WIL RICHARDSON TRADING AS RICHARDSON MEDIA

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Volume 1 – Operations Manual

INSPIRE 2
MAVIC PRO PLATINUM

Version 2.1 14/05/19

Amendment Record

Change Number	Change Date	Incorporated by	Date Incorporated
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	V1.1	WIL RICHARDSON	09/08/18
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Safety Statement and Commitment by Accountable Manager

WIL RICHARDSON TRADING AS RICHARDSON MEDIA is committed to providing safe SUA / SUSA during all operations. Safety is our priority and takes precedence over any other consideration, our mission is to operate at the highest standards and comply with all regulations and obligations laid down by the CAA and this operations manual. Under no circumstances shall any pilot operate company UAS outside of the procedures contained within this manual or the Permission for Commercial Operations as awarded by the CAA. No commercial drone operation will be undertaken without valid insurance. Our commitment to safety is proven by using the following:

- Qualified personnel
- Ongoing specific training as required
- Ongoing currency requirements
- Maintenance
- Risk management

Signed: 

Name: WIL RICHARDSON Date: 03/04/19
Accountable Manager

Acronyms & Abbreviations

General

It should be noted that the terminology related to Drone operations continues to evolve and therefore this Glossary is not exhaustive. The terms listed below are a combination of the emerging ICAO definitions, other 'common use' terms which are considered acceptable alternatives and a number of 'legacy' terms. Whilst these legacy terms will continue to be recognised, in the interests of commonality the use of the following terminology is advised.

The abbreviation ANO refers to the Air Navigation Order. CAP 393 Air Navigation: The Order and the Regulations includes the ANO and the Rules of the Air Regulations.

Note:

The terms 'Pilot in Command' and 'Remote Pilot' are being increasingly used worldwide (including ICAO) to describe the person who directly controls an unmanned aircraft. That trend is reflected in this document. It should be noted however, that within the United Kingdom there are many legal requirements in the Air Navigation Order applicable to 'pilots'. These references, however, apply only to pilots in the traditional sense i.e. persons on board and flying the aircraft. There are at present no legal requirements setting out the qualifications needed to control an unmanned aircraft; this work is still to be completed.

Common abbreviations

AAIB	Air Accidents Investigation Branch
AIAA	Area of Intense Air Activity
AIP	Aeronautical Information Publication
ALARP	As Low As Reasonably Practicable
AMSL	Above Mean Sea Level
ANO	Air Navigation Order
ASD	Air Safety Directive
ASL	Above Surface Level
ASMS	Air Safety Management System
ATA	Aerial Tactics Area
ATC	Air Traffic Control
ATCU	Air Traffic Control Unit
ATM	Air Traffic Management
ATS	Air Traffic Service
ATSU	Air Traffic Service Unit

ATZ	Aerodrome Traffic Zone
BMFA	British Model Flying Association
BVLOS	Beyond Visual Line of Sight
EVLOS	Extended Visual Line of Sight
FISO	Flight Information Service Officer
FMC	Flight Management Computer
FRC	Flight Reference Card(s)
FRTOL	Flight Radio Telephony Operators' License
GCS	Ground Control Station
GPS	Global Positioning System
GUI	Graphical User Interface
HALE	High Altitude Long Endurance
HF	Human Factors
HIRTA	High Intensity Radio Transmission Area
HMI	Human-Machine Interface
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
MALE	Medium Altitude Long Endurance
MATZ	Military Aerodrome Traffic Area
MEMS	Micro-Electro Mechanical Systems
MOR	Mandatory Occurrence Reporting
MTOM	Maximum Take-off Mass
NAA	National Aviation Authority
NOTAM	Notice to Airman
NPPL	National Private Pilot's License
NQE	National Qualified Entity
OEM	Original Equipment Manufacturer
PCM	Post-Crash Management
RA(T)	Restricted Area (Temporary)
Drone	Remotely Piloted Aircraft
RP	Remote Pilot

RPAS	Remotely Piloted Aircraft System
RPAS Cdr	Remotely Piloted Air System Commander
RPS	Remote Pilot Station
RTF	Radiotelephony
RTS	Release to Service
SRG	Safety Regulation Group
SUA	Small Unmanned Aircraft
SUSA	Small Unmanned Surveillance Aircraft
TDA	Temporary Danger Area
UA	Unmanned Aircraft
UAS	Unmanned Aircraft System(s)
UAS-c	UAS Commander
VFR	Visual Flight Rules
VLOS	Visual Line of Sight

Referenced Documents

Document Title/ Version / Date	**Link**
CAP 393 The Air Navigation Order (ANO) 2016 and Regulations. Fifth Edition V5.6. Amended 13 Mar 2019	http://publicapps.caa.co.uk/modalapplication.aspx?catid=1&pagetype=65&appid=11&mode=detail&id=7523
SI 2018 No. 623 The Air Navigation (Amendment) Order 2018 30 May 2018	http://www.legislation.gov.uk/uksi/2018/623/made
SI 2019 No. 261 The Air Navigation (Amendment) Order 2019 13 March 2019	http://www.legislation.gov.uk/uksi/2019/261/made
CAP 1763 Air Navigation (Amendment) Order 2018 and 2019 - Guidance for Small Unmanned Aircraft users (20 Feb 2019)	http://publicapps.caa.co.uk/modalapplication.aspx?appid=11&mode=detail&id=9002
CAP 722 Unmanned Aircraft System Operations in UK Airspace – Guidance (6th Edition 24/03/2015)	https://publicapps.caa.co.uk/modalapplication.aspx?appid=11&mode=detail&id=415

Glossary of Terms

Aircraft (ICAO)	Any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the Earth's surface.
Command and Control Link (C2) (ICAO)	The data link between the remotely-piloted aircraft and the remote pilot station for the purposes of managing the flight.
Detect and Avoid (ICAO)	The capability to see, sense or detect conflicting traffic or other hazards and take the appropriate action.
Ground Control Station (GCS)	See 'Remote Pilot Station'. Note: RPS is the preferred term as it enables the consistent use of one term with the same meaning irrespective of its location (e.g. on a ship or in another aircraft).
Handover	The act of passing piloting control from one remote pilot station to another.
Lost Link (ICAO)	The loss of command and control link contact with the remotely piloted aircraft such that the remote pilot can no longer manage the aircraft's flight.
Operator (ICAO)	A person, organisation or enterprise engaged in or offering to engage in an aircraft operation. Note: In the context of remotely-piloted aircraft, an aircraft operation includes the remotely-piloted aircraft system.
Pilot in Command	The person in direct control of the UA - See also 'Remote Pilot'.
Radio Line-Of-Sight (RLOS)	A direct electronic point to-point contact between a transmitter and a receiver.
Remote Pilot	The "remote pilot", in relation to a small unmanned aircraft, is an individual who (i) operates the flight controls of the small unmanned aircraft by manual use of remote controls, or (ii) when the small unmanned aircraft is flying automatically, monitors its course and is able to intervene and change its course by operating its flight controls
Remote Pilot Station (RPS) (ICAO)	The component of the remotely-piloted aircraft system containing the equipment used to pilot the remotely-piloted aircraft.
Remotely Piloted Air System	An unmanned air system includes a number of elements such as the ground-based control unit, ground launch system and the Remotely Piloted Air Vehicle (RPAV) and all associated flight safety-critical elements.
Remotely-Piloted Aircraft (Drone) (ICAO)	An unmanned aircraft which is piloted from a remote pilot station.
Remotely-Piloted Aircraft System (RPAS) (ICAO)	Any aircraft and its associated elements, other than a balloon, kite or small aircraft which is intended to be operated with no pilot on board.

Drone Observer (ICAO)	A trained and competent person designated by the operator who, by visual observation of the remotely-piloted aircraft, assists the remote pilot in the safe conduct of the flight.
Small Unmanned Surveillance Aircraft (SUSA)	A small unmanned aircraft which is equipped to undertake any form of surveillance or data acquisition.
Small Unmanned Aircraft Operator	In relation to a small unmanned aircraft, is the person who has the management of the small unmanned aircraft.
UAS-p	See 'Pilot in Command'.
UAV Pilot/UAV-p	See 'Pilot in Command'.
Unmanned Aircraft (UA)	An aircraft which is intended to operate with no human pilot on board, as part of an Unmanned Aircraft System. Moreover, a UA: - is capable of sustained flight by aerodynamic means - is remotely piloted or capable of autonomous operation - is reusable; and - is not classified as a guided weapon or similar one-shot device designed for the delivery of munitions Note: Drone is considered a subset of UA.
Unmanned Aircraft System	An Unmanned Aircraft System (UAS) comprises individual 'System Elements' consisting of the Unmanned Aircraft (UA) and any other System Elements necessary to enable flight, such as a Remote Pilot Station, Communication Link and Launch and Recovery Element. There may be multiple UAs, RPS or Launch and Recovery Elements within a UAS.
Unmanned Aerial Vehicle	See 'Unmanned Aircraft System'.
Visual Line-Of-Sight (VLOS) Operation (ICAO)	An operation in which the remote pilot or Drone observer maintains direct unaided visual contact with the remotely-piloted aircraft.

Table of Contents

1 Introduction

WIL RICHARDSON TRADING AS RICHARDSON MEDIA operates Class 1 (20Kg or less) UAVs for the purposes of aerial photography, aerial surveys, various forms of inspection and videography. WIL RICHARDSON TRADING AS RICHARDSON MEDIA will, at all times, adhere to the relevant rules and regulations in place. All remote pilots will be qualified and certified by the CAA (and any other relevant bodies). They will abide by the applicable permissions as required to allow legal and safe operation.

The purpose of this manual is to:

- Provide the necessary operating limitations, procedures, performance & systems information the operator needs to safely and efficiently operate the SUA / SUSA during all anticipated commercial operations.

- Serve as a comprehensive reference for use during transition training onto a Organisation's Name SUA/SUSA.

- Serve as a review guide for use in recurrent training and proficiency checks.

- Provide necessary operational data from the UK CAA to ensure legal requirements are satisfied. Establish standardised procedures and practices to enhance
- WIL RICHARDSON TRADING AS RICHARDSON MEDIEstablish operational philosophy & policy.

This manual is periodically revised to incorporate pertinent procedural and systems information.

Any questions about the content or use of this manual can be directed to:

Name: WIL RICHARDSON
Address: PENCARNAN FARM, ST DAVIDS, PEMBROKESHIRE, WEST WALES, SA626PY
Telephone 07884261303
Email: wil_1234567890@me.com

1.1 Model Identification

The SUA/SUSA listed in the table below are covered in this Operations Manual. SUSA may be added to the Operations Manual as the scope / variety of works undertaken develops / increases.

SUSA Name / Number is supplied by the operator (ourselves). Registry Number is supplied by the national regulatory agency. Serial number is the airframe serial number supplied by the manufacturer.

UAS Type/Model	Registry Number	Serial Number (Airframe)
INSPIRE 2	N/A under 20kg	0A0LF1D007001B
MAVIC PRO	N/A UNDER 20kg	SN 08QCF1GP021HXG

2 Safety Policy

2.1 Overview

It is WIL RICHARDSON TRADING AS RICHARDSON MEDIA policy to take all appropriate measures to ensure the protection of property, employees and the public whilst on company property, travelling to site and during the undertaking of SUA / SUSA activities.

In following this policy, the company will comply with this Operations Manual and all existing legislative requirements.

It is company policy to sustain continuing programs designed to promote the Health and Safety of all employees and to co-operate with organisations and associations devoted to safety research and education.

Safety shall be regarded by everyone as a prime consideration in the successful performance of their duties. The Accountable Manager is specifically responsible for the development and implementation of safe practices and procedures.

Employees have the responsibility to perform their duties in a manner which will not jeopardise the safety of the public, property and customers or adversely affect their own health, safety or physical well-being or that of their fellow-workers or contractors.

Reasonable precautions are also expected from each employee to protect the property and equipment of the company that is under their care. The company firmly believes that health and safety in the workplace can only be achieved through total commitment on the part of everyone.

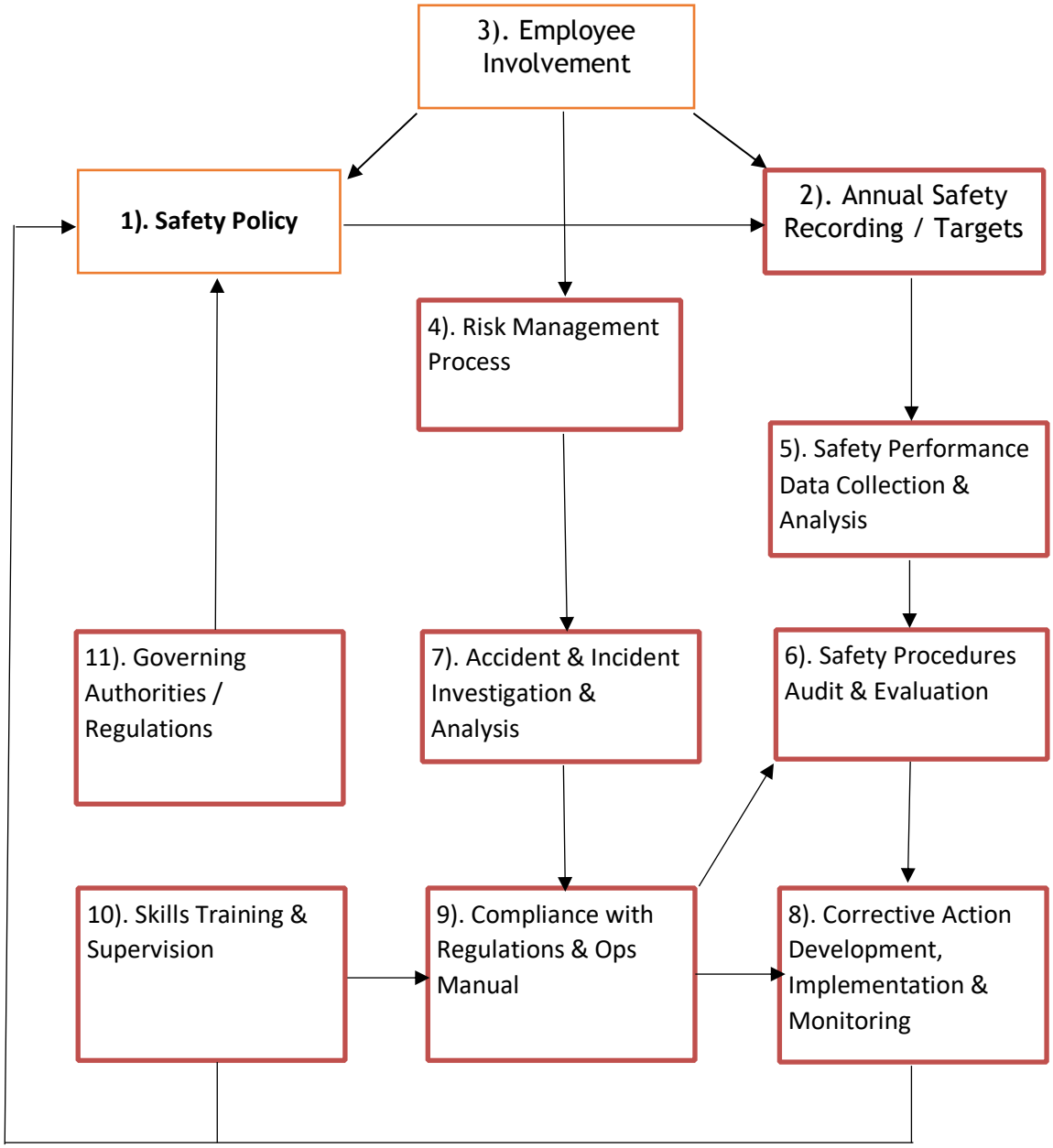
This applied philosophy of sharing safety responsibilities will further the foregoing objectives and contribute to a safer work environment.

2.2 Safety Management System

WIL RICHARDSON TRADING AS RICHARDSON MEDIA recognises that our Safety Management System (SMS) is top down driven, which means that the Accountable Manager of the organisation is responsible for the implementation and continuing compliance of the SMS.

Without the wholehearted support of the Accountable Manager an SMS will not be effective.

WIL RICHARDSON TRADINBG AS RICHARDSON MEDIA Safety Management Structure



2.3 Safety Policy

The WIL RICHARDSON TRADING AS RICHARDSON MEDIA mission is to provide a safe service using the latest state-of-the-art Small Unmanned Surveillance Aircraft equipment for aerial survey and videography.

Safety risks are kept to a minimum by the provision of certified training, operator support and establishing RP currency requirements whilst utilizing state-of-the art software.

Being a performance leader means we will achieve operational excellence and industry-leading customer satisfaction.

The Unmanned Aircraft Control Systems we use are the result of intense research, development and testing effort allied with exact engineering standards.

An accumulated sufficient flight testing period ensures high confidence in the SUASs flight capabilities. In addition, the SUA/SUSA will only be operated by trained and experienced RPs during all intended operations.

2.4 Annual Safety Recording / Targets

In addition to a safety policy WIL RICHARDSON TRADING AS RICHARDSON MEDIA have established annual safety performance targets and identifies initiatives to achieve those targets.

The ultimate goal, is to eliminate all incidents and or accidents.

Our annual targets are associated with planned safety initiatives designed to ensure that WIL RICHARDSON TRADINF AS RICHARDSON MEDIA Name can meet its safety performance targets.

See below for WIL RICHARDSON TRADING AS RICHARDSON MEDIA safety performance targets table.

Safety Performance Recording / Targets Table

Description of Target	Target	Actual 2019	Actual 2020
Minor Personal Injury – Staff	0	0	0
Minor Personal Injury – Public	0	0	0
Severe Personal Injury – Staff	0	0	0
Severe Personal Injury – Public	0	0	0
Repairable damage to drone	0	0	0
Un-repairable damage to drone	0	0	0
Repairable damage to property	0	0	0
Un-repairable damage to property	0	0	0
SOP non-compliance	0	0	0
PPE non compliance	0	0	0
Battery explosion / miss-handling	0	0	0
SUSA fly away resulting in crash	0	0	0

WIL RICHARDSON TRADING AS RICHARDSON MEDIA annual safety performance targets are:

- Measurable, meaningful and realistically achievable;
- They promote a continual safety improvement;
- Tailored to the needs of our organisation

Our target-setting process is:

- linked to our risk management process;

From the above table, WIL RICHARDSON TRADING AS RICHARDSON MEDIA can easily identify the safety initiatives / further training to be undertaken in addition to standard training to achieve the set targets.

- An annual review to revise or confirm the safety performance targets, is undertaken to ensure the correct variables are being measured.

2.5 Employee Involvement

Safety shall be regarded by everyone as a prime consideration in the successful performance of their duties. Staff participation in ongoing safety workshops and training will be the norm.

2.6 Risk Management Process

WIL RICHARDSON TRADING AS RICHARDSON MEDIA completes thorough risk assessments before undertaking any drone operation.

The risk assessment is split into two sections.

1. Standard risk (not site specific)
Standard risks encompass risks that could happen at any site, for example equipment failure etc.

2. Site specific risks
Site Specific risks are picked up whilst re-searching each individual location including dynamic risks. For example an area around a certain building may present no major risks apart from a particular day i.e. a football stadium.

By looking at each operational situation, we can build a picture of the potential hazards associated with each operation and identify what might cause harm to people, and property and make decisions to prevent that harm from occurring.

WIL RICHARDSON TRADING AS RICHARDSON MEDIA cannot remove all risks, but can protect people by putting in place measures to, as far as reasonably practicable, control the identified risks.

Our risk assessments only include what WIL RICHARDSON TRADING AS RICHARDSON MEDIA could reasonably be expected to know – **we cannot anticipate unforeseeable risks.**

2.7 Safety Performance Data Collection & Analysis

The Accountable Manager collects all data from the *Safety Performance Recording / Targets* table on an annual basis and analyses the findings. The findings are used to influence the requirement for additional ad-hoc refresher training.

2.8 Safety Procedures Audit & Evaluation

The WIL RICHARDSON TRADING AS RICHARDSON MEDIA Safety Procedures will be audited on an annual basis by the Accountable Manager. The findings will be communicated to all staff by the Accountable Manager and change will be implemented where required.

2.9 Accident / Incident Investigation & Analysis

All accidents / incidents are reported to the Accountable Manager, who will update the accident *Safety Performance Recording / Targets* table and decide if any mandatory reporting is required.

Following the investigation, the findings are fed back into the company and may influence the requirement for additional refresher training.

2.10 Corrective Action Development, Implementation & Monitoring

Thorough analysis of incidents and accidents allows WIL RICHARDSON TRADING AS RICHARDSON MEDIA to discover weak points of the delivery chain from the initial project brief to on site operations.

Corrective action to procedures is only achieved through understanding the steps leading to an incident / accident. Implementation of corrective action is carried out by further training or policy decision.

Monitoring of the effectiveness of corrective action is undertaken by the Accountable Manager.

2.11 Compliance with Regulations & Ops Manual

Compliance to WIL RICHARDSON TRADING AS RICHARDSON MEDIA company & statutory limitations is achieved by:

- 'Line check' type testing out in the field by the Accountable Manager or Chief Pilot. Observing RPs during operations is an efficient method of measuring compliance.

- Members of staff are encouraged to monitor the actions of their colleagues and report any breaches of policy to the Accountable Manager.

2.12 Skills Training & Supervision

Working as a RP is a skill that requires constant practice. Minimum currency levels are set out in this Operations Manual.

2.13 Governing Authorities / Regulations

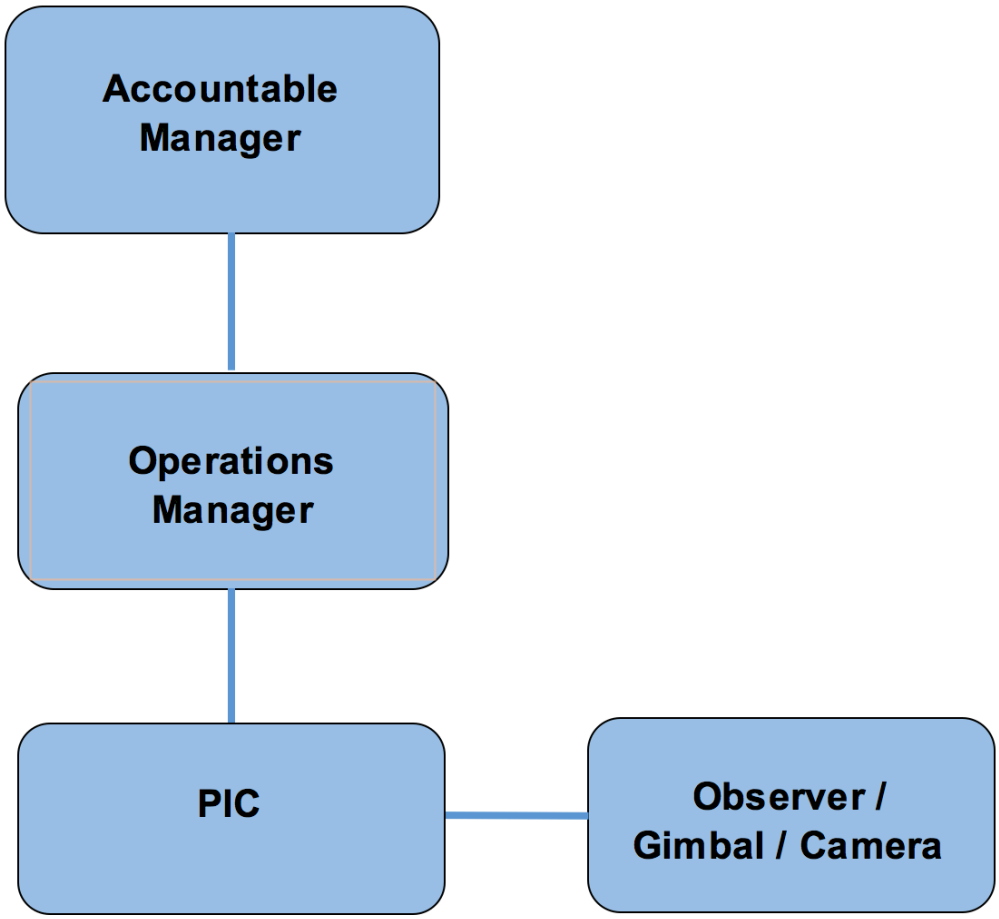
Governing Authorities revise legislation from time to time. This can include establishing of further operational limitations, medical limitations, crew rest requirements etc.

The Accountable Manager is responsible for ensuring WIL RICHARDSON TRADING AS RICHARDSON MEDIA operates within the confines of the law and all staff are made aware of changes to legislation in the following ways:

- Revision of OM
- 'Staff to read file' notices
- Ad hoc training as required

3 Organisation & Operations

3.1 Structure of Organisation & Contact Details



3.1.1 Nominated Personnel

Appointment	Name	Contact No	Email address
Accountable Manager	WIL RICHARDSON	07884261303	wil_1234567890@me.com
Operations Manager	WIL RICHARDSON	07884261303	wil_1234567890@me.com
Remote Pilot	WIL RICHARDSON	07884261303	wil_1234567890@me.com
Observer/Spotter	As required		

3.2 Roles & Responsibilities

3.2.1 Accountable Manager

- Adheres to the CAA documents & (PfCO), Operations Manual and Manufactures technical specifications.
- Ensures all staff are made aware of CAA documents, Operations Manual and Manufactures technical specifications and amendments.
- Revises / updates the Operations Manual as required and submits same to the CAA.
- Monitors staff adherence to Legislation, CAA documents, Company Policies, Operations Manual and Manufactures technical specifications.
- Monitors SUA/SUSA incident / MOR and devise ongoing training using incident data to improve safety.
- Organises ongoing Human Factors & currency training as required by the Operations Manual.
- Keeps up to date with changes to Legislation (CAP) and filter relevant information to staff through memos or training.
- Appoints and fully briefs additional staff if required.
- Ensures personal protection policy (such as hard hats, life jackets) is adhered to.

3.2.2 Remote Pilot

- Adheres to Legislation, CAA CAPs, Company Policies and the Operations Manual.
- Monitors crew medical status, their fitness to fly and personal logbooks.
- Completes a Pre-Deployment Survey form to assess the client requirements.
- Completes a Pre-site Risk Assessment.
- Checks that the flight area is clear of any danger areas.
- On arrival at the site complete an On-Site Survey Form and updates the Risk Assessment.
- Carries out a local weather check and review with most recent local forecast.
- Operate the drone IAW the recommendations in the Ops manual and manufacturers technical specifications.
- Briefs the crew appointed for the day with regard to the intended flight plan and their duties.
- Maintains Flight Safety Awareness during the flight.
- Notes time of flight and records in logbook.

3.2.3 Gimbal Operator / Observer (if required and suitably briefed)

- Operates the Gimbal safely to the RP instructions or per client brief.
- The Drone Pilot will brief the Observer on actions to be taken by the Observer in the event of any emergency or the Pilot becoming incapacitated.
- Before any flight, the Observer will assist the Pilot in choosing the take-off area and ensuring any third parties and animals are kept clear of the area.
- The Observer will keep watch on the Drone during the entire flight and advise the pilot of any loss of sight or risk of collision with aircraft, trees, buildings or obstructions.
- Maintains situational awareness with regard to other air users and ground incursions.
- Ensures good communication with the Pilot.

3.3 Type of Operation

When cleared by the CAA, WIL RICHARDSON TRADING AS RICHARDSON MEDIA will operate SUA/SUSA during daylight and night hours within VLOS rules following the separation rules set out in CAP 393 Article 94 & 95 and any notice which amends this be it more or less restrictive.

3.4 Supervision of SUA Operations

The Accountable Manager is responsible for the supervision of all SUA/SUSA operations within WIL RICHARDSON TRADING AS RICHARDSON MEDIA.

3.5 Accident Prevention, Risk Management & Flight Safety Program

Accountability for accidents and incidents lies with the Accountable Manager. WIL RICHARDSON TRADING AS RICHARDSON MEDIA has established a pro-active and robust Safety Management Scheme (SMS), see Chapter 2.0, to achieve and maintain risk awareness by all persons involved in SUA/SUAS operations. WIL RICHARDSON TRADING AS RICHARDSON MEDIA conducts assessments of ongoing process and develops mitigation to prevent potential accidents or incidents from occurring.

It is outdated and not part of WIL RICHARDSON TRADING AS RICHARDSON MEDIA culture, to purely react to events as they occur. Finding the cause and establishing steps to stop them happening again is the way WIL RICHARDSON TRADING AS RICHARDSON MEDIA wishes to operate.

Reporting

The CAP382 is the compliance document with reporting carried out using the ECCAIRS European Reporting Portal. http://www.aviationreporting.eu

3.6 Qualification Requirements

It is the belief of WIL RICHARDSON TRADING AS RICHARDSON MEDIA that personnel engaged in aviation activities which include RPAS, must be suitably qualified, trained and experienced to be able to undertake their tasks safely.

WIL RICHARDSON TRADING AS RICHARDSON MEDIA has developed minimum criteria in terms of remote pilot competency and currency which must be met before individuals may undertake work for the company.

The table below outlines the minimum levels of competency and currency.

Job Title	Minimum Qualification Requirement	Minimum Currency Requirements	
Remote Pilot	Certificate of recommendation / competence issued by a UK NQE	Monthly	45 Minutes flight time Remote pilot's logbook audit
		Quarterly	2 flying hours
		6 Monthly	Line Check by Chief Pilot or suitable agency

Pilots involved in commercial operations, are required to maintain operational currency standards by ensuring that they operate an aircraft for at least forty-five minutes flight time every calendar month. This may be completed with training flights or, in extreme circumstances (such as during periods of adverse weather conditions), a flight simulator may be permitted. In the event that weather conditions or other circumstances prevents an RP from maintaining minimum levels of currency, in order to re-commence

operations, the RP must first complete the monthly minimum currency requirement as training and not during operational flying.

3.7 Crew Health

It is the responsibility of the individual to determine if they are in a physically and mentally fit condition to operate as part of a Flight Crew. Crewmembers shall not perform SUA / SUSA duties if they are in any doubt of their ability to accomplish their assigned duties, or if they know or suspect that they is suffering from fatigue, or feel unfit to the extent that the flight / assignment may be endangered. Crewmembers must report unfitness to the accountable person when assigned for duty and should immediately advise the Pilot-In-Command or Observer if an aircraft is in flight, if they feel unable to continue with their assigned responsibilities.

3.7.1 Eyesight

Crew members must be capable of clearly reading a vehicle registration number plate from twenty metres distance using the same optical correction system (if worn) that will be used during the flight.

3.7.2 Alcohol and other intoxicating liquor

Crewmembers shall not consume alcohol of any nature within 10 hours of scheduled reporting time or whilst on active duty.

3.7.3 Narcotics, Drugs, Sleeping tablets, Pharmaceutical preparations

Crewmembers shall not take any prescription or non-prescription medication or drug, or undergo any other treatment, unless they are completely sure that the medication, drug or treatment will not have an adverse effect on their ability to perform their duties safely. If there is any doubt, advice shall be sought from a General Practitioner.

3.7.4 Blood donation

After donating blood, Crewmembers must wait a minimum of 24hrs before undertaking a flying assignment.

3.7.5 Meal precautions prior to and during flight

Sensible precautions should be taken to avoid the risk of food poisoning. Although eating is not usual during a SUSA/SUA flight, crewmembers should ensure that they eat and drink enough during the day, especially before the assignment.

3.7.6 Sleep and rest

Crewmembers shall not perform their duties if they know or suspect that they are suffering from fatigue, or feel unfit to the extent that the flight may be endangered.

3.7.7 Surgical operations

General Practitioner advice/release must be sought prior to returning to flight duties following any surgical procedure.

3.8 Log & Records

Concise and careful documentation of flight activities is essential to ensure efficient and effective operations. Traceability of process is a vital element to sound supervision and control.

The control, analysis and storage of the records and associated flight data documentation, is a valuable tool for operational supervision, traceability and quality control. The completeness and accuracy of the documents is constantly monitored by the Accountable Manager. Ready access to original information, or copies thereof, which concern details regarding a particular SUA/SUSA, is made available to audits and quality inspections by the CAA.

The following documents must be collated after each flight and batched to make a flight record document:

- Pre-deployment survey
- On site survey form
- On site risk assessment
- Copies of maps / charts used to plan
- Weather forecast
- NOTAMS
- Airfield / area briefs (if applicable)

The RP must update the RP logbook after each flight.

3.9 Operator Training Programme

See section 3.6 – Qualification Requirements

3.10 Accident / Incident and Investigation Policy

Incidents are categorised as either 'Limited' or 'Full'.

3.10.1 Limited 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.

3.10.2 Full 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.

3.10.3 Immediate steps to be taken Post Accident/Incident:

- Ensure site is safe
- Wear appropriate PPE as required
- Administer any first aid as required (Full incident only)
- Inform emergency services as necessary
- Restrict site access to essential personnel with no disturbance of items (Full incident only)
- Health and safety precautions to be taken
- Take photos and or make diagrams of crash site

- Recover Drone if appropriate
- Preserve any evidence for investigation.
- Take statements from all personnel and any witnesses.
- Reportable accidents will be reported using European Reporting Portal www.aviationreporting.eu

3.11 Copy of CAA Permission

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 **Wil Richardson Trading As Richardson Media** (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:
    1. (a) Other than by persons employed by or contracted to Wil Richardson Trading As Richardson Media 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);
    2. (b) Unless there is insurance cover for the small unmanned aircraft that meets the requirements of EC Regulation No. 785/2004;
    3. (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;
    4. (d) At a height exceeding 400 feet above the surface, unless permitted to do so under article 94A(3) of the Order;
    5. (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.
    6. (f) Over or within 150 metres of an organised open-air assembly of more than 1,000 persons;
    7. (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;
    8. (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;
    9. (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
    10. (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.

5. 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 **14/05/2019 until and including 14/05/2020** unless previously varied, suspended or revoked.

for the Civil Aviation Authority
Date: 14/05/2019
Ref: 20190514Wil Richardson Trading As Richardson MediaPAndEUAS6075 Certificate Number: 2
SSC Technical Services 0330 022 1908 / uavenquiries@caa.co.uk

Distribution: Wil Richardson Trading As Richardson Media (01437720580 / 0 7884 26130 3, wil_1234567890@me.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.

3.12

Moonrock Drone Insurance

1 Norfolk Court, Norfolk Road,
Rickmansworth, Hertfordshire
WD3 1LA
Tel: 01923 712441
Fax: 01923 777548
Email: info@moonrockinsurance.com
Web: www.moonrockinsurance.com

CERTIFICATE OF LIABILITY INSURANCE

We, the undersigned Insurance Brokers, hereby certify that the following described insurance is in force at this date, underwritten by Hiscox Underwriting Limited:

Name of Insured:	WIL RICHARDSON TRADING AS RICHARDSON MEDIA
Business	The piloting of any **drone** for commercial purposes and ancillary business activities in connection with the piloting of any **drone**
Period of Insurance	From 00.01 on 24 November 2018 To: 23.59 on 23 November 2019
Limit of Indemnity:	Public Liability £2,000,000
Territorial Limits:	Worldwide excluding USA and Canada
Policy Number:	9500153

I write to confirm the Moonrock insurance policy is underwritten by Hiscox insurance and meets the minimum requirements of EC 785/2004 for third party liability including war and terrorism risks.
We certify that to the best of our belief as Insurers of or Insurance Brokers to the Permission holder/Exemption holder or applicant the above particulars, insofar as they relate to the insurance policies held, are correct.

The policy is subject to the insuring agreements, exclusions, conditions and declarations contained therein. The above is accurate at the date of signature.

Should the above mentioned contract of insurance be cancelled, assigned or changed during the above Policy period in such manner as to affect this document, no obligation to inform the holder of this document is accepted by the undersigned or by the Insurers.

Signed:

Dominic Trigg
Director on behalf of Moonrock Insurance
Dated: 18 November 2018

4 Operations

4.1 Role Training & Currency

See Section 3.6

4.2 Area of Operation

WIL RICHARDSON TRADING AS RICHARDSON MEDIA will operate during daylight and night hours primarily in the UK and globally as required and in accordance with National legislation.

WIL RICHARDON TRADING AS RICHARDSON MEDIA flight operations are likely to be varied with areas of operations to include:

- Forest and Forest establishment site mapping and survey
- Industrial, commercial and residential building and structural inspections
- Property/Agricultural, construction survey
- Photography and Videography
- General Commercial work

All WIL RICHARDSON TRADING AS RICHARDSON MEDIA flight operations will take place in accordance with UK CAA regulations.

4.3 Night Operations – ANO CAP 393

- The SUA / SUSA must have an illuminated take-off / landing area for the duration of the night flight.
- The Remote Pilot must be able to record the wind direction to determine the SUA / SUSA take off / landing direction.
- Lights must be fitted to indicate the relative path of the SUA / SUSA to an RP / observer.
- Lights must be fitted to attract attention to the SUA / SUSA, though may not be displayed if they may be mistaken for lights indicating its relative path.
- Lights on the SUA / SUSA may not emit glare to endanger other aircraft.
- Lights on the SUA / SUSA may not be fitted to be mistaken for an aeronautical ground light such as approach lighting near a runway.
- A site suitability survey is to be carried out prior to the flight in daylight hours. To assess any possible obstacles/hazard to the intended flight.

4.4 Operating Limitations & Conditions

Note: The following are WIL RICHARDSON TRADING AS RICHARDSON MEDIA Operational Limitations – assuming all required statutory approvals / permissions are met before flight.

4.4.1 SUA/SUSA: DJI INSPIRE 2

Item	Detail
Ceiling Height:	<400ft As per VLOS rules
Operating Radius*:	<500m As per VLOS rules
Maximum Operating Altitude	4500m AMSL
Maximum Operating Range	4 km
Maximum Endurance (with payload):	Approximately 25 Minutes
MTOW	4000 g
Maximum Surface Wind for Take-off*:	10m/s (19.5kts)
Maximum Operating Temperature:	+40°c
Maximum Operating Speed:	26m/s (50kts)
Minimum Operating Temperature*:	-20°c
Can operate in:	Light Precipitation, Dust, Very Light Fog

SUA/SUSA: DJI MAVIC PRO PLATINUM

Item	Detail
Ceiling Height:	<400ft As per VLOS rules
Operating Radius*:	<500m As per VLOS rules
Maximum Operating Height:	16,404ft amsl
Maximum Operating Range	4,000m
Maximum Endurance (with payload):	Approximately 30 Minutes
MTOW	734g
Maximum Surface Wind for Take-off*:	10m/s (19.5kts)
Maximum Operating Temperature:	40°c
Maximum Operating Speed:	18m/s (35kts)
Minimum Operating Temperature*:	0°c
Can operate in:	Dry weather, within wind tolerances

Notes:

1. Pilot may operate UAS under VLOS to extent of permissions and any dispensation. Standard VLOS is limited to 400ft vertical, 500m horizontal.
2. Flight in known icing conditions should be avoided.

4.4.2 Statutory operational Limitations – ANO CAP 393

The following statutory limitations take precedence over any operational limitations unless prior permission is granted from the UK CAA.

4.4.2.1 ***Article 241*** *- Endangering safety of any person or property*

A person must not recklessly or negligently cause or permit an aircraft to endanger any person or property.

4.4.2.2 ***Article 94*** *– Small Unmanned Aircraft: requirements*

(1) A person must not cause or permit any article or animal (whether or not attached to a parachute) to be dropped from a small unmanned aircraft so as to endanger persons or property.

(2) The remote pilot of a small unmanned aircraft may only fly the aircraft if reasonably satisfied that the flight can safely be made.

(3) The remote pilot of a small unmanned aircraft must maintain direct, unaided visual contact with the aircraft sufficient to monitor its flight path in relation to other aircraft, persons, vehicles, vessels and structures for the purpose of avoiding collisions.

(4) Intentionally blank (articles removed)

(5) The SUA operator must not cause or permit a small unmanned aircraft to be flown for the purposes of commercial operations, and the remote pilot of a small unmanned aircraft must not fly it for the purposes of commercial operations, except in accordance with a permission granted by the CAA.

4.4.2.3 ***Article 94A*** *- Small Unmanned Aircraft: permissions for certain flights*

(1) If the permission or permissions that are required under this article for a flight, or a part of a flight, by a small unmanned aircraft have not been obtained—

(a) the SUA operator must not cause or permit the small unmanned aircraft to be flown on that flight or that part of the flight; and

(b) the remote pilot must not fly the small unmanned aircraft on that flight or that part of the flight.

(2) Permission from the CAA is required for a flight, or a part of a flight, by a small unmanned aircraft at a height of more than 400 feet above the surface

(3) But permission from the CAA is not required under paragraph (2) if—

(a) the flight, or the part of the flight, takes place in a flight restriction zone at a protected aerodrome, and

(b) permission for the flight, or the part of the flight, is required under paragraph (4) from an air traffic control unit or a flight information service unit.

(4) Permission for a flight, or a part of a flight, by a small unmanned aircraft in the flight restriction zone of a protected aerodrome is required—

(a) from any air traffic control unit at the protected aerodrome, if the flight, or the part of the flight, takes place during the operational hours of the air traffic control unit;

(b) from any flight information service unit at the protected aerodrome, if the flight, or the part of the flight, takes place during the operational hours of the flight information service unit and either—

(i) there is no air traffic control unit at the protected aerodrome, or

(ii) the flight, or the part of the flight, takes place outside the operational hours of the air traffic control unit at the protected aerodrome;

(c) from the operator of the protected aerodrome, if—

(i) there is neither an air traffic control unit nor a flight information service unit at the protected aerodrome; or

(ii) the flight, or the part of the flight, takes place outside the operational hours of any such unit or units at the protected aerodrome.

(5) In this article, "operational hours", in relation to an air traffic control unit or flight information service unit, means the operational hours—

(a) notified in relation to the unit, or

(b) set out in the UK military AIP in relation to the unit.

(6) In this article and article 94B, "protected aerodrome" means—

(a) an EASA certified aerodrome,

(b) a Government aerodrome,

(c) a national licensed aerodrome, or

(d) an aerodrome that is prescribed, or of a description prescribed, for the purposes of this paragraph.

(7) The "flight restriction zone" of a protected aerodrome is to be determined for the purposes of this article in accordance with the following table—

Type of protected aerodrome	The 'flight restriction zone'
A protected aerodrome which is— (a) an EASA certified aerodrome, (b) a Government aerodrome, or (c) a national licensed aerodrome, and which has an aerodrome traffic zone.	The flight restriction zone consists of— (a) the aerodrome traffic zone at the aerodrome, (b) any runway protection zones at the aerodrome, and (c) any additional boundary zones at the aerodrome.

A protected aerodrome which is— (a) an EASA certified aerodrome, (b) a Government aerodrome, or (c) a national licensed aerodrome, but which does not have an aerodrome traffic zone.	The flight restriction zone consists of the airspace extending from the surface to a height of 2,000 feet above the level of the aerodrome within the area bounded by a circle centred on the notified mid-point of the longest runway and having a radius of two nautical miles. But if the longest runway does not have a notified mid-point, the mid-point of that runway is to be used instead for the purposes of determining the flight restriction zone.
A protected aerodrome that is prescribed, or of a description prescribed, under paragraph (6)(d).	The flight restriction zone consists of the zone that is prescribed for the purposes of this paragraph.

4.4.2.4 ***Article 94B*** *– Interpretation of expressions used in the definition of "flight restriction zone"*

(1) This article makes provision about the meaning of expressions used in the definition of "flight restriction zone" in article 94A that applies in relation to a protected aerodrome which is—

(a) an EASA certified aerodrome,

(b) a Government aerodrome, or

(c) a national licensed aerodrome, and which has an aerodrome traffic zone.

(2) Subject to paragraph (4), there is one runway protection zone for each runway threshold of each runway at the aerodrome.

(3) A "runway protection zone", in relation to a runway threshold at the aerodrome, is the airspace extending from the surface to a height of 2,000 feet above the level of the aerodrome within the area bounded by a rectangle—

(a) whose longer sides measure 5 km;

(b) whose shorter sides measure—

(i) 1 km (except in the case of Heathrow Airport);

(ii) 1.5 km, in the case of Heathrow Airport; and

(c) which is positioned so that—

(i) one of the shorter sides of the rectangle ("side A") runs across the runway threshold, and

(ii) the two longer sides of the rectangle are parallel to, and equidistant from, the extended runway centre line as it extends from side A out to, and beyond, the runway end to which the runway threshold relates.

(4) There is no runway protection zone—

(a) for any runway threshold at the London Heliport;

(b) for any runway threshold that is prescribed, or of a description prescribed, for the purposes of this paragraph.

(5) The "runway threshold" of a runway at the aerodrome is the location that, for the purpose of demarcating the start of the portion of the runway that is useable for landing, is—

(a) notified as the threshold of the runway, or

(b) set out as the threshold of the runway in the UK military AIP.

(6) The "extended runway centre line", in relation to a runway at the aerodrome, is an imaginary straight line which runs for the length of the runway along its centre and then extends beyond both ends of the runway.

(7) An "additional boundary zone" is the airspace extending from the surface to a height of 2,000 feet above the level of the aerodrome within any part of the area between—

(a) the boundary of the aerodrome, and

(b) a line that is 1 km from the boundary of the aerodrome (the "1 km line"), that is neither within the aerodrome traffic zone nor within any runway protection zone at the aerodrome.

(8) The 1 km line is to be drawn so that the area which is bounded by it includes every location that is 1 km from the boundary of the aerodrome, measured in any direction from any point on the boundary.

4.4.2.5 ***Article 94G*** *– Meaning of "remote pilot" and "SUA operator"*

In this Order –

(a) the "remote pilot", in relation to a small unmanned aircraft, is an individual who –

(i) operates the flight controls of the small unmanned aircraft by manual use of remote controls, or

(ii) when the small unmanned aircraft is flying automatically, monitors its course and is able to intervene and change its course by operating its flight controls,

(b) the "SUA operator", in relation to a small unmanned aircraft, is the person who has the management of the small unmanned aircraft.

4.4.2.6 ***Article 95*** *– Small unmanned surveillance aircraft*

(1) The SUA operator must not cause or permit a small unmanned surveillance aircraft to be flown in any of the circumstances described in paragraph (2), and the remote pilot of a small unmanned surveillance aircraft must not fly it in any of those circumstances, except in accordance with a permission issued by the CAA.

(2) The circumstances referred to in paragraph (1) are –

(a) over or within 150 metres of any congested area;

(b) over or within 150 metres of an organised open-air assembly of more than 1,000 persons;

(c) within 50 metres of any vessel, vehicle or structure which is not under the control of the SUA operator or the remote pilot of the aircraft; or

(d) subject to paragraphs (3) and (4), within 50 metres of any person.

(3) Subject to paragraph (4), during take-off or landing, a small unmanned surveillance aircraft must not be flown within 30 metres of any person.

(4) Paragraphs (2)(d) and (3) do not apply to the remote pilot of the small unmanned surveillance aircraft or a person under the control of the remote pilot of the aircraft.

(5) In this article, "a small unmanned surveillance aircraft" means a small unmanned aircraft which is equipped to undertake any form of surveillance or data acquisition.

4.5 Methods to determine intended task and feasibility

An initial meeting/discussion with the client is required to determine if an operation is feasible. The company representative should act in a professional manner and work through the content of the pre-deployment survey form with the client. It is vitally important at this stage to establish landowners' permission.

Ideally the meeting should take place at the operation site. If this is not possible then the exact location must be established and Google Earth, SkyDemon Light and aeronautical charts used to assess the feasibility of the operation. Once the company representative and client are satisfied that the operation is possible, all relevant issues surrounding the operation should be agreed with the client.

4.6 Operating Site Planning & Assessment

The RP must carry out a site survey and risk assessment as detailed in the on-site survey form. The operation must not proceed until all relevant areas have been completed and agreed with the client. Consider contacting the landowner for further input into the planning process.

4.7 Communications

If the operation is being carried out in an unfamiliar location, the RP must ensure that he has the contact details for relevant local authorities as detailed in the on-site survey form.

If necessary, the RP should provide his contact details to local authorities such as local ATC. Effective communications may facilitate future safe operations, so it is very helpful to keep the local ATC in the loop.

On-site communication between RPs and observers / assistants must be considered using mobile phones / radios etc. Forms of communication should be practiced to ensure the transfer of information is readily achieved.

4.8 Pre-notification

During the completion of the pre-site survey form, it should be established if the operation falls within an ATZ, or is in proximity to an aerodrome or military installation. If necessary the ATC, relevant authorities and the Police should be contacted to prevent issues during the operation or in an emergency.

See link for ATC contacts http://www.nats-uk.ead-it.com/public/index.php%3Foption=com_content&task=blogcategory&id=6&Itemid=13.html

Operations near nuclear installations will require special permission. Operations in London may require an enhanced non-standard flight procedure application. This will be coordinated through the NATs online process.

4.9 Site Permissions

Before commencing the operation, the nominated Remote Pilot will obtain permission from landowners where flight operations are to be conducted on their property. The permission will either be in the form of a printed email attached to the Pre-Site Assessment Form or as a written signature obtained from the client captured on the On-Site Assessment Form. No flight operations will commence without permission from the relevant landowners.
Note 1: The landowner, can be taken as the person in charge of the site and who has been granted authority by the landowner for work to be carried out on his property.

Note 2: It is best practice to inform neighbouring landowners of intended operations. This action can be delegated to the client.

4.10 Weather

During the week leading up to any flight operation Organisation's Name will obtain long-range weather forecasts. Twenty-four hours before and on the morning of the proposed flight operations, a further forecast will be obtained. This information will either be printed and stapled to, or written in the Pre-Site Survey Form. The RP will review the weather forecast and based on the aircraft limitations, will decide on the validity and advisability of the planned flight operations. The client must be informed as soon as possible if flight operations are to be postponed.

Even if the operation involves a fixed-date event, the RP should not feel pressured to continue if he/she feels that safety is being compromised.

Weather should be checked using the Met Office (www.metoffice.gov.uk) and Metcheck (www.metcheck.co.uk) Aeroweather App or other websites. METARS should be obtained when working near an aerodrome.

4.11 On-site Procedures

A flight shall not be commenced until all pertinent pre-flight data has been compiled and the flight deemed safe.

The following forms / actions must be completed before any flight is undertaken:

1. Pre-deployment Survey.
2. Initial Risk Assessment
3. On Site Survey Form.

4. On Site Risk Assessment.

See Appendices for current survey and risk assessment forms.

4.11.1 Site survey

A pre-site survey should be carried out and a map generated prior to the operation using the pre-site survey form. Any potential hazards should be identified and marked on the map and included in the risk assessment. Access should be agreed and areas identified for parking, equipment assembly and launch. The site should be re-assessed on the day of operation to ensure that there have been no changes.

4.11.2 On Site Dynamic Risk Assessment

Having completed the on-site survey the RP will update the risk assessment to include any newly identified hazards and ensure the mitigation measures previously identified remain effective.

4.11.3 Selection of operating area and alternate

A safe launch area should be identified and the return-home area for the RPAS cleared and, if necessary, cordoned to avoid people entering it. The technical manual states that with 6 or more satellites DJI flight controllers should have an accuracy of + or – 2 metres. As a result, an area of at least 3 metre radius around the take-off point should be identified and, if necessary, cordoned off. It may be appropriate to use existing boundaries (e.g.) fences as part of this cordon.

The RP should clearly identify the operating area and any emergency landing areas.

4.11.4 Crew briefing

Any support crew and, if appropriate, persons who are to be under the control of the RP must be briefed on site. This should include final allocation of roles, a synopsis of the flight and emergency procedures. If persons under control of the RP are to be overflown they must be made aware of what to do in the event of a loss of control of the craft (see RPAS specific Emergency Procedures in Ops Manual section 4.16).

The Pilot-In-Command must cover the criteria listed below. If any crewmembers feel unable to complete their assigned tasks or has reservations about the flight operation, then they must make their concerns known at this briefing:

- Check that all relevant and required crewmembers are present.
- Issue identification badges and fluorescent vests if required
- Advise crew of Take-Off, Landing, Emergency and other Operating areas.
- Confirm flight plan with the crew.
- Advise the crew on timescales (expected flight times, durations and quantities).
- Ensure all crewmembers are aware of their individual responsibilities.
- Ensure crew are familiar with the Emergency Procedures and have emergency contact numbers.
- Ensure Observer is familiar with the failsafe functions.
- Check that the crew are happy to proceed.
- Issue radio communication devices if required and state channel to use.
- Check Cell-phones have adequate signal for emergency use and batteries are charged.
- Night Flying specific procedure.

4.11.5 Crew Clothing

All flight crewmembers should check the general weather forecast before the planned flight operation and bring suitable protective clothing and footwear to the operating site. During flight operations, each member of the flight crew is to wear high visibility clothing.

4.11.6 Cordon procedure

The Pre-Site Survey should have identified if a cordon is required but the Pilot-In-Command will confirm this. If large numbers of the public are expected, a cordon should be established fifty metres around the planned flight path. This cordon should be set out using cones and safety tape. Signs should be placed every ten metres advising members of the public that UAS flight operations are in progress. Extra spotters may be required to be positioned at gates or on public footpaths to advise members of the public about the dangers of entering the area. Gates may be closed and access restricted, but spotters may not detain any members of the public or prevent them from accessing public rights of way. They should advise the public on the dangers of entering operational areas.

If the location is set in a more rural area, a local cordon around the take-off and landing area may be utilised, this can be as little as four cones set out into a five metre square.

The Spotter are to ensure that the Observer is made aware of any encroachment from a member of the public. The Observer will in turn advise the Pilot-In-Command of any encroachments. This process will ensure that the Pilot-In-Command remains focused on operating the aircraft.

4.12 Aircraft Assembly & Functional Checks

Logs of previous aircraft operations should be checked in advance to establish if any repairs or servicing was carried out, if any is due and further steps as required.

It is the responsibility of the RP to ensure that the RPAS is in a fit state to fly. This will include checking that all batteries are correctly charged for the RPAS, laptop and photographic equipment and that the correct equipment is brought to the site. See loading list below.

4.13 Loading List

Item	Task
Anemometer (Wind Meter)	Check operation, check battery
Operations Manual	Check manufacturer's website for latest version of manufacture supplied manuals, software and firmware
Map / Charts	Relevant to task area and route
RPAS Maintenance and Log Book	Check serviceability of RPAS.
2-way radio/Mobile Phones	As required for task
Task Information	Flight plan & contact details
Fire Extinguisher	Check serviceable

First Aid Kit	Check contents and service date	
Personal Safety Equipment	Florescent Vests, Safety Glasses. Hard hat & safety boots as required	
Cordon Equipment	Signs / cordons / bollards / cones / tape as required	
Controller tablets	Check battery – charged Charger lead	
Lipo Container (PCM)	Lithium Polymer battery disposal / storage	
Laptop Computer / iPad	Check battery Charging lead	
Parts	Spare parts & tools as required	
Cables	Flight controller cable	
Night Operations Additional Equipment		
Torch	X 2	Used for illuminating the RPA in the event of emergency
Stand-alone lighting	X2	The landing area must be fully lit
Head torch	X2	All checks must be carried out under white light

4.14 Pre-Flight Checks

4.14.1 On site/On arrival checks

See also Annex B.

Action	Remarks
Carry out On-Site Survey & Risk Assessment.	As per Operations Manual
Daylight Site Walk Through	A site walk through & survey must be carried out in daylight hours before any night operations are conducted
Emergency/Alternative Landing Area	Confirm location Check area for suitability
Weather Check	Wind speed, direction & temp
Check RPAS Maintenance and Logbook for Serviceability	RPAS Maintenance Document if applicable.
Client/observer Briefing	Brief observer or client on actions to be taken as per briefing list to include; emergencies, pilot incapacitation, RTH and actions of Drone.

Lighting	Ensure all lights as required are working.

4.14.2 Pre-Flight Check List

Action	Remarks
Check Drone for damage.	• Drone body for cracks and cleanliness • Ensure all sensors are free of FOD • Security of attachments
Remove Gimbal lock	Store gimbal lock in rucksack
Check Navigation Lights	Ensure Operational
Check Antennas	Alignment
Check Camera	• Check security • Check lens filter and lens cleanliness • SD Card with sufficient memory fitted
Check Drone motors.	• Rotate freely without resistance • Dampers for signs of wear
Check propellers & fit	Chips, cracks and security
Check TX	• Look for damage • Unfold antenna
IPAD	Connect to RC Controller. Switch on and start App.
Switch on Drone	Call "*CLEAR PROPS"* Ensure battery is securely locked in airframe
Orientate and place Drone	• Check area for FOD • Place > 5m from ground station
Check primary transmitter switches	Flight mode switch to P or ATTI as required
Monitor LEDs on Drone	• Confirm flight mode and GPS status • Blinking Green light matching DJI GO App
Compass calibration	• Perform compass calibration if indicated by APP or if operating at a new location • P-Mode/Calibrate Compass
RTH	Set height to avoid obstacles
Check camera/video quality	
Adjust camera settings	Still or Video - resolution and mode
Check gimbal operation	

Review Mission	

4.15 Flight Procedures

4.15.1 Take off Checks - Expanded check list

Action	Remarks
Confirm weather conditions.	
Switch on Navigational Lights	Ensure operational and Visible
Request ATC take off clearance	If under ATC control
Check Air Space for Other Air Users	Final 360 check by RP and observer
Check landing area clear for take-off	• Assistants >5m • Public >30m

4.15.2 Take Off Checks

Action	Remarks
Check switches	P or ATTI as required
Confirm flight LED status	
Both control sticks to bottom corners	• Call *"CLEAR"* • Drone propellers start at idle speed, check rotor rotation
Take off and climb to 3m	Switch to GPS flight mode if necessary
	• Check control responses • Check camera responses
Commence task	Take last look around and depart

4.15.3 Landing Checks

Action	Remarks
Check landing area clear	Assistants >5m Public >30m

Note wind direction	Strength and gusts
Check switches	P or ATTI as required
Lower undercarriage	Not Applicable
Illuminate Landing Zone	Night Flight Only
Land	Call "*LANDING*""
Switch off UAV and TX	Call "*AIRCRAFT SAFE*" All LEDs extinguished

4.16 Post flight & between flight checks

4.16.1 Post Flight Checks

Action	Remarks
Monitor Motor Temps	If hot, wait until cool before packing
Check Drone for signs of visible damage	Note in airframe log book
Check & remove propellers	Chips and cracks
Check Drone landing gear	Signs of damage
Remove flight battery	Check for: Damage Swelling Excessive heat if hot, allow to cool before packing Loose connectors
Pack Drone away if task complete	Pack and account for all equipment Check area
Complete the required documentation	

4.17 Emergency Procedures

4.17.1 Loss of Control Data Link

Symptom/Issue	Warning	Pilot Action	Crew Action	Remarks
Drone not responding to commands	SUA unresponsive. Poor signal strength. Drone warning LEDs will **flash rapid yellow**	Alert crew to issue. Check height, speed, wind and direction of travel Confirm Failsafe mode Check Tx battery charge Attempt to regain control of the SUA by changing flight mode from its current mode to an alternate and back. Monitor video for location Monitor drone Recover drone	Ensure landing location is clear. Monitor video display (if still functioning). Provide pilot with appropriate updates on status. Call CLEAR	1. Failsafe mode will initiate after 3 seconds' loss of data link 2. Drone will ascend to RTH height if currently lower Note 1: Default RTH is set at 20m. If above the set RTH height, the Drone will return home at this height. 3. Drone will directly return to Take Off point and hover for 15 seconds 4. Drone will descend at home position, then lower gear if necessary, land and shut down motors Note 2: Failsafe mode may be interrupted and control re-gained if signal recovers by switching away from current control mode then back.
Drone Returning to Home Location	Drone Warning LED will **flash rapid yellow** OSD on iPad will indicate failsafe	Monitor Drone. Call CLEAR (If required) Inform other air users If required.	Monitor Drone. Call CLEAR (If required) Inform Other air users If required.	As above RTH Logic.

4.17.2 Loss of GPS Signal

Symptom/Issue	Warning	Pilot Action	Crew Action	Remarks
Drone will not hold lateral position. Erratic flight behavior.	**Flight mode indication + 3 red LED flashes.**	**Control Drone** **Consider Failsafe or Home Lock functions.** Monitor Drone. Continue with flight with no GPS position hold if confident of safe operation of Drone and operator capability.	Monitor Drone. Call CLEAR (If required) Inform Other Air Users If Required.	GPS signal is not vital. Pilot must not rely on RTH function only. Consider terminating flight.

4.17.3 Loss of Drone Power

Symptom/Issue	Warning	Pilot Action	Crew Action	Remarks
L**oss of power (SUA)** due to depleted battery	Uncommanded descent **Rapid red LED flash** due to low voltage condition	**Alert crew** to impending crash. **Attempt to regain control** by changing flight mode switch. If control regained, bring SUA home and land. If control not regained, prepare for crash landing. *Call "CLEAR"* Proceed to crash site if possible Inform local ATC if required Inform emergency services if required	Identify a landmark on the horizon to assist with location of SUA. Monitor video display (if still functioning). Provide pilot with appropriate updates on status. Proceed to crash site if possible Inform local ATC if required Inform emergency services if required	Carry out post-crash management procedure. Reportable accidents will be reported using CAA the ECCAIRS European Reporting Portal.

4.17.4 Loss of Transmitter Power

Symptom/Issue	Warning	Pilot Action	Crew Action	Remarks
Drone Not Responding to Commands	Flashing Rapid Yellow LED	Location, Height, Wind, Direction. **Check Tx battery state and replace, retake control if able.** **If unable:** **Check if Drone has entered failsafe via monitor display.** Monitor Video Imagery and OSD for location Monitor Drone. Call CLEAR if necessary Inform Other Air Users If Required. Recover Drone.	Location, Height, Wind, Direction. Monitor Drone Call CLEAR if necessary Inform Other Air Users If Required.	1. Failsafe mode will initiate after 3 seconds' loss of data link. 2. Drone will ascend to RTH height if currently lower. Default RTH height is set to 20m. If above set RTH height the Drone will return home at this height – no lower. 3. Drone will directly return to Take Off point and hover for 15 seconds. 4. Drone will descend at home position, then lower gear, land and shut down motors. 5). Note: Failsafe mode may be interrupted and control re-gained if signal recovers by switching away from current control mode then back.

4.17.5 Rogue Drone

Symptom/Issue	Warning	Pilot Action	Crew Action	Remarks
Un-commanded drone movement	SUA unresponsive	Check Drone has not inadvertently entered failsafe mode. If so follow failsafe checklist. If Drone has un-commanded movement: Enter failsafe mode and switch off transmitter & wait 5 seconds. If Drone continues un-commanded movement beyond 500m. 1). Warn anyone in the close flight path verbally. 2). Telephone local ATC unit. 3). Telephone local police. 4). Telephone any other organization, landowners briefed as part of initial flight safety survey. 5). Using the last known track, approx. speed and remaining endurance information draw a map of possible search area. 6). Organize search using man power available	Identify a landmark on the horizon to assist 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	If available, the operations assistant filming the rogue Drone during its un-commanded movement may provide vital evidence in an accident investigation and for future accident prevention. **Note:** In normal operations the Drone radius limit is set to 500m in the internal software. It is pertinent to wait until the 500m limit is broken by the rogue Drone before contacting the relevant authorities / organizations listed. Reportable accidents will be reported using CAA the ECCAIRS European Reporting Portal.

4.17.6 Pilot Incapacitation

Symptom/Issue	Warning	Pilot Action	Crew Action	Remarks
RP feels unwell, suspects they will soon become incapable of piloting safely	N/A	1). Initiate failsafe mode if able and sit away from the recorded landing area. 2). Call for help from passersby or dial 999.	1). Monitor RP, initiate failsafe mode by following instructions from RP briefing. 2). Administer first Aid, keep RP in the recovery position if required and call for emergency services if situation becomes serious. 3). Clear site after RP has been taken away using the relevant checklist.	When the RP feels ill the priority is to get the Drone on the ground in a safe and timely manner, preferable in the take-off/landing area. 1. Failsafe mode will initiate after 3 seconds' loss of data link. 2. Drone will ascend to RTH height if currently lower. Default RTH height is set to 20m. If above set RTH height the Drone will return home at this height – no lower. 3. Drone will directly return to Take Off point and hover for 15 seconds. 4. Drone will descend at home position, then lower gear, land and shut down motors. 5). Note: Failsafe mode may be interrupted and control re-gained if signal recovers by switching away from current control mode then back.

4.17.7 Airspace Incursion

Symptom/Issue	Warning	Pilot Action	Crew Action	Remarks
RP notices another airspace user entering the task area	**N/A**	**In flight:** Hold position and monitor other airspace user. If other Drone is on a collision course adjust height and position to avoid collision. If required, bring Drone back to the take-off / landing area if safe to do so. **On ground:** Hold position, take precautions necessary incase other airspace user flies within close proximity of the take-off / landing zone.	**In flight:** Monitor other airspace user and give any position / direction help to RP as required. If safe to do so, approach other airspace user RP and ask them their task and duration. Note details of other user for Airprox report. **On ground:** Monitor other airspace user and give any position / direction help to RP as required. Prepare for other airspace user Drone to fly within close proximity of the take-off / landing area. If safe to do so, approach other airspace user RP and ask them their task and duration.	The other airspace user may be oblivious to the presence of the commercial operation taking place so it must be assumed they may fly within close proximity of the take-off / landing area including the RP and operations staff. Submit CA1094 Airprox reporting form if required.

4.17.8 Drone Fire

Symptom/Issue	Warning	Pilot Action	Crew Action	Remarks
Drone Fire	**N/A**	**In flight:** If time permits, land Drone as soon as safely possible in designated landing zone. Adjust flight path as not to fly over any combustible materials i.e. dry grass etc. If no risk of explosion, administer fire extinguisher and cover Drone with fire blanket. **On ground:** If no risk of explosion, administer fire extinguisher and cover Drone with fire blanket.	**In flight:** Verbally warn any spectators / pedestrians in the Drone area to keep clear of landing zone. Put on safety glasses / fire gloves & prepare fire extinguisher and blanket ready to be deployed. Cordon off crash area if time available after landing.	A battery fire may lead to an explosion. A fire and /or explosion will give off toxic fumes that may render the RP & Operations Assistant unconscious. Only tackle the fire if you are sure that no risk of explosion or fume inhalation is present. If in doubt, and the grounded Drone is not a risk to its surroundings it can be left to burn out. Dispose of battery in accordance with safety guidelines Reportable accidents will be reported using the ECCAIRS European Reporting Portal.

4.17.9 Section 9 – Loss of Navigation Lights (at night)

Symptom	Warning	Pilot Action	Crew action	Remarks
Loss of Navigation Lights	**N/A**	**In flight:** Centralise control levers and enter a GPS mode hover. Yaw SUSA slowly if integral LED flash is not visible until LED visible. Enter 'Home Lock' and fly SUSA directly back to landing area. Land and diagnose fault. If LED not visible enter RTH and ensure SUSA is illuminated by torch. **On ground:** Do not take-off	**In flight:** Verbally warn any spectators / pedestrians in the RPA area to keep clear of landing zone. Call CLEAR LANDING Shine torch in direction of SUSA initially to help find its location. Follow RP instructions. Illuminate SUSA on its route home if RP cannot see any lighting from SUSA.	

5 Appendices

Appendix A: Pre-Deployment Survey Form

Service Delivery Information

Ref Number	
Date of production	
Name of Originator	
Name of Remote Pilot	

Client Information

Name of Client:	
Address:	
Contact Number:	

Task Information

Date/Time/Group of Task:		
Task Location (6 fig Grid):		
Altitude Above Mean Sea Level (ft.):		
Vehicular Access:	YES / NO	

Pre-Deployment Planning Aids:

http://skydemonlight.com
https://www.google.com/earth
https://www.metcheck.com
http://notaminfo.com/ukmap
http://nats-uk.ead-it.com/public/index.php.html
https://magic.defra.gov.uk
https://www.bing.com/maps
https://skyvector.com
https://gridreferencefinder.com
http://noflydrones.co.uk

Considerations	Action	Findings
Airspace Classification:	What is the Airspace category (A, C, D, E, G) that you intend operating in?	
PPE Requirements:	Hard hats, high visibility vests, gloves, eye protection, steel toe capped boots, wet weather gear. Client Safety equipment requirements	
Calculate fly away bubble:	Consider wind strength and direction, expected battery duration	
Other Airspace Restrictions:	MATZ, CTR, ATZ, Military/Civilian Danger Areas, Restricted Areas, Prohibited Areas, NOTAMS	
Local ATCU:	(If applicable) Who is the local ATCU for the area you intend operating in?	
ATCU Frequency:	(If Applicable) What Frequency does the ATCU operate on?	
Other Air Users Proximities:	Gliding Clubs, Power Gliding, Micro-Lights, Kite Flying, Model Aircraft Clubs, Private Heli pads.	
Potential Air Hazards:	Small Arms Ranges, Gas Venting Sites, High Intensity Radio Transmission Area, Bird Sanctuaries.	
Permission:	Local authority, Land owner, Military.	
Restrictions: (unless permission granted by that agency):	Nuclear Power Stations, Prisons, School Areas, Hospitals, Elderly Homes, Government Buildings	
Sensitivities:	As above with the additions of Nature Reserves, Bye Laws, Livestock (Farms).	
Terrain:	What is the terrain? (Farm Land, Woodland, Marshlands, Hilly, Mountainous).	
Ground Hazards:	Lakes, Rivers, Motorways, Railways	
Public Access:	Public Right of Way, Gates, Roads, Footpaths, Bridal Paths	
People:	Congested Areas	
Risk Reduction:	Can the job be done at another time to avoid crowds i.e. school leaving times, church services etc.	
Weather:	24-hour weather forecast of area of operation	

Notifications (if applicable)

Establishment	Date Notified	Contact Name	Contact Details
Local ATCU:			
Other Air Users:			
Military Control:			
NOTAM:			

Initial Risk Assessment (see Appendix C)

Risk Assessment:			
An initial risk Assessment is required at this stage (See Appendix C Risk Calculator Form)			
Hazard	Initial Risk	Mitigation	Final Risk
	Signature:		

Appendix B: On-Site Survey Form

Job Number:			Date:	
Met Data:	Wind Speed:		Temperature:	
Cloud Cover:				

Task Activity

Item	Consider	Check (☑ when done	Remarks
Permission	Landowner		
Air Traffic	Clearance required?		
Communications	2 Way communications with ATC and/or Crew		
Buildings	Proximity, awareness of occupants, Congested area		
People	Control, access to Operations areas		
Take Off Area	Ensure that the Take Off site is not near any ferrous objects (local magnetic attraction)		
Take Off Area	Cordoned off, FOD free, Warning Signs		
Land Area	Cordoned off, FOD free, Warning Signs. Emergency area identified		
Obstructions	Masts, Wires, Water, Industry, Trains, Traffic		
Line of Sight	Adequate for task		
Animals	Awareness of actions if disturbed		

Contact Numbers:	Notes:
Police	
Local ATC	
ATC Frequency	

Risk Assessment:

A Dynamic Risk Assessment is required to be carried out by the Remote Pilot*

Hazard	Initial Risk Level	Mitigation	Final Risk Level

Signature:	

Appendix C: Risk Calculator Form

Table 1 – Risk Matrix

		Severity				
		Catastrophic 5	Hazardous 4	Major 3	Minor 2	Negligible 1
PROBABILITY	Frequent 5	25	20	15	10	5
	Occasional 4	20	16	12	8	4
	Remote 3	15	12	9	6	3
	Improbable 2	10	8	6	4	2
	Extremely Improbable 1	5	4	3	2	1
	Unacceptable	The risk is unacceptable and major mitigation measures are required to reduce the level of risk to as low as reasonably practicable.				
	Review	The level of risk is of concern and mitigation measures are required to reduce the level to as low as reasonably practicable. Where further risk reduction/mitigation is not practical or viable, the risk may be accepted, provided that the risk is understood and has endorsement of the Accountable Manager.				
	Acceptable	Risk is considered acceptable but should be reviewed if it recurs.				

Table 2 - Risk Severity Classifications

Severity of Consequences		
Definition	**Meaning**	**Value**
Catastrophic	Results in accident, death or equipment destroyed	5
Hazardous	Serious injury or major equipment damage	4
Major	Serious incident or injury	3
Minor	Results in minor incident	2
Negligible	Nuisance of little consequence	1

Table 3 - Risk Probability Classifications

Probability of Occurrence		
Definition	**Meaning**	**Value**
Frequent	Likely to occur many times	5
Occasional	Likely to occur sometimes	4
Remote	Unlikely to occur but possible	3
Improbable	Very unlikely to occur	2
Extremely Improbable	Almost inconceivable that the event will occur	1

RISK EVALUATION:

Probability of occurrence (P) – How often could the hazard occur? Consider the task frequency, duration, method of work, employees involved. Severity (S) – How serious would the hazards effect be if realised. Consider type of hazard, biological, ergonomic, physical and chemical to evaluate the likelihood and severity, this will produce a Risk Rating (R).

Using Table 1 (Risk Matrix) Risk (R) = Probability (P) x Severity (S)

Appendix D: Observer/Client safety brief

Pilot Incapacitation

- The client and/or observer should be briefed how to command the drone to return to the landing site automatically, using the return to home (RTH) command on the transmitter.

- They must be made aware that the drone will not exactly return to the same spot, but within a few meters and that they must ensure that all personnel including the incapacitated pilot be removed from the landing area to allow the drone to land without causing injury to any persons close by.

- Once the drone has landed and only once the propellers have stopped rotating, the drone may be approached and switched off. This is done by pressing the battery button and releasing then pressing the button again for 2 seconds then releasing. The transmitter is switched off in the same manner.

Unauthorised people entering take-off / landing area

- Only the Pilot, Observer, or persons under their control, are allowed into the designated take-off and landing zone. Should anyone else stray into this area, or look as if they may, they are to be instructed to remain outside the area at all times.

Fire

- Instructions as to how to operate the fire extinguisher and its location.
