC (Taiwan, China): < 26 dBm
Hover Accuracy Range	RTK enabled and functioning properly: Vertical: ±0.1 m; Horizontal: ±0.1 m RTK disabled: Vertical: ±0.1 m (with vision positioning); ±0.5 m (with GNSS positioning) Horizontal: ±0.3 m (with vision positioning); ±1.5 m (with GNSS positioning)
Image Position Offset	The position of the camera center is relative to the phase center of the onboard D-RTK antenna under the aircraft body's axis: (36, 0, and 192 mm) already applied to the image coordinates in Exif data. The positive x, y, and z axes of the aircraft body point to the forward, rightward, and downward of the aircraft, respectively.
GNSS	
Single-Frequency High-Sensitivity GNSS	GPS + BeiDou + Galileo* (Asia); GPS + GLONASS + Galileo* (other regions)

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Multi-Frequency Multi-	Frequency Used GPS: L1/L2; GLONASS: L1/L2; BeiDou: B1/B2; Galileo*: E1/E5 First-Fixed Time: < 50 s
System High-Precision RTK GNSS	Positioning Accuracy: Vertical 1.5 cm + 1 ppm (RMS); Horizontal 1 cm + 1 ppm (RMS).
	1 ppm indicates error with a 1 mm increase over 1 km of movement. Velocity Accuracy: 0.03 m/s
Mapping Functions	
Mapping Accuracy**	Mapping accuracy meets the requirements of the ASPRS Accuracy Standards for Digital Orthophotos Class III.
Ground Sample Distance (GSD)	(H/36.5) cm/pixel, H indicates the aircraft altitude relative to the shooting scene (unit: m)
Acquisition Efficiency	Max operating area of approx. 1 km ² for a single flight (at an altitude of 182 m, i.e., GSD is approx. 5 cm/pixel, meeting the requirements of the ASPRS Accuracy Standards for Digital Orthophotos Class III).
Gimbal	
Stabilization	3-axis (pitch, roll, yaw)
Controllable Range	Pitch: -90° to +30°
Max Controllable Angular Speed	Pitch: 90°/s
Angular Vibration Range	±0.02°
Vision System	
Velocity Range	\leq 31 mph (50 kph) at 6.6 ft (2 m) above ground with adequate lighting
Altitude Range	0 - 33 ft (0 - 10 m)
Operating Range	0 - 33 ft (0 - 10 m)
Obstacle Sensory Range	2 - 98 ft (0.7 - 30 m)
FOV	Forward/Rear: 60° (horizontal), ±27° (vertical) Downward: 70° (front and rear), 50° (left and right)
Measuring Frequency	Forward/Rear: 10 Hz; Downward: 20 Hz
Operating Environment	Surfaces with clear patterns and adequate lighting (> 15 lux)
Infrared Sensing Syster	n
Obstacle Sensory Range	0.6 - 23 ft (0.2 - 7 m)
FOV	70°(Horizontal), ±10°(Vertical)
Measuring Frequency	10 Hz
Operating Environment	Surface with diffuse reflection material, and reflectivity > 8% (such as wall, trees, humans, etc.)
Camera	
Sensor	1" OMOS; Effective pixels: 20M

Lens	FOV (Field of View) 84°, 8.8 mm (35 mm format equivalent: 24 mm), f/2.8 - f/11, auto focus at 1 m - ∞					
ISO Range	Video: 100 - 3200 (Auto), 100 - 6400 (Manual) Photo: 100 - 3200 (Auto), 100 - 12800 (Manual)					
Mechanical Shutter	8 - 1/2000 s					
Electronic Shutter	8 - 1/8000 s					
Max Image Size	4864×3648 (4:3); 5472×3648 (3:2)					
Still Photography Modes	Single shot					
Video Recording Modes	H.264, 4K: 3840×2160 30p					
Max. Bitrate Of Video	100 Mbps					
Photo	JPEG					
Video	MOV					
Supported File Systems	FAT32 (≤ 32 GB); exFAT (> 32 GB)					
Operating Temperature	32° to 104° F (0° to 40° C)					
Remote Controller						
Operating Frequency	2.400 GHz to 2.483 GHz (Europe, Japan, Korea) 5.725 GHz to 5.850 GHz (United States, China)					
EIRP	2.4 GHz CE / MIC / KCC: < 20 dBm					
	9.8 GHZ SRRC / NCC / FCC: < 26 dBm					
Max Transmission Distance	FCC / NCC: 4.3 mi (7 km); CE / MIC / KCC / SRRC: 3.1 mi (5 km) (Unobstructed, free of interference)					
Power Consumption	16 W (typical value)					
Display Device	5.5 inch screen, 1920x1080, 1000 cd/m², Android system, 4G RAM + 18G ROM					
Operating Temperature	32° to 104° F (0° to 40° C)					
Intelligent Flight Batte	ry (PH4-5870mAh-15.2V)					
Capacity	5870 mAh					
Voltage	15.2 V					
Battery Type	LiPo 4S					
Energy	89.2 Wh					
Net Weight	468 g					
Operating Temperature	14° to 104° F (-10° to 40° C)					
Max Charging Power	160 W					
Intelligent Flight Batte	ry Charging Hub (P4CH)					
Voltage	17.5 V					
Operating Temperature	41° to 104° F (5° to 40° C)					

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Remote Controller Inte	Remote Controller Intelligent Battery (WB37-4920mAh-7.6V)						
Capacity	4920 mAh						
Voltage	7.6 V						
Battery Type	LiPo 2S						
Energy	37.39 Wh						
Operating Temperature	-4° to 104° F (-20° to 40° C)						
Intelligent Battery Cha	arging Hub (WCH2)						
Input Voltage	17.3 to 28.2 V						
Output Voltage and Current	8.7 V, 6 A; 5 V, 2 A						
Operating Temperature	41° to 104° F (5° to 40° C)						
AC Power Adapter (PH4C160)							
Voltage	17.4 V						
Rated Power	160 W						

Phantom 4 RTK User Manual

Aircraft Overview









- 1. Onboard D-RTK Antenna
- 2. Propellers
- 3. Motors
- 4. Front LEDs
- 5. Forward Vision System
- 6. Gimbal and Camera
- 7. Intelligent Flight Battery
- 8. Aircraft Status Indicator
- 9. Rear Vision System
- 10. Infrared Sensing System
- 11. Camera / Linking Status Indicator and Link Button
- 12. Micro USB Port
- 13. Camera microSD Card Slot
- 14. Downward Vision System

Vision System and Infrared Sensing System

The main components of the Vision System are located on the front, rear and bottom of the aircraft, including [1] [2] [4] three stereo vision sensors and [3] two ultrasonic sensors. The Vision System uses ultrasound and image data to help the aircraft maintain its current position, enabling precision hovering indoors or in environments where a GNSS signal is not available. The Vision System constantly scans for obstacles, allowing the aircraft to avoid them by going over, around, or hovering.

The Infrared Sensing System consists [5] of two 3D infrared modules on both sides of the aircraft. These scan for obstacles on both sides of the aircraft and is active in certain flight modes.



Detection Range

The detection range of the Vision System and Infrared Sensing System are depicted as follow. Note that the aircraft cannot sense and avoid the obstacles that are not within the detection range.



In P-mode, both the forward and the rear Vision Systems work if the speed is within 13mph (22kph). At higher speeds, only the vision system facing the direction of travel is active. MAVIC 2 PRO - Details taken from Mavic 2 Pro-UM

Appendix

Specifications	
Aircraft	
Takeoff Weight	907 g (Mavic 2 Pro); 905 g (Mavic 2 Zoom)
Dimensions	Folded: 214×91×84 mm (length×width×height) Unfolded: 322×242×84 mm (length×width×height)
Diagonal Distance	354 mm
Max Ascent Speed	5 m/s (S-mode), 4 m/s (P-mode)
Max Descent Speed	3 m/s (S-mode), 3 m/s (P-mode)
Max Speed	72 km/h (S-mode) (near sea level, no wind)
Max Service Ceiling Above Sea Level	6000 m
Max Flight Time	31 minutes (at a consistent 25 kph, no wind)
Max Hovering Time	29 minutes (no wind)
Overall Flight Time	25 minutes (In normal flight, 15% remaining battery level)
Max Flight Distance	18 km (at a consistent 50 kph, no wind)
Max Wind Speed Resistance	29-38 kph
Max Tilt Angle	35° (S-mode, with remote controller), 25° (P-mode)
Max Angular Velocity	200°/s
Operating Temperature Range	-10°C - 40°C
GNSS	GPS+GLONASS
Hovering Accuracy Range	Vertical: ±0.1 m (when vision positioning is active) ±0.5 m (with GPS positioning) Horizontal: ±0.3 m (when vision positioning is active) ±1.5 m (with GPS positioning)
Operating Frequency	2.400 - 2.4835 GHz; 5.725 - 5.850 GHz
Transmission Power (EIRP)	2.4 GHz FCC: ≤26 dBm; CE: ≤20 dBm; SRRC: ≤20 dBm; MIC: ≤20 dBm 5.8 GHz FCC: ≤26 dBm; CE: ≤14 dBm; SRRC: ≤26 dBm
Internal Storage	8 GB
Gimbal	
Mechanical Range	Tilt: -135 to 45°, Pan: -100 to 100°, Roll: -45 to 45°
Controllable Range	Tilt: -90 to 30°, Pan: -75 to 75°
Stabilization	3-axis (tilt, roll, pan)
Max Control Speed (tilt)	120°/s
Angular Vibration Range	±0.01° (Mavic 2 Pro) ; ±0.005° (Mavic 2 Zoom)

Color Mode	Ding-M (10-bit) support HDB video	
COIDI MODE	(HLG 10-bit)	D-Cinelike
Max Video Bitrate	100 Mbps	100 Mbps
Supported File System	FAT32: ≤ 32 GB	FAT32: ≤ 32 GB
	exFAT: > 32 GB	exFAT: > 32 GB
Photo Format	JPEG / DNG (RAW)	JPEG / DNG (RAW)
Video Format	MP4 / MOV (MPEG-4 AVC/H.264, HEVC/H.265)	MP4 / MOV (MPEG-4 AVC/H.264, HEVC/H.265)
Supported SD Cards	Micro SD Supports a microSD with capacity of up to 128 GB. A UHS-I Speed Grade 3 rating microSD card is required.	Micro SD Supports a microSD with capacity of up to 128 GB. A UHS-I Speed Grade 3 rating microSD card is required
Operating Temperature Range	-10°C to 40°C	-10°C to 40°C
HDR	Enhanced HDR, 14 EV	HDR, 13 EV
Hyperlight	8 dB SNR	8 dB SNR
Panorama	Pano (3×1): 4000×6000 (40°×80°)	Pano (3×1)): 4000×6000 (41°×93°)
	W (3×3)): 8000×6000 (113°×80°)	W (3×3)): 8000×6000 (117°×93°)
	180° (3×7)): 8192×2840 (240°×76°)	180° (3×7)): 8192×2840 (249°×87°)
	Sphere (3×8+1)): 8192×4096 (360°×126°, 360°×180°)	Sphere): (3×8+1) 8192×4096 (360°×126°, 360°×180°)
		Super Resolution): 8000×6000 (24 mm equivalent FOV)
Remote Controller		
Operating Frequency	2.400 - 2.4835 GHz; 5.725 - 5.850 GI	Hz
Max Transmission Distance	FOC: 10 km; CE: 6 km; SRRC: 6 km;	MIC: 6 km
	(unobstructed, free of interference)	
Operating Temperature Range	0°C - 40°C	
Battery	3950 mAh	
Transmission Power (EIRP)	2.400 - 2.4835 GHz FCC: ≤26 dBm; CE: ≤20 dBm; SRRC:	≤20 dBm; MIC: ≤20 dBm
	5.725 - 5.850 GHz FCC: ≤26 dBm; CE: ≤14 dBm; SRRC	≤26 dBm
Operating Current/Voltage	1800 mA @ 3.83 V	
Supported Mobile Device	110 (11 12 12 12 12 12 12 12 12 12 12 12 12	12 22
Size	Max length: 160 mm; max thickness: (5.5 – 8.5 mm
Supported USB Port Types	Lightning, Micro USB (Type-B), USB-0	5
Charger		
Input	100-240 V, 50/60 Hz, 1.8 A	
Output	Main: 17.6 V = 3.41 A or 17.0 V = 3.5 USB: 5 V = 2 A	3 A
Voltage	17.6±0.1 V or 17.0 V+0.1 V	
	60 W	

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Sensing System						
Sensing System	Omnidirectional Obstacle Sensing					
FOV	Forward: Horizontal: 40°, Vertical: 70° Backward:Horizontal: 60°, Vertical: 77° Downward: Front and Back: 100°, Left and Right: 83° Lateral: Horizontal: 80°, Vertical: 65°					
Obstacle Sensing Range	Forward: Precision Measurement Ran Detectable Range: 20 - 40 m Effective Sensing Speed: < 14 m/s	ge: 0.5 - 20 m				
	Backward: Precision Measurement Ra Detectable Range: 16 - 32 m Effective Sensing Speed: ≤ 12 m/s	inge: 0.5 - 16 m				
	Upward: Precision Measurement Rang	ge: 0.1 - 8 m				
	Downward: Precision Measurement R Detectable Range: 11 - 22 m	ange: 0.5 - 11 m				
	Sides: Precision Measurement Range: 0.5 - 10 m Effective Sensing Speed: ≤ 8 m/s					
Operating Environment	Surface with clear pattern and adequate lighting (lux >15) Detects diffuse reflective surfaces (>20%) (walls, trees, people, etc.)					
Velocity Range	≤31mph (50 kph) at 6.6 ft (2 m) above ground					
Altitude Range	0.1 - 11 m					
Operating Range	0.3 - 50 m					
Camera	Mavic 2 Pro	Mavic 2 Zoom				
Sensor	1" CMOS	1/2.3* CMOS				
	Effective Pixels: 20 million	Effective Pixels: 12 million				
Lens.	FOV: approx. 77° 35 mm Format Equivalent: 28 mm Aperture: f/2.8–f/11 Shooting Range: 1 m to ∞	FOV: approx. 83° (24 mm) approx. 48° (48 mm) 35 mm Format Equivalent: 24-48 mm Aperture: f/2.8 (24 mm)-f/3.8 (48 mm) Shooting Range: 0.5 m to ∞				
ISO Range	Video: 100-6400 Photo: 100-3200 (auto) 100-12800 (manual)	Video: 100-3200 Photo: 100-1600 (auto) 100-3200 (manual)				
Shutter Speed	Electronic Shutter: 8-1/8000 s	Electronic Shutter: 8-1/8000 s				
Still Image Size	5472×3648	4000×3000				
Still Photography Modes	Single shot Burst shooting: 3/5 frames Auto Exposure Bracketing (AEB): 3/5 bracketed frames at 0.7 EV Bias Interval (JPEG: 2/3/5/7/10/15/20/30/60s RAW: 5/7/10/15/20/30/60s)	Single shot Burst shooting: 3/5/7 frames Auto Exposure Bracketing (AEB): 3/5 bracketed frames at 0.7 EV Bias Interval (JPEG: 2/3/5/7/10/15/20/30/60s RAW: 5/7/10/15/20/30/60s)				
Video Resolution	4K: 3840x2160 24/25/30p 2.7K: 2688x1512 24/25/30/48/50/60p FHD: 1920x1080 24/25/30/48/50/60/120p	4K: 3840x2160 24/25/30p 2.7K: 2688×1512 24/25/30/48/50/60p FHD: 1920×1080 24/25/30/48/50/60/120p				

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Intelligent Flight Battery	
Capacity	3850 mAh
Voltage	15.4 V
Max Charging Voltage	17.6 V
Battery Type	LIPo 4S
Energy	59.29 Wh
Net Weight	297 g
Charging Temperature Range	5°C - 40°C
Max Charging Power	80 W
APP	
Video Transmission System	OcuSync 2.0
Name	DJI GO 4
Live View Quality	Remote Controller: 720p@30fps / 1080p@30fps DJI Goggles: 720p@30fps / 1080p@30fps DJI Goggles RE: 720p@30fps / 1080p@30fps
Latency (depending on environmental conditions and mobile device)	120 - 130 ms
Required Operating System	iOS 10.0.2 or later Android 4.4 or later

Aircraft Diagram 2. Propellers 3. Motors 4. Front LEDs 5. Antennas 6. Gimbal and Camera 9. Battery Buckles 10. Lateral Vision System 11. USB-C Port





1. Forward Vision System

- 7. Backward Vision System
- 8. Aircraft Status Indicator
- 12. Link Button/Linking Status Indicator
- 13. Battery Level LEDs
- 14. Power Button
- 15. Intelligent Flight Battery
- 16. Upward Infrared Sensing System
- 17. Downward Vision System
- 18. microSD Card Slot
- 19. Downward Infrared Sensing System
- 20. Auxiliary Bottom Light

Appendix C – Logbooks

	Precision Air Surveys Limited										
I	Combined Pilot & Aircraft Hours Logbook										
Flight Ref _{↓1}	Date (dd/mm/y)'رُ	Take-Off Time (hh:mn -	Landing Time (hh:mn -	Flight Duration (hh:mm -	Aircraft ID	Aircraft System Name ╺	Remote Pilot	Observer Name	Location	Purpose of Flight	Comments and Minor Incidents
< →	Pilot Aircraft	Log Mai	ntenance Lo	ig Battery L	.og Incide	nt Log 🧃	Ð		: []		Þ

Precision Air Surveys Limited						
MAIN	ITENANCE	LOGBOOK			AIRCRAFT	
DATE	REASON FOR MAINTENANCE	WORK COMPLETED	COMPLETED BY	PARTS REPLACED	TEST FLIGHT SIGNATURE	NOTES

Precision Air Surveys Limited BATTERY CHARGE LOGBOOK BATTERY

Battery ID	DATE OF CHARGE	PRE-FLIGHT BATTERY CHARGE %	BATTERY RESIDUAL CHARGE %	DATE OF USE	NOTES

Precision Air Surveys Limited Incident Logbook							
DATE	TIME	INJURIES / DAMAGE	INCIDENT DETAILS	ACTION TAKEN / INCIDENT REPORT	NOTES		

Appendix D - Permission for Commercial Operations

Operations Manual

CIVIL AVIATION AUTHORITY

Air Navigation Order 2016



PERMISSION – Small Unmanned Aircraft / Small Unmanned Surveillance Aircraft.

- 1. The Civil Aviation Authority, in exercise of its powers under articles 94(5) and 95(2)(a) of the Air Navigation Order 2016 ('the Order'), as amended, hereby permits **Precision Air Surveys Limited** (the SUA operator), to operate small unmanned aircraft (see Note 1) of the class(es) listed in paragraph 2 below, for the purposes of commercial operations and for operations over or within 150 metres of any congested area.
- 2. This permission is applicable to the following class(es) of small unmanned aircraft:
 - (a) Multirotor / Helicopter.
- 3. This Permission is granted subject to the following conditions, namely, that the small unmanned aircraft shall not be flown:
 - (a) Other than by persons employed by or contracted to Precision Air Surveys Limited whilst being holder(s) of an appropriate recommendation issued by a UK National Qualified Entity for remote pilot competency, or an alternative existing aviation qualification determined to be acceptable to the CAA (CAP722 refers);
 - (b) Unless there is insurance cover for the small unmanned aircraft that meets the requirements of EC Regulation No. 785/2004;
 - (c) Unless the small unmanned aircraft is maintained within the direct, unaided Visual Line of Sight(VLOS) of the remote pilot, out to a maximum horizontal range of 500 metres unless a lesser control link radio range has been specified by the manufacturer;
 - (d) At a height exceeding 400 feet above the surface, unless permitted to do so under article 94A(3) of the Order;
 - (e) Within the flight restriction zone (see Note 2) of a protected aerodrome, unless in receipt of the appropriate permission as required within article 94A of the Order.
 - (f) Over or within 150 metres of an organised open-air assembly of more than 1,000 persons;
 - (g) Within 50 metres of any person, vessel, vehicle or structure that is not under the control of the SUA operator or the remote pilot, except that during take-off and landing this distance may be reduced to 30 metres;
 - (h) Unless it is equipped with a mechanism that will cause the small unmanned aircraft to land in the event of disruption to or a failure of any of its control systems, including the radio link, and the remote pilot has ensured that such mechanism is in working order before the aircraft commences its flight;
 - (i) Unless the remote pilot is reasonably satisfied that any load carried by the small unmanned aircraft is properly secured, that the aircraft is in a safe condition for the specific flight, and that the flight can safely be made taking into account the wind and other significant weather conditions; and
 - (j) Unless the flights are conducted in accordance with the current operations manual of the SUA operator, to include a site safety assessment, as well as records of each flight undertaken. The SUA operator must maintain records of each flight made pursuant to this permission, and must make such records available to the Civil Aviation Authority on request.
- 4. Flights at night shall only be conducted in accordance with the approved Ops Manual procedures. Prior to flying operations, a daylight reconnaissance and site safety assessment including aircraft flight-paths within the surrounding area, shall be undertaken to identify, address and record any hazards, restrictions and obstacles. The launch site shall be provided with adequate illumination and the aircraft shall be equipped with adequate conspicuity lighting. Flights shall only commence when the weather conditions are suitable for continuous VLOS operations.

Precision Air Surveys Limited

- Any occurrences that take place while the said aircraft is being operated under this Permission shall be reported in accordance with Regulation (EU) No 376/2014 (the Occurrence Reporting Regulation).
- 6. This permission shall have effect from **24/07/2020 until and including 24/07/2021** unless previously varied, suspended or revoked.



for the Civil Aviation Authority Date: 24/07/2020 Ref: 20200724Precision Air Surveys LimitedPAndEUAS11825 Certificate Number: 1 SSC Technical Services 0330 022 1908 / uavenquiries@caa.co.uk

Distribution: Precision Air Surveys Limited (01273 205991 / 07968532279, sj@precisionairsurveys.com);

Note 1: 'Small unmanned aircraft' means any unmanned aircraft, other than a balloon or a kite, having a mass of not more than 20 kg without its fuel but including any articles or equipment installed in or attached to the aircraft at the commencement of its flight.

Note 2: The "flight restriction zone" of a protected aerodrome can be determined by reference to the table contained within ANO 2016 article 94A, paragraph 7.

Note 3: SUA operators and remote pilots should be aware that the collection of images of identifiable individuals, even inadvertently, when using surveillance cameras mounted on a small unmanned surveillance aircraft, may be subject to the General Data Protection Regulation and the Data Protection Act 2018. Further information about these regulations and the circumstances in which they apply can be obtained from the Information Commissioner's Office and website: https://ico.org.uk/for-the-public/drones/

Note 4: SUA operators and remote pilots must be aware of their responsibilities regarding operations from private land and any requirements to obtain the appropriate permission before operating from a particular site. In particular, they must ensure that they observe the relevant trespass laws and do not unwittingly commit a trespass whilst conducting a flight.

Appendix E – Flight Planning and Risk Assessment Forms

Precision Air Surveys Limited							
/	/						
Appendix E: Pre	e-Site & Site Survey Form						
2.1	Client						
Name:							
Company:							
Job Reference:							
Intended date:							
Weather on date:							
2.2	Pre-Site Visit						
Long Lat: & height AMSL							
Client specific PPE							
Vehicle access:							
Airspace:	Describe permissions(<u>A.B</u> ,C,D,E,F,G) NOTAMS						
Terrain:	Flat, Hilly, Urban, Water, Roads.						
Proximities:	Other aircraft, Airports, Helipads.						
Hazards:	Transmitters, Power Pylons etc.						

Nuclear power, Prisons, Military.

Nature reserves, Recreation areas.

Local habitation.

Farms, Wildlife etc.

Local Police: Local ATC: Local Hospital:

Land owner, Local authority.

Public footpaths, Bridleways.

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Restrictions:

Sensitivities:

People:

Livestock:

Permissions:

Footpaths:

Emergency Info:



2.4	Site Survey					
Confirm info at 2.2						
Obstructions:	Masts, Wires, Buildings, Train lines, Trees, Lakes, Rivers etc.					
People:	Cordon requirement, Crowd Control.					
Livestock:	Farm animals, Dogs, Wildlife.					
Proximity:	Public, Road Users.					
Take-Off:	Primary:	Secondary:				
Landing:	Primary:	Secondary:				
Comms:	Radio's requires by ops team.					
Other:						
	Complete and Attach risk assessment based on Pre-Site Visit & Site Survey.					

PRECISION AIR SURVEYS LIMITED - RISK ASSESSMENT

Risk Assessment	Location:	
Completed by:		
completed by.		
Date Completed:	Job Reference:	

1. Hazard		Ņ	3. Existing Co	ontrol	rol Risk			7. Further Control Me	easures	Ris	sk		
(Something with the potential to cause ha how will it be realised what is the potential injury?)	arm, d and	At Risk	Measures			4. Severity	5. Probability	6. Risk			4. Severity	5. Probability	10. Risk
Risk Assessment (By Pilot other than p	t Sign	Off comple	ting)	Name:						Date:			
AT RISK (Column 2)	SEVE	RITY (C	column 4 and 8)	PR	OBABILITY (Co	lumn	5 and 1	9)	RISK RATING (Column 6, 8 a	and 10			
							Severity x Probability – 1 to	5	L	ow			
E – Employees		No injury	/, Property damage	Jamage 1 Extremely U			_	_	May be acceptable, review to s	ee it risk can be furth	er rédu		
V - Visitors	3 6	Renortal	2 Remotely Po			Occur	r	_	Only proceed with specialist p	ersonnel / safety team	N		
P - Public	P - Public 4 Major Injury / Single Fatality 4 Will Probably (/ Occu	ır		Severity x Probability – 12 1	o 25	H	IGH			
A - All	5 1	Multiple	Fatalities	5	Almost Certa	in			Task should not proceed		_		

Appendix F – Flight Reference Cards and Checklists

F.1 Equipment Loading List

EQUIPMENT LOAD	ING CHECKLIS	ST
ПЕМ	ACTION / CHECK	ПСК
Job File (Paperwork)	Check Condition	
Checklists, Manuals & Logbooks	Check Condition & Current	
Notepad & Pens	Check Condition	
Mobile Phone & Emergency No's	Check Condition & Functionality	
Mobile Phone Battery	Charge & Check Condition	
Drone/Airframe	Check Condition & Airworthiness	
Flight Controller / Transmitter(s)	Check Functionality	
USB Cable & Leads	Check Condition & Functionality	
Flight Battery Packs	Charge & Check Condition	
Spare Props. (Tractor & Pusher)	Check Condition & Quantity	
Camera Memory Cards	Check Condition & Space	
Anemometer	Check Condition & Functionality	
Signs, Safety Tape, Cones	Check Condition & Quantity	
First Aid Kit & Fire Extinguisher	Check Condition & Contents	
Fluorescent Jacket(s) / Hard Hats	Check Condition & Quantity	
Take off and Landing Mat	Check Condition	

F.2 On Site Set Up Checklist

SITE SET UP CHECKLIST

ITEM	ACTION / CHECK	TICK
HARD HAT / FLOURESCENT JACKETS	WORN AND ISSUED AS REQUIRED	
WINDSPEED CHECK	CHECK WINDSPEED IS WITHIN LIMITS AND NOTE	
SITE SURVEY	CARRY OUT SITE SURVEY - WEATHER, DISTANCES, HAZARDS, 2nd LZ etc	
RISK ASSESSMENT	UPDATE RISK ASSESSMENT AS NECCESARY	
CORDON, SIGNS AND SAFETY TAPE	SETUP AS REQUIRED	
FIRST AID KIT (if available)	POSITION TO BE EASILY ACCESSIBLE & INFORM CREW OF LOCATION	
FIRE EXTINGUISHER (if available)	POSITION TO BE EASILY ACCESSIBLE & INFORM CREW OF LOCATION	
FLIGHT PLAN / BRIEF	CONFIRM FLIGHT PLAN & BRIEF CREW AND OBSERVER ON ROLE (AIR AND GROUND INCURSION/ PILOT INCAPACITATION)	
CREW / HELPERS	POSITION AS REQUIRED TO MAINTAIN SAFE FLYING ZONE	

F.3 SUA Assembly and Functional Checklist

ASSEMBLY AND FUNCTIONAL CHECKLIST

ITEM	ACTION / CHECK	TICK
DRONE/AIRFRAME	CHECK FOR DAMAGE, WEAR, TIGHTNESS OF FITTINGS, CONDITION AND SECURE FITTING OF PROPELLERS AND SECURE ATTACHMENT OF CAMERA	
FLIGHT BATTERY	CHECK CONDITION, CHARGE LEVEL AND FIT INTO AIRFRAME - DO NOT SWITCH ON	
DRONE/AIRFRAME	ENSURE AIRCRAFT IS LEVEL ON LANDING MAT	
FLIGHT CONTROLLER/TRANSMITTER	SWITCH ON, CHECK BATTERY POWER IS AT LEAST 80%, ENSURE TRIMS ARE NUETRAL AND ALL SWITCHES ARE IN THERE CORRECT POSITIONS	
USB CONNECTION	INSERT USB AND SECURE	
GROUND STATION	SWITCH ON AND LOAD SOFTWARE	
FLIGHT BATTERY	CALL "CLEAR PROPS" AND TURN ON AIRCRAFT	
SELF DIAGNOSTIC	WAIT FOR DIAGNOSTIC TO FINISH	
TELEMETRY/VISUAL LINK	ENSURE VISUAL FEED AND TELEMETRY BEING RECEIVED AND DISPLAYED	
CALIBRATION (if required)	CALIBRATE AS PER INSTRUCTIONS	
CAMERA GIMBAL	TEST FOR CONTROL AND OPERATION AND POSITION FOR TAKE OFF (Lens parallel with ground level)	
SATELLITE CAPTURE	MONITOR SATELLITE CAPTURE ON SCREEN UNTIL SATELLITES ARE CAPTURED (MIN 10)	
GPS POSITION FIX/RTK	CONFIRM GPS POSITION FIX AND RTK CORRECTIONS BEING RECEIVED IF AVAILABLE	
RTH POSITION FIXED AND HEIGHT	CONFIRM ON MAP AND BY AUDIO CONFIRMATION - RTH HEIGHT SUITABLE FOR ENVIRONMENT	
CHECK APP AND AIRCRAFT STATUS	CHECK IN APP THAT AIRCRAFT FIT TO FLY AND READY FOR FLIGHT (STATUS, MODE, BATTERY CELL LEVELS, INTERFEREN	CE)

CAMERA CHECK AND SETTINGS (if required CHECK CAMERA FUNCTION AND SETTINGS AS REQUIRED

F.4 Pre-Flight

Checklist

PRE FLIGHT CHECKLIST

ITEM	ACTION / CHECK	TICK
WEATHER AND WIND SPEED CHECK	CHECK WEATHER AND WIND SPEED STILL ACCEPTABLE - RECORD AS NECCESARY	
LOGS	UPDATE PILOT AND BATTERY LOGS AS REQUIRED (TAKE OFF TIME AND BATTERY VOLTAGE)	
CREW, PUBLIC & CLIENT	ENSURE ALL CREW, PUBLIC AND CLIENT ARE IN CORRECT SAFE POSITIONS	
CLEARENCE	DOES THIS FLIGHT OPERATION HAVE CLERANCE FROM AIR TRAFFIC CONTROL AND ATC CONTACTED IF REQUIRED?	
FOREIGN OBJECT DEBRIS	TAFE OFF AND LANDING AREA CLEAR OF FOREIGN OBJECT DEBRIS	
POWER UP	CALL "TAKING OFF" AND START MOTORS (Left transmitter stick to bottom right corner)	
TAKE OFF	TAKE ONE FINAL LOOK AROUND, CHECK WITH OBSERVER THAT THEY AGREE IT IS SAFE TO FLY, POWER UP AND TAKE OFF, CLIMB TO APPROXIMATELY 2 METERS	
CONTROL TEST	TEST YAW AND CYCLIC CONTROLS (Use small gentle movements and ensure aircraft reacts correctly)	
FUNCTION TEST	ENGAGE POSITION AND ALTITUDE HOLD TO TEST FUNCTION (Aircraft should hold position and altitude)	
FLIGHT BATTERY CHECK	CHECK BATTERY STATUS AND SATELLITES BEING TRACKED	
OPERATION	CONFIRM WITH THE OBSERVER THAT THE PLANNED FLIGHT OPERATION IS STILL GOOD TO GO AHEAD	

F.5 Pre-Landing Checklist

LANDING CHECKLIST

ITEM	ACTION / CHECK	ΤΙϹΚ
LANDING AREA	NO MEMBERS OF CREW WITHIN 5 M OF THE LANDING AREA	
FOREIGN OBJECT DEBRIS	LANDING AREA CLEAR OF FOREIGN OBJECT DEBRIS	
PUBLIC	PUBLIC AT LEAST 30 M FROM LANDING POINT	
CAMERA	ENSURE CAMERA IS POINTING FORWARDS AND LEVEL	
LANDING GEAR	LOWER LANDING GEAR IF RAISED	
ORIENTATION	ORIENTATE AIRCRAFT POINTING AWAY FROM LANDING POSITION	
REVERSE	REVERSE AIRCRAFT INTO LANDING POSITION	
CALL	CALL 'CLEAR'	
DESCENT	DESCEND SLOWLY INTO LANDING POSITION	
DISARM	DISARM MOTORS	

F.7 Post Flight Checklist

POST FLIGHT CHECKLIST

ITEM	ACTION / CHECK	ΤΙϹΚ
DATA RECORDING	RECORD PILOT, AIRCRAFT AND BATTERY DETAILS IN THE RELEVANT LOGBOOKS	
POWER DOWN	WALK TO AIRCRAFT, DISCONNECT FLIGHT BATTERY PACK AND CALL "Aircraft Safe"	
REMOVAL	REMOVE THE AIRCRAFT FROM THE LANDING AREA	
AIRFRAME	CHECK FOR DAMAGE, WEAR, TIGHTNESS OF FITTINGS, CONDITION AND SECURE FITMENT OF PROPELLERS AND SECURE ATTATCHMENT OF CAMERA	
FLIGHT BATTERY	REMOVE FLIGHT BATTERY FROM AIRCRAFT	
TRANSMITTER	SWITCH OFF CONTROL TRANSMITTER	
MEMORY CARD	REMOVE MEMORY CARD FROM CAMERA AND BACKUP TO GROUND STATION PC	
REVIEW	REVIEW IMAGES AND EVALUATE WITH CREW AND CLIENT IF REQUIRED	

Appendix G – SUA Emergency Procedures

G.1 Pilot Incapacitation

Symptom/Issue	Warning	Pilot Action	Crew Action	Remarks
Pilot incapacitation		Activate RTH (Return to Home)	Pick up controller.	Administer first aid to pilot.
			Confirm launch area clear and call "EMERGENCY RETURN TO HOME" to warn crew and people	When Return to Home is initiated: If below 20m the SUA will climb to 20m (if already above 20m the SUA will stay at the same height)
			nearby. Initiate Return to Home procedure, OR land the SUA <u>if trained</u> <u>to do so</u> . Monitor video display (if still functioning) & continue to monitor	The SUA will return directly to the launch position, hover for 5 seconds then gradually descend until it lands, and the motors will automatically disarm. Complete CAP 382 MOR ECCAIRS.
			Administer First Aid to pilot as appropriate Call Emergency Services if required	

G.2 Airspace Incursion

Symptom/Issue	Warning	Pilot Action	Crew Action	Remarks
Airspace Incursion	Visible or audible signs of another air user in the location.	Call "EMERGENCY AIR INCURSION" The remote pilot will	Crew to prioritise the identification of the location of the other air user.	Record any relevant information relating to the airspace incursion for UK AirProx Board.
		collision and apply appropriate action to avoid or eliminate the risk. This will generally be to Climb or descend as appropriate.	Crew to keep pilot aware of what they can see. Ensure landing location is clear.	Complete AirProx Form CA1904
		Alert crew to issue. When location of other air user has		
		directly away, land if safe to do so.		

G.3 Ground Incursion

Symptom/Issue	Warning	Pilot Action	Crew Action	Remarks
Ground Incursion	Visible signs of persons, animals or vehicles within 30m of the landing zone	The remote pilot will assess the risk of a collision and if necessary take avoiding action to eliminate or reduce the risk.	Alert the remote pilot by calling "EMERGENCY GROUND INCURSION" Inform the remote pilot of the location and direction of incursion and continue to verbalize the ground incursion movement. If safe to do so direct the ground incursion to a safe place and inform the remote pilot.	Complete CAP 382 MOR ECCAIRS.

G.4 Loss of Control Data Link

Symptom/Issue	Warning	Pilot Action	Crew Action	Remarks
Loss of Control	SUA	Alert crew to issue by	Ensure landing location	SUA will enter a 'failsafe'
Data Link	unresponsive.	calling "EMERGENCY	is clear.	mode in this situation after
		DATA LINK LOST"		3 seconds.
	Poor signal		Monitor video display	
	strength.	Attempt to regain	(if still functioning).	When failsafe is initiated: If
		control of the SUA by		below 20m the SUA will
	SUA shows fast	changing flight mode	Provide pilot with	climb to 20m (if already
	flashing Yellow	from its current	appropriate updates on	above 20m the SUA will stay
	lights	mode to an alternate	status.	at the same height)
		and back.		
				The SUA will return directly
				to the launch position, hover
				for 5 seconds then gradually
				descend until it lands, and
				the motors will
				automatically disarm.
				If SUA re-acquires link at any
				time the pilot can change
				the flight mode to regain
				control of the SUA by cycling
				the flight mode switch.
				Dilet much level the CLIA
				Pliot must land the SUAas
				soon as it is safe to do so to
				investigate the issues.
				Complete CAP 383 MOP
				ECCAIDS
				ECCAIRS.

G.5 Rogue SUA – FLY-AWAY

Symptom/Issue	Warning	Pilot Action	Crew Action	Remarks
SUA flying without response from Remote Pilot and uncontrollable	SUA unresponsive.	Alert crew to issue by calling "EMERGENCY FLY-AWAY"	Identify a landmark on the horizon to assist with identifying direction of flight, from	Dependent on outcome possibly inform the relevant agencies and personnel.
uncontrollable		Attempt to regain control of the SUA by changing flight mode switch. Attempt to initiate Return to Home using switch. Turn off Pilot Controller to attempt to force a failsafe. If this does not work turn controller back on again and try to regain control. If control regained, bring SUA home and land. If control not regained, prepare for crash landing. <i>Call "CLEAR"</i> Proceed to crash site if possible Inform local ATC if required	 with identifying direction of flight, from launch area or mark location. Monitor video display (if still functioning). Provide pilot with appropriate updates on status. Take a bearing of the direction of flight. Inform local ATC if required Inform emergency services if required 	Complete CAP 382 MOR ECCAIRS.
		Inform emergency services if required		

G.6 Loss of Power (SUA)

Warning	Pilot Action	Crew Action	Remarks
Un-commanded	Alert crew to	Identify a landmark on	Carry out post-crash
descent	impending crash.	the horizon to assist	management procedure.
	Call "EMERGENCY –	with location of SUA.	
	POWER LOSS"		Complete CAP 382 MOR
		Monitor video display	ECCAIRS.
	Attempt to regain	(if still functioning).	
	control by changing		
	flight mode switch.	Provide pilot with	
		appropriate updates on	
	If control regained,	status.	
	bring SUA home and		
	land.	Proceed to crash site if	
	If a subust uset	possible	
	If control not		
	regained, prepare for	Inform local ATC If	
	crash lanung.	required	
	Call "CLEAR"	Inform emergency	
	Cull CLLAN	services if required	
	Proceed to crash site	services in required	
	if nossible		
	11 20331010		
	Inform local ATC if		
	required		
	Inform emergency		
	services if required		
	Warning Un-commanded descent	WarningPilot ActionUn-commanded descentAlert crew to impending crash. Call "EMERGENCY – POWER LOSS"Attempt to regain control by changing flight mode switch.If control regained, 	WarningPilot ActionCrew ActionUn-commanded descentAlert crew to impending crash. Call "EMERGENCY – POWER LOSS"Identify a landmark on the horizon to assist with location of SUA.Attempt to regain control by changing flight mode switch.Monitor video display (if still functioning).If control regained, bring SUA home and land.Provide pilot with appropriate updates on status.If control not regained, prepare for crash landing.Inform local ATC if requiredCall "CLEAR"Inform local ATC if requiredInform local ATC if requiredInform mergency services if required

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G.7	Loss of Power	(Ground	Control	Equipment)
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Symptom/Issue	Warning	Pilot Action	Crew Action	Remarks
Loss of power (ground control equipment)	Tablet screen extinguished.	Alert crew to the loss of control. By calling "EMERGENCY	Monitor video display (if still functioning).	If SUA experiences control data loss for more than 3 seconds it will enter a failsafe mode.
	Green connection light and / or white power lights on RC extinguish.	CONTROL SYSTEM FAILURE" Ensure landing site is cleared.	Provide pilot with appropriate updates on status.	When failsafe is initiated: If below 20m the SUA will climb to 20m (if already above 20m the SUA will stay at the same
	SUA shows fast flashing Yellow lights.	Watch the behavior of the aircraft to ensure failsafe is operating correctly. If not initiate Rogue SUA procedure.		height) The SUA will return directly to the launch position, hover for 5 seconds then gradually descend until it lands, and the motors will automatically disarm.
				If SUA re-acquires link at any time the pilot can change the flight mode to regain control of the SUA.
				Pilot must land the SUA as soon as it is safe to do so to investigate the issues.
				Complete CAP 382 MOR ECCAIRS.

G.8 Unexpected Behaviour in Flight

Symptom/Issue	Warning	Pilot Action	Crew Action	Remarks
Unexpected		Alert crew to the loss	Monitor video display	Thorough system checks must be
behavior in flight		of control by calling	(if still functioning).	undertaken prior to commencing
		"EMERGENCY		any further operations
		RETURN TO HOME	Provide pilot with	
			appropriate updates	
		Ensure landing site is	on status.	
		cleared.		
		Pilot must land the		
		SUA as soon as it is		
		safe to do so to		
		investigate the		
		issues.		

G.9 Lithium Polymer Battery Fault

Symptom/Issue	Warning	Pilot Action	Crew Action	Remarks
Swelling of battery		Alert crew to the	Crew to keep location	LiPo batteries are highly
or overheating		fault.	of fire clear.	dangerous and can explode
From impact		Call "EMERGENCY		Keep distance until safe to
damage following		BATTERY FAULT"		approach
aircraft crash,				
dropping of battery		If SUA is in flight and		First on scene of SUA:
or charging		still under control		approach battery with extreme
malfunction		land immediately in a		caution, wearing PPE (goggles,
		safe area away from		fire resistant gloves), LiPo bag and
		public.		with fire extinguisher to hand.
			Inform emergency	
		Inform emergency	services as required.	Dispose of battery in accordance
		services as required.		to safety guidelines OR safely
			Cordon off area 30m	discharge battery.
		Cordon off area 30m	radius from	
		radius from	battery/RPA.	Complete CAP 382 MOR ECCAIRS.
		battery/SUA.		
			If necessary and safe	
		If necessary and safe	to do so use	
		to do so use	extinguisher.	
		extinguisher.		

G.10 SUA Fire

Symptom/Issue	Warning	Pilot Action	Crew Action	Remarks
Smoke / fire		Alert crew to the	Crew to keep location	LiPo batteries are highly
		fire.	of fire / crash site clear.	dangerous and can explode
		<i>Call "</i> EMERGENCY FIRE"		Keep distance until safe to approach
		If SUA is in flight and still under control land immediately in a safe area away from public.		First on scene of SUA: approach battery with extreme caution, wearing PPE (goggles, fire resistant gloves), LiPo bag and with fire extinguisher to hand.
		•	Inform emergency	
		Inform emergency services as required.	services as required.	Dispose of battery in accordance to safety guidelines.
			Cordon off area 30m	Complete CAP 382 MOR
		Cordon off area	radius from	ECCAIRS.
		30m radius from	battery/RPA/crash site.	
		battery/RPA/crash		
		site.		
			If safe to do so use	
		If safe to do so use extinguisher.	extinguisher.	