Leicester Drones

OPERATIONS MANUAL

This Operations Manual covers the following aircraft: **DJI Phantom 3 Advanced**

DJI Phantom 3 Advanced

This document is a combined Safety and Operations Manual for small enterprises that covers all of the appropriate aspects of Leicester Drones required to satisfy the requirements of National Aviation Authorities Permissions / Exemptions for Aerial Work.

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Accountable Manager: Christian Smith

www.leicesterdrones.com

Amendment Record

Commitment of Accountable Manager

Issue Number	Amendment Date	Amendments Incorporated	Signed Off By
Issue 1.0	09-02-2016	First Edition of Leicester Drones Operations Manual	Christian Smith
Issue 1.1	14-03-2016	Front Cover - Change of issue number and date; Page 1 - Change of copyright date; Page 5 – Removal of aviation authority details for IRL and NL; Page 10 – Observer Responsibilities added; Page 11 - no. 7 - 15 amendments made to table; Page 12 – no 7.1 - 3 amendments made to table; Page 14 – 10.4 – paragraph added at end; Page 15 – 12.1 – training removed; Page 17 – reference to The Netherlands removed; Page 21 – no 28 – reference to Oscium device removed and frequency changed; Page 22 – no 29 – reference to battery charge log changed; Page 24 – no 30 – sentence added regarding centre of gravity; Page 24 – 32.1 – amendments made to bullet point list.	Christian Smith
Issue 1.2	23.03.2016	Front Cover – change of issue number and date; Page 1 - Amendment record – font size changed; Page 11 – No 7 - change to unladen weight; Page 12 – no 7.1 Balance Limitation changed to Centre of Gravity and Balance Limitations added.	Christian Smith

This Operations Manual describes the organisation, aircraft systems, personnel, flight operations and procedures by which Leicester Drones carries out its Small Unmanned Aircraft 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 relevant National Aviation Authorities addressed by this document.

Signed…….. Date: 23 March 2016

Accountable Manager: Christian Smith
Leicester Drones

For and on behalf of **Leicester Drones**

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PART A – SAFETY AND ORGANISATIONAL LAYOUT

1. Purpose

The purpose of this document is to detail the items to be covered for the safe operation of **DJI Phantom 3 Advanced** by Leicester Drones personnel.

2. Scope

This operations manual applies to all Leicester Drones personnel involved in the safe operation of the **DJI Phantom 3 Advanced** detailed in the Aircraft Technical Specifications section.

2.1. Safety Policy and National Perspective

Leicester Drones adopts best industry practice to ensure that all of its flight operations using small unmanned aircraft systems (SUAS) as previously detailed are carried out as safely as possible.

Leicester Drones addresses operations in the United Kingdom and covers regulations, procedures and specific details concerning individual countries. Where specific National Aviation Authority requirements are addressed, these are preceded by the following prefix to lines and paragraphs as appropriate:

UK CAA-UK –United Kingdom - Civil Aviation Authority

2.2. Safety Goals

It is the goal of Leicester Drones to operate aircraft without harm, injury or damage to any persons or property. The Leicester Drones Pilot-In-Command will comply with all of the safety requirements and limitations of the Permission / Exemption for Aerial Work issued by the UK CAA to Leicester Drones.

2.3. Safety Assurance

Leicester Drones is committed to maintaining the highest standards of flight safety and aims to minimise harm to any persons or property by undertaking thorough risk assessment, site surveys, crew briefings and ensuring aircraft are in operational condition through regular inspection and maintenance regimes. By these processes Leicester Drones assures safety at all times whilst carrying out flight operations. Safety assurance is also provided by the following processes and procedures contained within this document, including:-

- Operating Limitations;
- Maintenance Principles;
- Qualification Requirements;
- Crew Health;
- Flight Planning;
- On-Site Procedures;
- Emergency Procedures; and
- Incident Reporting.

Safe operations will also be assured through regular reviews and safety performance monitoring, e.g. through regular reviews of incident logs.

2.4. Organisational and Safety Training

All Leicester Drones crew members will undertake an organisational training course and must follow specific procedures set out in this Operations Manual. The training course will include a brief technical overview of the aircraft currently in service, limitations to be considered for operating, organisational

procedures and emergency procedures. Any Leicester Drones Pilot-In-Command will hold the relevant, current qualification as stated in the qualification requirements section in order to operate the specific aircraft. Crew performance will be monitored, assessed and refresher training may be given if required. All incidents will be recorded, analysed and any findings will be fed back to the crew as training to form a basis of Continual Professional Development.

3. Definitions and Abbreviations

Below is a list of abbreviations used in this Operations Manual:-

Reference	Title
ATC	Air Traffic Control
BNUC-S	British National Unmanned Aircraft Systems Certificate - small
CAA	Civil Aviation Authority
FPV	First Person View
GPS	Global Positioning System
iOSD	On Screen Display
CS	Christian Smith (Owner/Director of Leicester Drones) Accountable Manager for this Operations Manual
KTS	Knots
MTOM	Maximum Take-off Mass
NOTAM	Notice to Airmen
RPAS	Remotely Piloted Aircraft System
TBA	To be allocated/added when known

4. Document Control and Amendment Process

All amendments to this Operations Manual are to be made by Christian Smith and must be recorded on the Amendment Record Page found at the front of this document. Each amendment is identified with an Amendment Number, Amendment Date, Amendments Incorporated and Incorporated by information header. EuroUSC™ and all relevant NAAs will be informed of all major updates such as new aircraft or pilots. All Leicester Drones employees will be informed of any changes to this Operations Manual and they must maintain a current up-to-date version either in electronic or paper format. All amendments will be signed off by the Accountable Manager, Christian Smith.

OR

CS is responsible for amendments to the Operations Manual.

Any amendments will ne noted in the amendment record at the beginning of this document, and a new version number will be entered.

Typical amendments may include updated check lists, grammar changes, spelling corrections, additional safety procedures, etc.

All amendments will be signed off by the Accountable Manager, CS.

Major changes will be sent to EuroUSC™ and the CAA for approval.

5. Referenced Documents

Reference	*Full Title*	*Issue Number & Date of Issue*
Civil Aviation Act 1949	Primary Legislation Document	2006
CAP 393 (ANO)	Air Navigation: The Order and the Regulations	10th Jan 2015 (4th Edition) and 1st May 2015 (4th Edition amendment)
CAP722	Unmanned Aircraft Systems Operations in UK Airspace – Guidance	31st March 2015 (6th Edition)
CAP 382	Mandatory Occurrence Reporting	18th March 2011 (9th Edition)
CAP403	Flying Displays and Special Events	February 2015 (13th Edition)
NOTAM	Notice to Airmen	As published and available

6. Organisation

Organisation Name: Leicester Drones

Organisation Type: Sole Trader

Country of Registration: United Kingdom

Leicester Drones - Sole trader; provider of Aerial Photography Services

Leicester Drones has third Party Public Liability Insurance as outlined below:-

Insurer:	100% Underwriters at Lloyd's
Insurance Policy Number:	00-SMCX02CD01
Insured Amount:	GBP £2,000,000
Insurance Company	John Heath (UK) Limited
Insurance Broker	COVERDRONE
Period Valid/Expiry Date	From 12 February 2016 to 11 February 2017 – 12 months

6.1. Nominated Personnel

Pilot-in-Command:	Christian Smith
Telephone Number:	0116 267 7454
Mobile Number:	07787 292 455
Email Address:	chris@leicesterdrones.com
Payload Operator	Christian Smith
Telephone Number:	0116 267 7454
Mobile Number:	07787 292 455
Email Address:	chris@leicesterdrones.com

6.2. Responsibilities

Pilot-In-Command;

- The Pilot-In-Command on the day is responsible for supervising the operation of the UAS.
- Ensure all crew members are aware of their responsibilities by giving a Crew Briefing.
- Ensuring all required paperwork is completed such as pilot and aircraft hours, battery log etc.
- Ensuring the On-Site Assessment is completed correctly.
- Ensuring the aircraft is only operated within the stated limitations for that particular aircraft.
- Ensuring all commercial work is completed within the limitations stated on the Permission for Aerial Work document.
- Ensuring that the aircraft used is airworthy by completing the pre-flight checklist.
- Ensuring that the welfare of themselves or others is not compromised by any planned operations.
- Ensuring that they are of sound body and mind to operate the aircraft.

Payload Operator;

- Ensuring the camera is operational. (Fully charged, empty memory card fitted, lens clean)

- Ensuring the camera is securely mounted. (The Pilot-In-Command must confirm this also)
- Ensuring the camera is switched on and operating correctly before activation of the aircraft.
- Ensuring the camera 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.
- Ensure the camera is rotated to the stored position for take-off and landing procedures.
- Communicate with client as required to establish required task.

Observer;

Leicester Drones will use members of their client personnel as observers if they are on-site and additional observers/payload operators will be employed when required. Pre-site surveys will be used by the Pilot-in-Command to highlight potential issues and to provide an indication when extra support personnel will be needed.

Observer Responsibilities;

- The Observer will inform the Pilot in Command of any other aircraft entering its flight path.
- The Observer will monitor the security of the area and keep a look-out for any member of the public who is approaching the Pilot in Command and intervene, if necessary, to stop the Pilot in Command being distracted.
- The Observer will operate the Return to Home function if the Pilot in Command becomes incapacitated.
- The Observer will assist in observing and noting the heading of the aircraft in the event of a 'Fly Away' scenario.

PART B – AIRCRAFT AND OPERATIONAL CONTROL

7. Aircraft Technical Specifications

The table below shows specifications for aircraft: **DJI Phantom 3 Advanced**

Item	Aircraft Details
Operators Name / Registered Keeper	Christian Smith
LUASS Registration Number	2165
Manufacturer Name	DJI
Distributor Name	DJI
Airframe Make	DJI
Airframe Model	Phantom 3 Advanced
Serial Number	P76DCD13011171
Airframe Type	Multi-rotor
Span / Diameter (metres)	29cm
Un-laden Weight (kg)	0.8kg
Maximum Take-Off Mass (kg)	1.2kg
Propulsion Type	4 x DJI Brushless Electric Motors
Number of Motors / Engines	4
Motor / Engine Size	2312 960KV
Motor KV	960
Flight Battery Type	DJI LiPro 4S
Flight Battery Capacity	4480mAh
Propeller Size	24cm tip-to-tip
Flight Control System	2.400 GHz – 2.483 GHz
Flight Control System Make & Model	DJI integrated system
Flight Control Serial Number	P80DCD10010210
Flight Control Power Supply	6000mAh LiPo 2S main flight battery
Transmitter Make and Model	DJI GL300a

Receiver Make & Model	DJI Integrated System
Aircraft Control Frequency & Power Output	2.4GHz @ 100mW
GPS Unit	DJI Integrated System
Inertial Measuring Unit	DJI Integrated System
Ground Station Type	Active
Ground Station Make and Model	IPad Mini
Telemetry Link Make, Model, Frequency & Power Output	DJI "Lightbridge" system on 2.4GHz @ 100mW
Payload Link Make, Model, Frequency & Power Output	DJI "Lightbridge" System on 2.4GHz @ 100mW
Software / Firmware Version	V1.6.0040

7.1. Operating Limitations and Conditions

The table below shows aircraft operational limitations;

Limitation	DJI Phantom 3 Advanced
Operational Ceiling	4,800ft Above Mean Sea Level (AMSL)
Operational Endurance	20 Minutes
Maximum Permissible Airspeed	20 Knots Airspeed
Maximum Outside Air Temperature	40°C
Minimum Outside Air Temperature	0°C
Maximum Permissible Wind Speed Including Gusts	15 Kts @ 0ft Above Ground Level (AGL)
Frequencies Used	2.400GHz @ 100mW
Centre of Gravity	Marked with a sticker on bottom of gimbal
Balance Limitations	15mm fore and aft of the balance point

7.2. Types of Operation

The table below shows all types of Operations undertaken by Leicester Drones and the aircraft used for each operation:-

Operation Type	Aircraft Utilised	Payload Fitted
Aerial Photography	**DJI Phantom 3 Advanced**	Sony EXMOR 1/2.3 Camera

8. Maintenance Principles and Regime

Only Leicester Drones staff or appointed service engineers can carry out maintenance to **DJI Phantom 3 Advanced** aircraft. In all cases the Maintenance Logbook must be filled in to reflect any work completed and a flight test which tests all functions must be carried out by a registered, qualified Leicester Drones pilot.

ROUTINE MAINTENANCE

The Pre-Flight and Post-Flight checklists as shown in Appendix D must be carried out by a Leicester Drones pilot every time a Leicester Drones aircraft is operated.

Either every six months or every fifty hours of flight time, whichever comes first, the following inspection should be carried out by a Leicester Drones qualified pilot. The inspection should be recorded in the Aircraft Maintenance Logbook along with any findings. Any issues identified must be remedied and the aircraft must undergo a full flight test before the aircraft is returned to Operational Status:-

- Inspect the airframe for any damage, unusual marks and tightness of fixings.
- Inspect the motor mountings for correct tension.
- Inspect propellers for condition, unusual marks, chips, cracks and tightness of fixings.
- Inspect electrical wiring for condition, unusual marks or discolouration.
- Inspect electrical terminal fittings and plugs for secure attachment and general condition.
- Inspect attachment of all fittings such as flight controller, GPS antennae etc. for secure attachment
- Inspect payload attachment points for condition and security of payload.
- Inspect condition and function of all ancillary equipment such as transmitter, ground station etc.
- Test all system battery packs for charge status and general condition.

If any issues or problems are identified then the aircraft must not be allowed to fly until the issue has been remedied. If Minor problems (damaged propeller, faulty battery pack etc.) are identified and remedied and the Pilot-In-Command believes the aircraft is suitable to return to Operational Status, then the work completed should be noted in the Aircraft Maintenance Logbook. If Major issues are identified (unserviceable motor, damaged airframe etc.) then the aircraft must undergo a full flight test regime as shown below once the identified fault has been remedied:-

FULL FLIGHT TEST

The system must have all functions thoroughly tested with a minimum of fifteen minutes flight time by a qualified Leicester Drones pilot recording any abnormalities in the Aircraft Operating Hours Logbook. If the Pilot-In-Command deems the aircraft safe then the Accountable Manager, Christian Smith should sign the Aircraft Operating Hours Logbook as fit for operational use.

Systems with identified issues to firmware or software should be grounded until the problem can be rectified.

8.1. Software and Firmware Update Policy

All new software and firmware will be thoroughly assessed before installation. Particular attention should be focused on relevance to operations, reason for release and any known issues. Multi-rotor and UAS forums should be examined for any reported issues with the release and only when the validity of the upgrade has been confirmed should the upgrade be considered.

In all circumstances the upgrade should only be performed by qualified Leicester Drones personnel or appointed service providers. All upgrade information such as version numbers and new functions must be recorded in the Aircraft Maintenance Logbook. All Leicester Drones pilots must be made aware that the firmware or software has been upgraded before any flight is undertaken.

Any upgraded system must then have all functions thoroughly tested with a minimum of fifteen minutes flight time by a qualified Leicester Drones pilot recording any abnormalities in the Aircraft Operating Hours Logbook. If the Pilot-In-Command deems the aircraft safe then the Accountable Manager, Christian Smith should sign the Aircraft Operating Hours Logbook as fit for operational use. If any doubts exist as to the new upgrade then the aircraft should be downgraded to the previous firmware and the flight test procedure repeated.

Systems with identified issues to firmware or software should be grounded until the problem can be rectified.

9. Supervision of Remotely Piloted Aircraft System (RPAS)

When in-flight the Leicester Drones Pilot-In-Command on the day is responsible for supervising the operation of the Leicester Drones SUAS.

10. Incident Investigation and Mandatory Occurrence Reporting

Any Incidents or Occurrences will be dealt with by Leicester Drones as follows:-

10.1. 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

10.2. Incident Logging

All **MINOR** incidents should be logged in the Aircraft Operating Hours Logbook. 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 and the Incident Logbook should be completed.

10.3. Investigation Procedure

Any investigations undertaken by Leicester Drones will follow the procedure shown below. EuroUSC™ will be advised initially of any occurrence with a simple statement of the known facts such as date, time, location, aircraft involved, Pilot-In-Command, damage sustained and a brief description of the occurrence. EuroUSC™ will also then receive a copy of the final investigation report once completed.

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 short-comings highlighted through the investigation process. These may cover anything, however the key issue of safety must be addressed and is the primary concern of EuroUSC™.

10.4. Mandatory Occurrence Reporting

Mandatory Occurrence Reporting will be completed as required by the National Aviation Authority for the particular country of operation. For example, when operating in the United Kingdom CAP382 will be the compliance document and reporting will be carried out utilising the form SRG 1601.

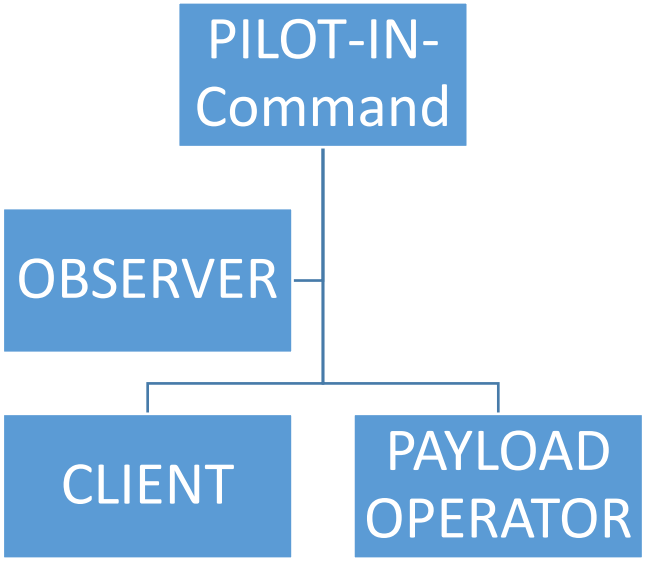
In the event that a person is injured or killed I would also contact the Air Accident Investigation Branch (AAIB): the AAIB operates a 24 hour hotline, 01252 512299, and following registration of the incident the AAIB will advise me whether anything additional is required.

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.

11. Operation of Multiple Aircraft

Not applicable at present time.

12. Flight Team Composition



12.1. Qualification Requirements and Currency

All personnel operating as Pilot-In-Command for Leicester Drones must be at least eighteen years of age and have undertaken the following :-

- BNUC-S™ Qualification (Theory Examination & Flight Operations Examination)

Leicester Drones pilots are required to maintain operational currency standards by ensuring that they operate an aircraft for at least thirty minutes flight time every calendar month. This may be completed with training flights or in extreme circumstances such as periods of adverse weather conditions, a flight simulator may be permitted. All Leicester Drones pilots are required to submit an up-to-date 'Pilot Hours' logbook to EuroUSC™ once a year as requested.

12.2. 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 the Flight Crew for Leicester Drones. All Flight Crew members must be capable of clearly reading a vehicle registration number plate from twenty metres distance. Leicester Drones Flight Crew members shall not operate if they are under the influence of alcohol. Leicester Drones also has a strict no drugs policy. All Flight Crew members taking prescription drugs should seek professional guidance and also advise the Pilot-In-Command. Any Flight Crew members should advise the Pilot-In-Command or Observer if an aircraft is in flight immediately if they feel unable to continue with their assigned responsibilities. All Leicester Drones Pilots are limited to a maximum of sixty minutes of flight time in any twenty four hour period.

13. Logs and Records

Leicester Drones will maintain up-to-date information and operational logbooks for:-

- Aircraft and Pilot Operating Hours Logbook
- Battery Charge Logbook
- Aircraft Maintenance Logbook
- Incident / Accident Logbook

Please see Appendix E for examples of these logbooks.

PART C – FLIGHT PLANNING AND PREPARATION (Pre-Site)

14. Determination of Intended Task and Feasibility

Initial customer enquiries should be captured using the Customer Enquiry Form found in Appendix C. Details should be captured on the form from the customer such as:-

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

A Pre-Site Survey Form, Risk Assessment Form and an On-Site Survey Form should also be stapled to this Initial Contact Form to produce a 'Job File' which will be taken On-Site whilst the Flight Operations are undertaken and will then be retained for at least three years for future reference if required.

15. Operating Site Location and Assessment

The Pre-Site Assessment Survey Form which can be found in Appendix C should be completed. Any experienced Leicester Drones personnel can complete the form using the following information sources:-

- Client Information
- Current Relevant Aeronautical Charts
  Sky Vector - Online Aeronautical Charts
- Google Earth
- Google Maps
- NATS Aeronautical Information Services – United Kingdom
- Sky Demon Light

16. Risk Management

Leicester Drones staff will use the Risk Assessment form found in Appendix C to record Hazards which affect normal flight operations. Potential mitigating factors should also be recorded. Below is a Risk Matrix which should help to determine if a proposed Flight Operation has acceptable risks:

Severity of Potential Incident or Fatality					
1 to 5 = Low Risk 6 to 10 = Moderate Risk 12 to 15 = High Risk 16 to 20 = Unacceptable Risk		Insignificant No Incident 1	Non Reportable Incident 2	Reportable Incident 3	Major Injury or Fatalities 4
Probability of Hazard	Almost Certain 5	5	10	15	20
	Will Probably Occur 4	4	8	12	16
	Will Possibly Occur 3	3	6	9	12
	Remote Possibility 2	2	4	6	8
	Extremely Unlikely 1	1	2	3	4

- Risk factors between 1 and 10 are acceptable and the operation can be cleared.
- Risk factors between 12 and 15 are unacceptable but mitigating factors may reduce the risk.
- Risk factors between 16 and 20 are unacceptable and the operation cannot be cleared.

17. Communications

Contact telephone numbers for the following must be recorded on the On-Site Survey Form which can be found in Appendix C before embarkation to the site. This task is best carried out at the planning stage whilst the Pre-Site Survey form is being completed.

- Pilot Contact Number
- Observer Contact Number
- Client Contact Number
- Local Police Station Contact Number
- Local Hospital Contact Number
- Local Air Traffic Control Contact Number
- EuroUSC™ Contact Number

Consideration must be given to the Operating Location in relation to crew communication. If the operating location is likely to be busy or noisy then two way radios should be issued so that crew members can remain in contact. The Pilot-In-Command will not be given a radio as all communication will be relayed through the Observer so as not to disturb concentration. The Pre-Site Assessment should have already identified any possible forms of frequency interference, if there is a possible risk then a frequency spectrum analyser should be used to assess potential interference. All Leicester Drones crew members must carry a fully charged mobile phone and ensure they have all of the relevant contact numbers in case of emergencies.

18. Pre-Notification

Pre-Notification is required if a planned flight operation is to take place within two and a half nautical miles of an aerodrome. The Pilot-In-Command should contact the Local Control Tower in person at least twenty four hours before the planned flight to advise the controller of the planned flight operation. Contact details for the tower can be found on the relevant On-Site Survey Form as part of the Job File.

If the planned flight operation is to take place in areas where there is likely to be members of the public, it is recommended that the local police are informed. The contact number can be found on the On-Site Assessment form.

If the Flight Operation is to take place in highly congested areas such as housing estates, a leaflet drop must 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 Leicester Drones employee to announce planned flight operations at least one hour before commencement.

All relevant Leicester Drones crew members must be advised of a planned flight operation at least twenty four hours in advance by means of a 'Call Sheet'.

19. Site Permissions

Leicester Drones will obtain permission from all land owners over which flight operations are to be conducted. 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 land owners.

20. Weather Forecasts

In the week leading up to any flight operation Leicester Drones will obtain long range weather forecasts. Twenty four hours before the proposed flight operations a further weather forecast will be obtained. The information from this weather forecast will either be printed and stapled to or written in the Pre-Site Survey Form. The Pilot-In-Command will then review the weather forecast and based on the aircraft limitations make a decision about the validity of the planned flight operations. The client must be informed at least twenty four hours in advance if flight operations are to be postponed. Weather forecasts will be obtained using the following resources:-

- Met Office
- BBC Weather
- Weather Pro

21. Preparation and Serviceability of Equipment

Leicester Drones will ensure that all aircraft are kept in a serviceable condition through routine maintenance and the following checklists which can be found in Appendix D:

- Embarkation Checklist
- Arrival Checklist
- Pre-Flight Checklist
- Post-Flight Checklist

The Leicester Drones Pilot-In-Command on the day is responsible for ensuring that all checklists are completed correctly. The Leicester Drones Pilot-In-Command must check the Aircraft Maintenance Logbook for any issues and ensure that all required flight batteries are fully charged and ready to use before arriving at the operations site location.

PART D – OPERATING PROCEDURES (On-Site)

22. On-Site Assessment Survey

Upon arrival at the operating site location, the Leicester Drones Pilot-In-Command will carry out an On-Site Assessment Survey to familiarise themselves with the local geography of the site. This is completed by physically walking around the site to assess any hazards marked on the Pre-Site Assessment Form. It is advisable to carry out this procedure with the Observer so that all issues can be discussed as they are found. All findings should be recorded using the On-Site Assessment Form found in Appendix C. The mobile application GPS Test will be used to ascertain satellite coverage, a minimum of seven satellites over a good spread will be required for all Leicester Drones flight operations.

If the Pilot-In-Command feels confident that the proposed flight operations can be safely carried out then the operation can progress to the next stage.

- GPS Test Application - http://www.chartcross.co.uk/products/WM00002_details.asp

23. Selection of Operating Areas and Alternative

The Leicester Drones Pilot-In-Command should select an Operating or Take-Off area based on the following criteria. An alternative or emergency landing zone should also be discussed with the observer and selected, this area should be available to land in if the first location becomes inaccessible:

- Full visual coverage of the operating site.
- Position in relation to the sun to avoid visual impairment.
- Physical obstacles such as overhanging trees, rocks, buildings, power lines etc.
- Terrain topography, avoid steep slopes or uneven ground.
- Consider effects such as wind shear from nearby trees, buildings etc.
- All buildings and persons not under the control of the Pilot-In-Command must remain 30 metres away from the aircraft for Take-Off and 50 metres in flight.

24. Weather Checks

The Leicester Drones Pilot-In-Command for the operation must assess the local weather conditions. Wind speed in knots and outside air temperature in degrees Celsius will be obtained by using a hand held anemometer. The wind direction can be obtained using the compass feature of the GPS Test mobile application. The Rain Today application should also be consulted for operations in the UK, this gives information about the path rain has taken and predictions can be made from this. The on-site weather information should be recorded on the on-site survey form.

- Rain Today Application - http://www.raintoday.co.uk/

25. Crew Briefing

The Leicester Drones Pilot-In-Command will give the Crew Briefing. This briefing must be carried out before any flight operations take place. If possible a Pre-Operation crew briefing should be given on the day before a flight operation is to take place so that all crew members can be prepared on the day. If this is not possible an email should be sent to each flight crew team member at least twenty four hours before the planned flight operation advising on location and arrival time.

All Leicester Drones Flight Crew Team Members must be present at the crew briefing on-site. If any members miss the briefing they must complete a one to one briefing with the Pilot-In-Command. The Pilot-

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

- Check that all relevant and required crew members are present.
- Issue identification badges and fluorescent vests if required
- Advise crew of Take-Off, Landing, Emergency and Operating areas.
- Confirm flight plan with the crew.
- Advise the crew on timescales. (expected flight times, durations and quantities)
- Ensure all crew members 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 function.
- Check that the crew are happy to proceed.
- Issue Two Way radio communication devices if required and state channel to use

26. Crew Clothing

All Leicester Drones flight crew members should check the weather forecast before the planned flight operation and bring suitable clothing and footwear to the operating site. Whilst on site Leicester Drones identification badges must be worn at all times. During flight operations, each individual member of the flight crew must wear high visibility clothing clearly stating their role i.e. Pilot, Observer, Payload Operator etc.

27. Cordon Procedure

The Pre-Site Assessment should have identified if a cordon is required but the Leicester Drones Pilot-In-Command will confirm if a cordon is required. If large numbers of the public are expected then 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, access may be restricted but spotters may not detain any members of the public or prevent them from accessing public rights of way. The spotters are there to advise on the dangers of entering restricted areas and to advise the Observer about public encroachments.

If the location is set in a more rural area then 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.

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

28. Aircraft Communications

As part of the On-Site assessment survey the Leicester Drones Pilot-In-Command will check the available satellite coverage using the mobile GPS signal application GPS TEST. Consideration to *'Dilution of Precision'* must be given into account; seven satellites over a good spread (not all next to each other) are required for the planned flight operations to proceed. Consideration should be given to buildings and structures which could block or distort the GPS / GNSS signal. It should be noted that if the satellite coverage is not sufficient for the aircraft to attain a 3D fix the fail safe function will not operate. The audio visual link should be tested at the earliest convenience and if any interference is witnessed on the 2.400 GHz frequency another channel

can be selected, there are several channels to choose from and are changed by moving the dip switches on the transmitter module. Care should be taken to ensure that the switch positions on the transmitter and receiver match to ensure a link.

29. Charging and Fitting of Batteries

The Leicester Drones Pilot-In-Command is responsible for charging and fitting flight battery packs to the aircraft. All battery packs should be charged and checked as part of the embarkation checklist found in Appendix D. All Leicester Drones battery packs will be identified by a unique specific identification number applied to the battery pack. Battery identification codes can be found in the front of the Battery Charge Logbook.

All Leicester Drones battery information will be recorded in the Battery Charge Logbook, an example of which can be found in Appendix E.

The procedure for flight battery charging is:-

- Measure the battery residual charge % and enter the value in the corresponding charge logbook box.
- Connect the battery to the charger charge lead and balance lead.
- Select the appropriate settings on the charger for the battery.
- Place the battery pack into the Lipo-Safe bag and start the charge cycle.
- Stay in the area of the charging battery, never leave unattended.
- When battery is charged log the mAh charge input in the charge logbook.
- Switch off the charger and disconnect the battery pack.
- Fit the “Charged” peg to the battery lead to confirm this battery is ready for use.

Batteries must be charged in “Lipo-Safe” protective bags using the correct specific battery charger in line with the manufacturer’s guidelines. Batteries must never be left unattended whilst charging. A fire extinguisher must be present when charging battery packs. All batteries will be stored in the large storage box marked “Batteries”. Any battery packs showing anomalies will not be used and must be disposed of through the recognised battery disposal area at the council refuse site.

Before any battery is to be used the voltage must be checked by pressing the button on the intelligent flight battery and noting the number of lights and this reading should be logged in the charge logbook in the appropriate box. Any battery under 90% charge will not be fitted. The charged peg must be removed from the battery to identify that this battery is no longer fully charged and requires charging before being refitted.

If a battery pack is not used in any three month period it must be checked and charged if required.

See this Guide for further Details – 4 Max Lithium Polymer Battery Guide

30. Loading of Equipment

The Leicester Drones Payload Operator is responsible for ensuring that the payload is ready to use. If the payload is a camera the memory card should be empty and the battery should be fully charged.

The Leicester Drones Pilot-In-Command is responsible for ensuring that the payload is securely fitted to the airframe. All payloads require two mechanical fixings such as a retaining bolt and safety lanyard before flight operations can commence. The Pilot-In-Command should ensure that the aircraft balances correctly with the selected payload fitted, adjustments to position should be made to ensure this is the case and under no circumstances should the aircraft fly if the balance is not within limitations. The centre of gravity is marked

with a sticker on the bottom of the gimbal. The Pilot-In-Command is responsible for ensuring that the aircraft does not operate in excess of the stated maximum take-off mass.

31. Pre-Flight and Post-Flight Checks

The Leicester Drones Pilot-In-Command on the day must complete the following checklists as required:

The *Embarkation Checklist* must be completed before the equipment is loaded and brought to site, ideally twenty four hours in advance.

The *Arrival Checklist* must be completed as soon as the Pilot-In-Command reaches the intended flight operation location.

The *Pre-flight Checklist* must be completed immediately prior to any flight operation.

The *Post-flight Checklist* must be completed immediately after landing.

All Checklists can be found in Appendix D. If any fault or problem is found which cannot be remedied, then the intended flight operations must be postponed until a solution is found. All findings must be documented in the relevant logbook. Any interrupted checklist procedure must be restarted from the beginning.

32. Flight Procedures

The following procedures are basic guidelines for Leicester Drones flight crew. As far as practically possible these procedures must be complied with. The Leicester Drones Pilot-In-Command on the day is responsible for supervising the operation whilst the aircraft is in flight.

32.1. Start-up Procedure

The following procedure is to be completed by the Pilot-In-Command

- Check Flight Battery Pack Level by pressing the button on the intelligent flight battery and making sure at least four lights are illuminated;
- Record Battery Pack identification code and power level details in the Battery Logbook;
- Fit the Flight Battery to the aircraft and place the aircraft on the calibration platform facing into wind;
- Ensure all switches on the Aircraft Control Transmitter are set correctly;
- Switch on the Aircraft Control Transmitter and ensure battery level is over 80%;
- Call *"Clear Props"* and connect the flight battery pack *;*
- Let the aircraft run the system diagnostics program;
- Test camera gimbal operation and move to take-off position *(camera lens parallel with ground level);*
- Switch on Ground Station and load software;
- Monitor satellite capture on screen until at least 6 satellites are captured;
- Confirm GPS / GNSS position fix*;*
- Load waypoint flight plan if required.

32.2. Take-off Procedure

The following procedure is to be completed by the Pilot-In-Command

- Make a 360° visual sweep of the area *(Pay particular attention to airspace and public encroachments)*
- Confirm with the Observer that it is clear to take off
- Check and note the time

- Call *"Taking Off"* and start the motors *(Move the left transmitter stick to bottom right)*
- Take a final look above the aircraft and power up to ¾ power *(Use a steady progressive movement)*
- Climb to approximately 2 metres and reduce power to hover
- Test yaw and cyclic controls *(Use small gentle movements and ensure aircraft reacts correctly)*
- Engage position and altitude hold to test function *(Aircraft should hold position and altitude)*
- Check battery status and number of satellites being tracked
- Call *"Camera Free"* to advise payload operator that the payload can now be moved
- Confirm with observer that the planned flight operation is still good to go ahead

32.3. In-flight Procedure

The following procedure is to be completed by the Pilot-In-Command and observer

- Pilot-In-Command to keep aircraft within the 500 metre wide and 400 feet height bubble
- Pilot-In-Command to maintain primary focus on the aircraft and immediate surroundings
- Pilot-In-Command to monitor basic telemetry from aircraft when safe and appropriate
- Pilot-In-Command to maintain communications with the Observer at all times
- Pilot-In-Command to follow instruction from payload operator if safe to do so
- Observer to monitor telemetry, flight battery voltage, satellites tracked, altitude etc.
- Observer to give Pilot-In-Command continuous feedback of flight battery voltage
- Observer to maintain visual lookout for public encroachments and airspace incursions

32.4. Landing Procedure

The following procedure is to be completed by the Pilot-In-Command, observer and payload operator

- Pilot-In-Command to advise Observer of intention to land
- Observer to visually check landing area to ensure it is safe to land
- Pilot-In-Command to fly directly to landing site and hover at approximately 2 metres facing into wind
- Payload Operator to ensure payload is stowed for landing and call *"Camera Safe"*
- Pilot-In-Command to take a final look below the aircraft and call *"Landing"*
- Pilot-In-Command to reduce power and land the aircraft *(Be aware of ground effect)*

32.5. Shut-down Procedure

The following procedure is to be completed by the Pilot-In-Command

- Upon touchdown stop the motors *(Move the left transmitter stick to the bottom left corner)*
- Approach the aircraft, disconnect the flight battery pack and call *"Aircraft Safe"*
- Check and note the time
- Switch off the Aircraft Control Transmitter
- Check Flight Battery Pack Level with Battery Checker
- Fill in Pilot / Aircraft Hours and Battery Logbooks

33. Emergency Procedures

Below is a list of Emergency Procedures for various scenarios which should be adhered to by the Leicester Drones Pilot-In-Command. Spotters may need to utilise two way radios to ensure that their calls can be heard by the rest of the crew. Any emergency situation should be recorded in the Aircraft Hours Logbook under the "*notes"* section. Refer to Section 10 for Incident Handling Procedures.

FAIL SAFE PROCEDURE: Upon activation of the 'fail safe' function the aircraft will hold position and altitude for three seconds, the aircraft will then climb to 20 metres if lower or remain at current altitude if higher

than 20 metres. The aircraft will then head directly to the position at which it attained GPS / GNSS position lock after power up. Once in position the aircraft will hold position for a further three seconds before slowly descending to land. Once the aircraft has landed the motors will shut-down.

Emergency Type	Action Required	Responsibility Delegated to
Transmitter Failure Frequency Interference	Call *"Fail Safe"* so that the crew understand the situation and observe the aircraft's flight path. Upon transmitter failure or frequency interference the aircraft will enter the 'Fail Safe' mode as described above.	Pilot-In-Command
	Upon hearing the call *"Fail Safe"* ensure that the take-off site is clear of all persons as the aircraft will be returning to its initial 'power up' coordinates.	Observer / Spotters
Loss of Propulsion Motor or Propeller Failure Aircraft Battery Failure	Call *"Dead Stick"* and assess if the aircraft is controllable, if sufficient control is maintained head directly to either the landing site or alternate landing site whichever is closest. If control is compromised try to execute a controlled descent.	Pilot-In-Command
	Upon hearing the call *"Dead Stick"* identify the closest safe landing position to the aircraft and advise the Pilot-In-Command.	Observer
	Upon hearing the call *"Dead Stick"* immediately clear any persons directly underneath or in the path of the aircraft to either the landing site or alternate landing site whichever is closest. Maintain visual contact with the aircraft once the area is clear.	Observer / Spotters
Ground Control Station Failure	Call *"Landing"* and carry out the standard landing procedure. The aircraft is not in immediate danger but the ground station monitors crucial systems and therefore it is not advisable to fly without telemetry information.	Pilot-In-Command
Loss of GPS / GNSS Signal	Call *"Dead Stick"* and switch the aircraft in manual or 'attitude' control, head directly to either the landing site or alternate landing site whichever is closest. If control is compromised try to execute a controlled descent.	Pilot-In-Command
	Upon hearing the call *"Dead Stick"* identify the closest safe landing position to the aircraft and advise the Pilot-In-Command.	Observer
	Upon hearing the call *"Dead Stick"* immediately clear any persons directly underneath or in the path of the aircraft to either the landing site or alternate landing site whichever is closest. Maintain visual contact with the aircraft once the area is clear.	Observer / Spotters
Public Encroachment	Call *"Public"* and approach the member of the public asking them to follow you to safety as they are currently in an extremely dangerous situation.	Spotter
	Upon identifying an encroachment from a member of the public or hearing the call *"Public"* advise the Pilot-In-Command by using the relevant phrase *("Public Below", "Public Left" or "Public Right")*. Identify the nearest available landing site away from the encroachment and advise the Pilot-In-Command. Once the Pilot-In-Command confirms they understand, if there is no Observer present dealing with the situation approach	Observer

	the member of the public asking them to follow you to safety as they are currently in an extremely dangerous situation.	
	Upon being advised by the Observer of a public encroachment immediately hold position and wait for further instruction. The Observer will advise which the safest area to land is and confirmation should be given that the instruction has been understood. Immediately proceed to the advised landing site.	Pilot-In-Command
Aircraft Incursions	Upon identifying an imminent aircraft incursion within the 400ft, 500 metre bubble call the relevant phrase (*"Aircraft Ahead", "Aircraft Behind", "Aircraft Left" or "Aircraft Right"*) and maintain visual contact with the approaching aircraft.	Spotter
	Upon identifying an imminent aircraft incursion within the 400ft, 500 metre bubble or hearing the call "Aircraft …" identify the approaching aircraft. Advise the Pilot-In-Command to take avoiding action by using the phrase *"Aircraft, Descend"*. Once the aircraft has passed by then Advise the Pilot-In-Command by using the phrase *"Aircraft Clear"*.	Observer
	Upon being advised by the Observer of an aircraft incursion immediately hold position and look beneath the aircraft to identify hazards. Descend the aircraft to around 10ft above the ground or any structure. Once the Observer advises the incursion no longer exists the planned operation may resume.	Pilot-In-Command
Fly Away Actions	Call *"Fly Away"* so that the crew understand the situation. Activate the return to home fail safe function in case communication is re-established and maintain direct visual contact with the aircraft for as long as possible. If visual contact is lost make a note of estimated altitude, speed, remaining battery endurance and heading estimated from the compass rose on the calibration platform. Once the Observer confirms actual information contact the local air traffic control and local police using the contact numbers found on the on-site assessment form to advise them of the situation. If the aircraft is seen to make contact with the ground or a structure, execute the shutdown procedure and walk over to the crash site taking a fire extinguisher and camera. Take photographs at the crash site, contact details and statements from anyone present and recover the aircraft. Leave contact details for any property damaged as a result.	Pilot-In-Command
	Upon hearing *"Fly Away"* immediately monitor the aircraft telemetry data and make a note of the aircraft's actual heading, speed and altitude. Try to activate the return to home or land functions on the ground station. Continue to monitor the telemetry data for as long as the connection remains and advise the Pilot-In-Command of the actual information so that the local air traffic control can be advised by the Pilot-In-Command.	Observer
	Upon hearing *"Fly Away"* maintain direct visual contact with the aircraft for as long as possible and advise the Pilot-In-Command of an estimated heading.	Spotter
Pilot Incapacitation	Upon feeling as though incapacitation is imminent try to	Pilot-In-Command

	activate the fail safe function and call *"Fail Safe"*	
	Upon noticing the Pilot-In-Command has become incapacitated activate the return to home fail safe function and call *"Fail Safe"*. Ensure that the Pilot-In-Command is not in any imminent danger from a returning aircraft and then ensure that the take-off site is clear of all persons as the aircraft will be returning to its initial 'power up' coordinates. Call for the emergency services if required. Once the aircraft lands and shuts down disconnect the flight battery.	Observer
Fire (Ground Equipment)	Upon noticing fire call *"Fire"*. If the fire is a Lithium Polymer battery fire do not try to extinguish, allow the battery to burn out and then extinguish any additional fires. If the fire cannot easily be extinguished and increases in size call the emergency services.	All Crew
Fire (Aircraft in Flight)	Upon noticing an aircraft fire call *"Aircraft Fire"* and wait for instruction from the Observer. Upon hearing *"Aircraft Fire"*, proceed directly as instructed by the Observer to the safest available landing point. Upon landing shut down the motors.	Pilot-In-Command
	Upon identifying an aircraft fire call *"Aircraft Fire"*. Upon hearing *"Aircraft Fire"* immediately identify the nearest safe landing point and advise the Pilot-In-Command. Approach the aircraft with a fire extinguisher and continue as per the Fire (Ground Equipment) procedure	Observer
	Upon identifying an aircraft fire call *"Aircraft Fire"*. Upon hearing *"Aircraft Fire"* wait for the aircraft to land and then treat the emergency as per the Fire (Ground Equipment) procedure.	Spotter / Remaining Crew

Appendix A Permission / Exemption for Aerial Work

Appendix B Insurance Document

COVERDRONE

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.**	00-SMCX02CD01		
	Insurer	100% Underwriters at Lloyd's		
	Name of Insured	Christian Smith		
	Business of the Insured	Owner and Operator of SUA Including whilst in training		
	Address	24 Wanlip Avenue Birstall Leicester LE4 4JP United Kingdom		
	Period of Insurance	From	12/02/2016	
		To	11/02/2017	
		Both days inclusive		
PART 2	**Particulars of UAS**			
	(1) Make	(2) Type	(3) Year of Manufacture	Registration Marks
	DJI Phantom	3 Advanced	2015	30111171
	Non Owned Electronic Equipment	Sum Insured	Not Insured	
PART 3	**Standard Uses:** Commercial	**Special Uses:**	Aerial work being Photography and Filming Including whilst in training	
PART 4	**Operator Qualifications**	BNUC-s		
PART 5	**Geographical Limits**	Europe		
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)
	II Liability to Third Parties	**Bodily Injury** Nil		Bodily Injury and Damage to Property Combined

Coverdrone Policy Schedule *Page 2 of 2*

	Damage to Property You will pay the first GBP 100 in respect of damage to property each Accident **Professional Indemnity** The amount of GBP 1,000 shall be deducted from each and every claim	GBP 2000000 each Accident Inclusive of Aviation Liabilities sub-limit GBP 2000000 (never less than 750,000 SDR's) Professional Indemnity shall not exceed GBP 50,000 in the Policy period **This policy is fully compliant with EU Regulation (EC) No 785/2004**
Premises liability Subsection	**Bodily Injury** Nil **Damage to Property** You will pay the first GBP 100 in respect of damage to property each Accident	GBP 2000000 Any one Accident
Hangarkeepers Subsection		GBP 2000000 Any one Accident
Products Liability Subsection		GBP 2000000 Any one Accident and in the aggregate
Important	**COVERDRONE** Arrowscroft | 142 Nantwich Road | Crewe | Cheshire | CW2 6BG | United Kingdom **Email:** coverdrone@johnheath.com **Telephone** United Kingdom: 01270 448 998 Southern Ireland: 0144 75241 Germany: 0303 119 9281 Malta: 27761303 **Regulation** Coverdrone is a trading name of John Heath (UK) Limited – a Private Limited Company registered in England and Wales, company number 07636523. Authorised and Regulated by The Financial Conduct Authority. Dated: Friday, 05 February 2016	

Appendix C Operational Forms

Customer Enquiry Form

CUSTOMER ENQUIRY FORM		DATE
CUSTOMER DETAILS		**JOB NUMBER**
CUSTOMER NAME:		
ADDRESS:		
		DATE REQUIRED
POSTCODE:		**QUOTED PRICE**
CONTACT NUMBER:		£
LATITUDE:		**CLIENT VISIT REQUESTED**
LONGITUDE:		YES / NO
DESCRIPTION OF WORK REQUIRED		

Pre-Site Assessment Form

PRE SITE SURVEY

JOB NUMBER	DATE

SITE NAME		
LATITUDE & LONGITUDE:		
ALTITUTUDE FROM SEA LEVEL:		ft
WORK REQUIRED:		
DATE WORK REQUIRED:		
DOWLOADED MAP TO GROUNDSTATION: (Tick		
VEHICULAR ACCESS:	YES	NO

TEAM

PILOT IN COMMAND:	
OBSERVER:	
UAV REGISTRATION	
HELPER 1:	
HELPER 2:	

LOCATION

ITEM	ACTION (Use skydemon light, google earth & metcheck)	FINDING
AIRSPACE	What is the Airspace? (A,C,D,E,F,G) - Do I need ATC permission?	
TERRAIN	What is the Terrain? (Flat, Mountainous, Boggy)	
PROXIMITIES	Other Aircraft (Aerodromes, Heli Pads, Model Sites)	
HAZARDS	Live Firing, High Intensity Radio Transmissions, Gas Venting	
RESTRICTIONS	Nuclear Power Stations, Prisons	
SENSITIVITIES	Nature Reserves, Recreational Areas, Bye Laws	
PEOPLE	Local Habitation (Do we need to Letter Drop)	
LIVESTOCK	Local Farms	
PERMISSION	Local Authority, Land Owner, Military Space	
ACCESS	Public Right of Way, Gates & Roads	
FOOTPATHS	Public Footpaths, Bridal Paths	
ALTERNATE	Alternative Operational / Take Off Sites	
RISK REDUCTION	Can the job be done at another time to avoid School times etc	
WEATHER	24 hour forecast	
NOTAMS	Any Notice to Airmen that may effect operations	

PRE NOTIFICATIONS

If Notified Date, Time & Contact Name

LOCAL AIR TRAFFIC CONTROL:	
REGIONAL AIR TRAFFIC CONTROL:	
MILITARY CONTROL:	
NOTICE TO AIRMEN:	

RISK ASSESSMENT

Workplace		**Assessment Number**	000
Task / Activity			
Date Conducted	**Review by Date**	**Date Reviewed**	[REVIEWDATE]
Assessment Team			

1 **Hazard** (something with the potential to cause harm, how will it be realised and what is the potential injury?)	2 At Risk	3 **Existing Control Measures**	Risk 4 Severity	Risk 5 Probability	Risk 6 Risk	7 **Further Control Measures**	Risk 8 Severity	Risk 9 Probability	Risk 10 Risk

Further Actions (Further control measures that could be implemented at the planning stage to improve safety)

Additional Comments (Actions identified by personnel on site, to make the task safer)

Authorised by The Responsible Manager	**Name** (Print):	**Signed:**	**Dated:**

At Risk (column 2)	Severity (column 4 and 8)		Probability (column 5 and 9)	Risk Rating (column6B and 10)		
E - Employees	1	No Injury, property damage	1 Very Unlikely	Severity X Probability = 1 to 5	Low	Y – acceptable risk, work can start
C - Contractors	2	Minor Injury	2 Unlikely			
V - Visitors	3	+3 Day Absence	3 Likely	Severity X Probability = 6 to 14	Med	Y or N – may need further consideration
P - Public	4	Major Injury	4 Very Likely			
A - All	5	Death	5 Virtually Certain	Severity X Probability = 15 to 25	High	N – Unacceptable risk Do not start work

4.1.2 Risk Assessment Rev7 1 of 2

On-Site Assessment Form

ON SITE SURVEY	DATE	WIND SPEED
		KNOTS
PILOT:	TEMP.	DIRECTION
OBSERVER:	*C	

ITEM	CHECK	FINDING
OBSTRUCTIONS	Masts, wires, Buildings, Train Lines, Trees, Lakes, Rivers, Canals or Industrial Hazards	
VIEW LIMITATIONS	Anything that may impair line of sight vision	
PEOPLE	Is a Cordon required or some kind of crowd control	
LIVESTOCK	Any Animals or Wildlife	
SURFACE	Flat Surface, Rough, Sloped, Wet	
PERMISSION	Do We Have the Land Owners Permission	
PUBLIC	Public Right of Way, Footpaths, Gates	
AIR TRAFFIC	Do We Need & or Have Clearance	
COMMUNICATION	Two Way Radios Required	
PROXIMITY	Are We Far Enough Away from Buildings etc.	
TAKE OFF AREA	Where is the Safest Convenient Position	
LANDING AREA	Where is the Safest Convenient Position	
OPERATIONAL ZONE	Are there Any Hazards or Obstructions	
EMERGENCY AREA	Where is the Safest Convenient Position	
HOLDING AREA	Where is the Safest Convenient Position	

CONTACT NUMBERS
PILOT:
OBSERVER:
CLIENT:
LOCAL POLICE:
LOCAL HOSPITAL:
LOCAL AIR TRAFFIC CONTROL:
EURO USC:

NOTES:

Appendix D Checklists

Embarkation Checklist

EMBARKATION CHECKLIST

ITEM	ACTION / CHECK	TICK
Airframe	Check Condition & Airworthiness	
Camera Mount	Check Condition & Functionality	
Flight Controller / Transmitter(s)	Check Functionality	

ITEM	ACTION / CHECK	TICK
Camera(s) & Lens(s)	Check Condition & Functionality	
Camera Connection	Check Condition	
Camera Memory Cards	Check Condition & Space	
Camera Attached Correctly	Check Condition	

ITEM	ACTION / CHECK	TICK
RPAS Battery Charger	Check Condition & Functionality	
FPV Battery Charger	Check Condition & Functionality	
Camera Charger	Check Condition & Functionality	

ITEM	ACTION / CHECK	TICK
Screwdrivers (Flat / Cross Drive)	Check Condition	
Allen Keys	Check Condition	
Pliers (Standard / Long Nose)	Check Condition	
Cable Ties (Various Sizes)	Check Condition & Quantity	
Spare Props. (Tractor & Pusher)	Check Condition & Quantity	

ITEM	ACTION / CHECK	TICK
Mobile Phone Charger	Check Condition & Functionality	
FPV Receiver & Leads	Check Condition & Functionality	
Laptop & Leads	Check Condition & Functionality	
Mobile Phone & Emergency No's	Check Condition & Functionality	
Anemometer	Check Condition & Quantity	
First Aid Kit	Check Condition & Contents	
Fluorescent Jacket	Check Condition	
Clothing (Boots, Coat, Gloves)	Check Condition	
Air Navigation Map	Check Condition	
Checklists, Manuals & Logbooks	Check Condition & Current	
Notepad & Pens	Check Condition	
Site Assessment Form	Check Condition	
Signs, Safety Tape, Cones	Check Condition & Quantity	

ITEM	ACTION / CHECK	TICK
Flight Battery Packs	Charge & Check Condition	
Transmitter Batteries	Charge & Check Condition	

Arrival Checklist

ARRIVAL CHECKLIST

ITEM	ACTION / CHECK		TICK
SITE SURVEY	CARRY OUT SITE SURVEY WITH OBSERVER		
FLIGHT PLAN / BRIEF	CONFIRM FLIGHT PLAN & BRIEF CREW, OBSERVER & CLIENT		
AIRFRAME	UNLOAD & CHECK AIRFRAME FOR ANY DAMAGE IN TRANSIT		
CAMERA	CHECK ATTATCHED TO PLATFORM		
PROPELLERS	CHECK SECURING NUTS FOR TIGHTNESS (Replace if Removed)		
COMPUTER	SWITCH ON AND TEST OPERATION		
FPV MONITOR	SWITCH ON AND TEST OPERATION		
TRANSMITTER	CHECK OPERATION		
CREW IDENTIFICATION BADGES	ISSUE AS REQUIRED		
FLOURESCENT JACKETS	ISSUE AS REQUIRED		
FIRST AID KIT	POSITION TO BE EASILY ACCESSIBLE & INFORM CREW OF LOCATION		
CREW / HELPERS	POSITION AS REQUIRED TO MAINTAIN SAFE FLYING ZONE		
CORDENS, SIGNS & SAFETY TAPE	SETUP AS REQUIRED TO MAINTAIN SAFE OPERATION		

Pre-Flight Checklist

PRE FLIGHT CHECKLIST

ITEM	ACTION / CHECK		TICK
AIRFRAME	CHECK FOR DAMAGE, WEAR, TIGHTNESS OF FITTINGS, CONDITION AND SECURE FITMENT OF PROPELLERS AND SECURE ATTATCHMENT OF CAMERA		
FLIGHT BATTERY	NOTE BATTERY NUMBER IN BATTERY LOGBOOK, RECORD PRE-FLIGHT BATTERY POWER % AND FIT INTO AIRFRAME (No Lower than 90%)		
TRANSMITTER(S)	SWITCH ON, CHECK BATTERY POWER IS WITHIN SAFE PARAMETERS, ENSURE TRIMS ARE NUETRAL AND ALL SWITCHES ARE IN THEIR CORRECT POSITIONS		
CAMERA	SWITCH ON AND CONFIRM CORRECT OPERATION		
AIRFRAME	ENSURE AIRCRAFT IS LEVEL		
SELF DIAGNOSTIC	WAIT FOR DIAGNOSTIC TO FINISH & GPS LOCK TO BE ESTABLISHED (Flashing Green Lights)		
FPV MONITOR	CHECK FUNCTION & QUALITY OF LINK FROM CAMERA		
CAMERA PLATFORM	TEST FOR CONTROL AND OPERATION		
TELEMETRY LINK	ENSURE FPV AND TRANSMITTER DISPLAYS ARE CONNECTED		
CAMERA	START RECORDING		
AIRCRAFT ALIGNMENT	REPOSITION AIRCRAFT IN TAKE OFF AREA ON LEVEL GROUND FACING INITIAL FLYING DIRECTION		
CREW, PUBLIC & CLIENT	ENSURE ALL CREW, PUBLIC & CLIENT ARE IN CORRECT SAFE POSITIONS		
CLEARENCE	DO WE HAVE CLERENCE FROM AIR TRAFFIC CONTROL IF REQUIRED?		
POWER UP	CALL "*TAKING OFF*" AND START MOTORS (Left + RightTransmitter Stick to Bottom Right/Left Corners)		
TAKE OFF	TAKE ONE FINAL QUICK LOOK AROUND, CHECK WITH OBSERVER THAT THEY AGREE IT IS SAFE TO FLY, POWER UP AND TAKE OFF		
COMMUNICATION	THROUGHOUT ENTIRE FLIGHT STAY IN AUDIABLE CONTACT WITH OBSERVER, LISTEN FOR BATTERY WARNINGS, AIRSPACE INFRINGEMENTS OR PUBLIC ENCROACHMENTS		
LANDING	BEFORE LANDING, CHECK WITH OBSERVER, HOVER OVER LANDING AREA. TAKE A QUICK LOOK BELOW AIRCRAFT AND CALL "*LANDING*" AND THEN LAND.		

Post-Flight Checklist

POST FLIGHT CHECKLIST

ITEM	ACTION / CHECK		TICK
TOUCHDOWN	UPON TOUCHDOWN IMMEADIATELY STOP MOTORS (Left Transmitter Stick to Bottom Centre)		
TRANSMITTER	SWITCH OFF TRANSMITTER and FPV		
POWER DOWN	WALK TO AIRCRAFT, POWER OFF BATTERY AND CALL "*SAFE*"		
CAMERA	STOP RECORDING AND SWITCH OFF		
REMOVAL	REMOVE AIRCRAFT FROM LANDING AREA		
BATTERY	REMOVE FLIGHT BATTERY FROM AIRCRAFT, CHECK RESIDUAL BATTERY %, RECORD DETAILS IN BATTERY LOGBOOK & PLACE ON CHARGE IN LIPO SAFE BAG PROVIDED THAT THE BATTERY IS NOT WARM (If So Allow to Cool)		
MEMORY CARD	REMOVE FROM CAMERA AND BACK UP TO GROUND STATION		
REVIEW	REVIEW IMAGES AND DISCUSS WITH CREW AND OR CLIENT IF REQUIRED		
DATA RECORDING	RECORD FLIGHT TIME DETAILS IN PILOTS LOGBOOK & BATTERY LOGBOOK		
AIRFRAME	CHECK FOR DAMAGE, WEAR, TIGHTNESS OF FITTINGS, CONDITION AND SECURE FITMENT OF PROPELLERS AND SECURE ATTATCHMENT OF CAMERA		

Appendix E Logbooks

Battery Identification Chart & Logbook

BATTERY CHARGE LOG

BATTERY NUMBER	PRE-FLIGHT BATTERY CHARGE %	FLIGHT DURATION	NOTES	BATTERY RESIDUAL % BEFORE CHARGE	DATE OF CHARGE	CHARGE INPUT mAh

Maintenance Logbook

Date	Weekly Check (Pass/Fail)	Monthly Check (Pass/Fail)	OTHER REASON FOR MAINTENANCE	WORK DONE	PARTS REPLACED	SYSTEM TESTED YES OR NO	NOTES

Pilot and Aircraft Hours Logbook

Flight Numb	Date	Take-Off time (hh:mi	Landing time (hh:mi	Duration (hh:mr	Aircraft Registratic	Aircraft System	Engine Battery No:	Pilot-in-Command	Observer	Payload Operat	Location Nam	Latitude	Longitude	Purpose of Flight	Comments and Minor Incidents
1	15-Jul-13	14:01	14:40	00:39	n/a	Sim 1	n/a	Ian Charge			Office 1			Simulator	
2	15-Jul-13	15:00	15:30	00:30	n/a	Sim 1	n/a	Luke Out			Office 1			Simulator	
3	21-Jul-13	14:01	14:40	00:39	G-UAV9999	OctoPlus1	BATT-01	Ian Charge	Luke Out		Flight Site 1	66°57'44N	002°21'20W	Training Flight	Observer missed Hawk Jet approaching
4	21-Jul-13	08:10	08:25	00:15	G-UAV9998	OctoPlus1	BATT-02	Ian Charge	Roger Handover	Cameron Ready	Flight Site 1	66°57'44N	002°21'20W	Training Flight	Camera Battery Failed
5	01-Aug-13	10:02	10:27	00:25	G-UAV9999	OctoPlus1	BATT-01	Roger Handover	Luke Out		Flight Site 1	66°57'44N	002°21'20W	Training Flight	Bent prop on heavy landing. Prop replaced.
6	02-Aug-13	11:03	11:34	00:31	G-UAV9998	OctoPlus1	BATT-02	Roger Handover	Luke Out	Cameron Ready	Flight Site 1	66°57'44N	002°21'20W	Training Flight	Momentary loss of control signal. No cause found.
7	15-Aug-13	10:00	10:21	00:21	G-UAV9999	OctoPlus1	BATT-01	Ian Charge	Roger Handover	Cameron Ready	Kineton	521132N	0013652W	Flight Operations Exam	Recommended "Red plastic shrink" on failsafe switch
8	15-Aug-13	10:47	11:07	00:20	G-UAV9998	OctoPlus1	BATT-02	Roger Handover	Luke Out	Cameron Ready	Kineton	521132N	0013652W	Flight Operations Exam	
9	23-Aug-13	14:01	14:35	00:34	G-UAV9999	OctoPlus1	BATT-02	Ian Charge	Roger Handover	Cameron Ready	Flight Site 1	66°57'44N	002°21'20W	Operations Rehearsal	Low batttery warning. Landed early.
10	01-Sep-13	10:42	11:17	00:35	G-UAV9999	OctoPlus1	BATT-03	Ian Charge	Roger Handover	Cameron Ready	York	53°57'44N	001°4'54W	Luke Creative (Contract)	
		TOTAL	HOURS	03:05											

INCIDENT LOG

Date of Incident	*Time of incident*	*Incident Type*	*Incident Category*	*Injuries/Damage*	*Incident details*	*Action taken / Incident Report*	*Notes*

Incident Type	Incident Cat
Operational	Minor
Technical Failure	Medium
Environment	Serious