

PDRA01 Operations Manual Template

CAP 2606

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Revision History

Edition	Date	Summary
First Edition	April 5 th 2024	First Edition
First Edition - Amendment 1	April 10 th 2024	Changes to clarify sections of the PDRA01 template and bring into alignment with CAP 722H Version 3.
Version 2	August 02 nd 2024	Split operations manual into volume 1, volume 2 and annexes to aid CAA oversight. Added direct references to CAP 722 and the UAS Regulation in Publications. Added clarity regarding required UAS operator information on the operations manual front cover and within 1.2 and 1.5.2. Added reference to airspace managers in 2.16.7. Added UAS operator ID field to Annex 1- Feasibility study form. Added flyer ID information field to Annex 2 – Site survey form. Expanded upon airspace considerations in Annex 3 - Pre-flight briefing form. Added MAMC information to section 2.6 and contact details to section 2.6.1.5. Added information to 2.6.2 regarding trespass and nuisance. Added details to 2.11.2 regarding battery power contingency. Added GNSS data fields in 3.2 UA performance characteristics and 3.7 Navigation. Minor typos corrected.
Version 3	December 4 th 2024	Added to Terminology Moved visual observer information into support personnel section of 1.6 Responsibilities and duties of the UAS operator, remote pilot and support personnel and 1.7 Qualification, role training, currency and competency. Added 1.6.3.3 Maintenance personnel to 1.6 Responsibilities and duties of the UAS operator, remote pilot and support personnel. Added 1.7.3.3 Maintenance personnel to 1.7 Qualification, role training, currency and competency. Added MAMC phone number to 2.6.1.5 Military Airspace Management Cell Amended 2.9 Onsite Procedures to include date and time of the onsite survey. Changed 'Geo-fence' item in 12.11.3 Pre-flight checklists to 'Flight volume limitation'. Added guide text regarding centre of gravity calibrations to 2.11.3 Pre-flight checklists and 2.12.1 Take-off checklist. Added 2.13 Safety feature operating procedures.

		<p>Amended 2.19.4 Repairs to include information regarding test flights.</p> <p>Amended 2.19.5 Maintenance, repair and modification log to include details regarding modifications.</p> <p>Amended 2.20 Logs and records to include logs for modifications to the system.</p> <p>Added 3.10 Payloads.</p> <p>Amended Annex 1 - Feasibility study form to align with CAP 2606A.</p> <p>Amended Annex 2 - Onsite survey form. Site survey' changed to 'onsite survey'. 'Go / No Go?' changed to 'Go / No Go decision'. Other minor amends to align with CAP 2606A.</p> <p>Minor typos and formatting errors corrected.</p>
Version 3 - Amendment 1	19 th May 2025	<p>Amended 2.6 Pre-notification to third parties. To include 'As a safety action, to inform air users of your planned operation'.</p> <p>Changed MAMC and NOTAM from 'Obtain permission' to 'Safety action' in the table in 2.6 Pre-notification to third parties.</p> <p>Amended text in 2.6.1.5 Military Airspace Management Cell to offer clarity.</p>

Enquiries regarding the content of this publication should be addressed to: uavenquiries@caa.co.uk

The latest version of this document is available in electronic format at: [Drone and remote piloted aircraft publications | Civil Aviation Authority \(caa.co.uk\)](#)

PDRA01 operations manual

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Company/business/entity details

Company/business/entity	University of Portsmouth
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UAS systems

Make	Model	Type	Quantity
DJI	Mini 3 Pro	Multirotor	2
DJI	Mavic 3M	Multirotor	1
Wingtra	WingtraOne Gen I	VTOL fixed wing	1

Operational authorisation details

OA name	PDRA01-24199
OA expiry date	25th November 2026

Document details

Version	9.3
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About this document

This UAS PDRA01 operations manual includes organisation detail, safety information and operational procedures required to satisfy the Civil Aviation Authority's PDRA01 operational authorisation in compliance with UK Reg (EU) No. 2019/947 and CAP 722H.

This operations manual may only be used by competent personnel in accordance with the accountable managers permission.

Amendment record

Version	Date	Amended by	Details of change
1	September 2017	<p>M. Schaefer (UAS Safety Officer)</p> <p>T. Meredith (UAS Safety Officer)</p> <p>L. Martin (Deputy H&S Manager)</p>	<p>First draft:</p> <ul style="list-style-type: none"> Final version save for submission Adding Toby Meredith as a trained Pilot Adding Malcolm Whitworth's RPAS Formatting and drawings Resub meeting H&S edits
2	September 2018	<p>M. Schaefer (UAS Safety Officer)</p> <p>T. Meredith (UAS Safety Officer)</p> <p>L. Martin (Deputy H&S Manager)</p>	<p>Annual review:</p> <ul style="list-style-type: none"> Final version save for submission Added UAS Tec Specs as requested by CIVIL AVIATION AUTHORITY Added insurance declaration Added Paul Wright as trained Pilot, and added Fixed Wing UA details Minor amendments to flight logs Added system category to pilots' information Update terminology, organisation detail, changed ERP procedures, amended pre-site survey and on-site checklist forms. Corrected spelling and formatting Added new insurance declaration Update ERP procedures with specific scenarios Updated insurance certificate Added Pilot
3	September 2019	<p>M. Schaefer (UAS Safety Officer)</p> <p>T. Meredith (UAS Safety Officer)</p> <p>L. Martin (Deputy H&S Manager)</p>	<p>Annual review:</p> <ul style="list-style-type: none"> Updated OM to reflect latest CAP393/722, amended medical requirement text to match UoP Policy, removed 7kg mass boundary. Pre-renewal check with UAS Team
4	October 2020	<p>M. Schaefer (UAS Safety Officer)</p> <p>T. Meredith (UAS Safety Officer)</p>	<p>Annual review:</p> <ul style="list-style-type: none"> Minor changes to phrasing, removed MS from pilots list Re-added MS to Pilot's list, checked for renewal

			<p>process,</p> <p>removed PW from pilot's list, removed drones w/out pictures</p> <p>from drone list, added Wingtra pictures, amended log forms,</p> <p>updated insurance documents.</p> <ul style="list-style-type: none"> ● Finalisation for OM submission ● Removed MS, TM as pilot, added version numbers to CIVIL <p>AVIATION AUTHORITY documents, added date of document</p> <p>revision to header, Clarified Practical Flight Assessment as set</p> <p>out in CAP722 with reference to full chapter, section and subsection, added pilot incapacitation and incursion to Emergency Procedures, added mitigations from updated CAP393 to risk mitigation section to include FRZ, max height</p> <p>AGL and open air assemblies.</p> <ul style="list-style-type: none"> ● Added pilots in as CIVIL AVIATION AUTHORITY confirmed <p>covid statements are valid</p> <ul style="list-style-type: none"> ● Amended Accountable Manager
01	October 2021	<p>M. Schaefer (UAS Safety Officer)</p> <p>J. Shoebridge (CRP Manager)</p> <p>C. Fairlamb (HSW Advisor)</p> <p>T. Meredith (UAS Safety Officer)</p>	<p>Annual review:</p> <ul style="list-style-type: none"> ● changed front cover ● moved safety policy ● updated mitigations ● updated areas and types of operation ● added Loss of propeller/motor to ERP following CIVIL AVIATION AUTHORITY guidance ● made minor changes to wording to align with CAP722A ● added sections on security and privacy ● updated appendix with new RA and log forms ● Updated Insurance declaration ● Updated references, removed CAP393, Changed SUA to UAS and RPAs to UAS, Changed ECCAIRS to ECCAIR32. ● Changed acronym UAS from unmanned to uncrewed. ● Minor updates to checklist <p>Wording update throughout the document- authoritative command words such as shall/will rather than should</p> <p>7.5.7-</p>

			<p>physical security arrangements added 8.1- further detail of</p> <p>TRUCE arrangements and recording added.</p> <ul style="list-style-type: none"> Amended following GVC trainer meeting. Emergency cards <p>added for field use. Currency requirements amended.</p> <p>Clarified operator/remote pilot roles if not named on OA.</p> <p>Pilot removed due to insufficient hours.</p> <ul style="list-style-type: none"> Arrangement order amended for ease of use. Separated out the associated forms as standalone Separated out the Emergency Response Plan
6	August 2022	<p>M. Schaefer (UAS Safety Officer)</p> <p>C. Fairlamb (HSW Advisor)</p> <p>T. Meredith (UAS Safety Officer)</p>	<p>Annual Review</p> <ul style="list-style-type: none"> Updated relevant legislation Minor formatting changes Added SEGG DJI P4 Pro to list of UAS Added H&S DJI Mini 3 to list of UAS
6.1	October 2022	<p>M. Schaefer (UAS Safety Officer)</p> <p>T. Meredith (UAS Safety Officer)</p>	<ul style="list-style-type: none"> Updated relevant legislation Added Overflight section Added Night Section Minor formatting changes Minor amendments following external audit
6.2	November 2022	<p>Brent Schwarz (Accountable Manager)</p> <p>M. Schaefer (UAS Safety Officer)</p>	<p>Added page numbers to footer</p> <ul style="list-style-type: none"> Added date to Accountable Manager signature Added dates to H&S legislation Amended CAP1789A date Added ANO2016/765 Added acknowledgment of new regulations under Safety Statement Removed reference to CAP1763
6.3	March 2023	<p>Martin Schaefer (UAS Safety Officer)</p>	<p>Amended responsible and accountable managers.</p>
7.0	September 2023	<p>Brent Schwarz / Martin Schaefer / Toby Meredith</p>	<p>Whole document review</p>
7.1	10 th November 2023	<p>Martin Schaefer</p>	<p>Amendments based on CAA feedback</p> <ul style="list-style-type: none"> Corrected version date mismatch Added a full history of previous versions Moved Amendment Record to end of document Added AMC to Abbreviations Added AMC requirements to RP responsibilities Added AMC to Flight Operations Corrected Flyer ID for Toby Meredith

8.0	3 rd October 2024	Charlotte Downs, Martin Schaefer, Toby Meredith	Moved to PDRA01 Operations Manual Template CAP2606
8.1	2nd June 2025	Martin Schaefer	Amended AM
9.0	6 th October 2025	Martin Schaefer	First draft for renewal; Updated as per CAP2606 changes above to match all sections added or amended since last version. Amended operations planning and checklists to align with the spirit of the CAP2606 check lists, while keeping UX experience.
9.1	11 th November 2025	Martin Schaefer, Laura Sayers	Final check and signing prior to renewal.
9.2	6 th January 2026	Martin Schaefer	Moved check-lists to use the Survey123 app on mobile devices rather than paper check lists.
9.3	15/06/2026	Martin Schaefer	Changed AM

Amendments to this document shall be authorised by the accountable manager. All changes shall be read by the remote pilots. Any changes that impact flight operations will be accompanied by additional training. Any recent changes to this document shall be highlighted.

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Acronyms and abbreviations

Insert abbreviations into the table below that are used in this operations manual.

Abbreviation	Item
AAIB	Air Accident Investigation Board
AIAA	Area of Intense Aerial Activity
AIRPROX Board	Air Proximity Board (UK) – (Air miss Investigation)
ALARP	As Low As Reasonably Practicable
AOO	Area Of Operation
AMC	Acceptable Means of Compliance
ANO	Air Navigation Order
ANSP	Air Navigation Service Provider
ATC	Air Traffic Control
ATS	Air Traffic Services
C2	Command and Control
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
CG	Centre of Gravity
CTR	Control Traffic Region
CU	Command Unit
EC	Electronic Conspicuity
EMI	Electromagnetic Interference
ERA	Emergency Response Action
ERP	Emergency Response Plan
EU	European Union
FIS	Flight Information Service
FOD	Foreign Object Debris
FMS	Flight Management System
FRZ	Flight Restriction Zone
FW	Fixed Wing
GA	General Aviation
GDPR	General Data Protection Regulation
GNSS	Global Navigation Satellite System
HIRTA	High Intensity Radio Transmission Area

HMI	Human Machine Interface
IP	Ingress Protection
IR	UAS Implementing Regulation
Kp	Planetarische Kennziffer (planetary index scale used to measure space weather)
LFA	Low Flying Area
MAMC	Military Airspace Management Cell
mb/s	Megabits per second
METAR	Meteorological Terminal Aviation Report
MOR	Mandatory Occurrence Report
MORS	Mandatory Occurrence Reporting Scheme
MR	Multicopter
m/s	Metres per second
MTOM	Maximum Take-Off Mass
NAA	National Aviation Authority
NOTAM	Notice to Airmen
NSF	Non-Standard Flight
OM	Operations Manual
OS	Ordnance Survey
OSC	Operating Safety Case
OSD	On Screen Display
RLOS	Radio Line Of Sight
RP	Remote Pilot
RTH	Return to Home
s	Second
SKU	Stock Keeping Unit
TAF	Terminal Aerodrome Forecast
TOAL	Take-Off And Landing
TOLA	Take-Off and Landing Area
TTA	Tactical Training Area
UA	Uncrewed Aircraft*
UAS	Uncrewed Aircraft System*
UAS SO	UAS Safety Officer
UK	United Kingdom
UoP	University of Portsmouth

VLOS	Visual Line Of Sight
VTOL	Vertical Take-Off and Landing

*The University of Portsmouth (UoP) has adopted the gender-neutral term of 'Uncrewed Aircraft', rather than 'Unmanned Aircraft'. The UoP terminology of UAS is synonymous with the terminology (Unmanned Aircraft or Remotely Piloted Aircraft System) used within CAP 722, and UK Regulation (EU) 2019/947, i.e., uncrewed refers to any legal or natural person. 'Unmanned' has been retained in this document when it is a direct quote from CAA guidance documents.

Terminology

Flight volume

A volume of airspace that should encompass the entire operation, with sufficient buffer for any operational movement around the flight path, due to navigational errors, expected weather conditions and any other reason for deviating from the flight path.

Geo-cage

Safety system used to create a virtual boundary around a UA to control or restrict its movement. Parameters are set by the RP, inputting GNSS co-ordinates into the UAS.

GO

Parameters are such that the UAS operation may proceed.

NO GO

Parameters are such that the UAS operation may not proceed.

Non-smart battery

A battery that does not contain any internal electronics to manage its status or record its charging history.

Smart battery

A battery with internal electronics that typically assist efficient charging, can be set to automatically discharge the battery into storage state, manage its own temperature and automatically maintain battery charging logs.

UAS operation

A flight made with an unmanned aircraft to conduct an aerial task.

Publications

Publications that affect the proposed flight operations can be found in the CAA publications library:

[Drone and remote piloted aircraft publications | Civil Aviation Authority \(caa.co.uk\)](#)

[CAP 722](#) contains guidance for UAS operations in the UK.

[CAP 722H](#) contains information specific to PDRA01 UAS operations.

[UAS Regulation](#) contains the Consolidated Regulation, Acceptable Means of Compliance and Guidance Material to UK Regulation (EU) 2019/947 (as assimilated).

Volume 1

Section 1 – The organisation

1.1 Introduction

The University of Portsmouth is a Higher Education Institution primarily engaged in research and teaching and provides commercial services through University of Portsmouth Enterprise Limited (UPEL) which is a fully owned subsidiary of the University of Portsmouth.

UAS use within the University is not limited to a single area of operation or purpose, due to the varied requirements of each school within the University and the differing requirements of research and teaching. The main types of operation are:

- Aerial Photography: The production of still images across the electromagnetic spectrum including but not limited to thermography and photogrammetry.
- Aerial Videography: The production of video footage across the electromagnetic spectrum including but not limited to thermography and photogrammetry.
- Mapping / Autonomous flight management: The use of automated flight patterns to photograph specified areas to produce 3D models either as visible light models or 'Light Imaging, Detection and Ranging' (LIDAR). This will be achieved through pre-programmed, automated flight patterns over the pre-arranged, operationally specified areas.

UAS derived data captured using these operations can provide valuable insights into processes, capture snapshots in time or be used for creative purposes. We have used UAS to monitor coastal evolution, seagrass beds or salt marsh restoration. We have used UAS in film projects or to provide marketing footage for community projects.

In addition, UAS skills can prepare students for their transition to a work environment, the UAS business being a growing business area.

For the purpose of this PDRA, the area of operations may be in the whole of the UK, and encompass remote, rural, coastal or urban settings.

For this operations manual the University of Portsmouth is the organisation acting as the UAS Operator.

1.2 Safety statement

The University of Portsmouth is committed to safety as the primary consideration whilst conducting Uncrewed Aircraft System (UAS) operations. The protection of employees, contractors and the general public is of paramount importance and as such, all operations will be conducted in a safe and responsible manner. The University of Portsmouth embraces “just culture” and fosters an open, honest environment where employees are encouraged to voice any concerns over safety related issues so that they can be addressed immediately.

The UAS operator shall ensure all UAS systems are safe to operate in the proposed environment and that all systems to be employed will be operated safely. The UAS operator shall ensure that the flight crew adhere to the processes and procedures contained within this operations manual and any CAA authorisation issued.

The UAS operator shall ensure that all flight operations comply with any applicable rules relating to it, in particular with regard to privacy, data protection, liability, insurance, security and environmental protection.

The UAS operator is committed ensure all flight operations are conducted safely and that persons and property shall not be endangered.

All operations must be carried out in accordance with the issued Operational Authorisation PDRA01 and abide by the requirements of the Air Navigation Order 2016 (as amended) and Assimilated Regulation (EU) 2019/947 (The UAS Implementing Regulation) and to its Acceptable Means of Compliance.

Name:

Position: Accountable manager

Date:

1.3 Safety policy

The UAS operator adopts best industry practice to ensure all flight operations are conducted as safely as possible. This is achieved by ensuring all hazards are identified, that they are reduced to as low as reasonably practicable and that the outcome shall be tolerable.

All the flight crew shall be trained to the required level of competence in order to conduct the UAS operations detailed in this operations manual.

Just culture is embraced to enable all flight crew to contribute towards the safety targets of the UAS operator.

1.3.1 Safety targets

The safety targets for the flight operations are:

- Mitigate all hazards so they are ALARP and tolerable
- Minimise the possibility of occurrences
- Zero expectation of injury to any person
- Encourage an honest and open flight safety reporting policy using 'Just culture'.

Any person involved in flight operations can offer feedback to the accountable manager, either verbally or in writing, in order to continually improve the level of safety.

1.4 Insurance

Insurance **must** comply with regulation (EC) No 785/2004. The only exceptions are government departments who self-insure.

Insurance	
Insurer	HDI Global SE
Policy number	110-01157346-30026
Broker	Gallagher
Periodicity	Annual
Regulation (EC) No 785/2004 compliant?	Yes

Note: This insurance does not cover night operations, a separate insurance is required for night operations. This would be a Regulation (EC) No 785/2004 compliant per-flight insurance.

1.5 Nominated Personnel

1.5.1 Change Management

The PDRA01 operational authorisation is the responsibility of the accountable manager. Therefore, UAS flight operations in the Specific category must immediately cease and the CAA notified whenever any of the following occur:

- The accountable manager changes within the business/entity/organisation
- The principal place of business changes
- There is a change of ownership of the business/entity/organisation

The CAA will conduct an audit to decide if the changes can be conducted under the existing operational authorisation, or if a new application needs to be submitted.

1.5.2 Accountable manager

[UK Regulation \(EU\) 2019/947, Article 2, Definitions, \(2\)](#) definition:

Unmanned aircraft system operator (UAS operator) means any legal or natural person operating or intending to operate one or more UAS.

1.5.3 Remote pilot

[CAP 722D](#) definition of a remote pilot:

A natural person responsible for safely conducting the flight of an unmanned aircraft by operating its flight controls, either manually or, when the unmanned aircraft flies automatically, by monitoring its course and remaining able to intervene and change the course at any time.

1.5.4 UAS Safety Officer (UAS SO)

The person/s designated as UAS SO is/are responsible for assisting the Accountable Manager (CAA) in ensuring that, as a minimum standard, the requirements of the Civil Aviation Act, Air Navigation Order and associated legislation is met. The post holder may also be required to support other Health, Safety and Wellbeing activities commensurate with the grade and skillset

The UAS SO is a member of the University's Health, Safety and Compliance team, supporting the development and implementation of strategic and operational frameworks which facilitate a positive health and safety culture and good practice in all matters relating to Uncrewed Aircraft Systems.

The UAS SO provides competent advice to all university departments, including Faculties and Support Services, on matters relating to UAS ensuring that suitable and sufficient systems and processes are established throughout the organization and are effective.

The UAS SO provides guidance to all university staff on how to carry out UAS activities that adhere to UK legislations and regulations, the terms in the operations manual, and all UoP UAS policies.

1.6 Responsibilities and duties of the UAS operator, remote pilot and support personnel

1.6.1 UAS operator

The UAS operator is responsible for ensuring each remote pilot fulfil their competency requirements and responsibilities.

UAS Operator	Details
Regulation	UK Regulation (EU) 2019/947, UAS.SPEC.050 Responsibilities of the UAS operator
Responsibilities	<ul style="list-style-type: none"> • Overall responsibility for establishing safety procedures and limitations adapted to the type of operation • Provide procedures to ensure all security requirements for the area of operation are completed by the flight crew • Ensure the UAS cannot be interfered with or accessed by unauthorised persons, either physically or virtually (cyber) • Ensure data is protected and handled responsibly, in particular to images that may capture the identity of uninvolved people • Provide guidelines for remote pilots to minimise nuisances, including noise and emissions to uninvolved people and animals • Ensure the correct and legal use of radio spectrums for command, control and communication • Ensure all remote pilots are suitably trained, qualified, competent and current • Ensure all remote pilots have read and understood the Operations Manual • Designate a suitably qualified remote pilot to each operation • Ensure geographical zones, such as FRZs, RPZs and restricted airspace are kept up to date • Ensure that all flight operations are conducted within the limitations of the UAS, environmental conditions, flight crew and Operational Authorisations • Keep up-to-date records for a minimum of 3 years, to include training logs of the flight crew, personnel in charge of duties, maintenance, flight planning, flight logs and occurrences • Ensure fatigue of the flight crew is minimised • Ensure the UAS is suitable for the proposed operation • Ensure the UAS is maintained in a suitable condition for safe operation • Provide procedures for maintenance, including time periods, training and identification of maintenance staff • Keep an up-to-date list of the personnel and their assigned duties. • Keep an up-to-date list of the remote pilot for each flight • Ensure the safety of the operation of high voltage storage devices • Ensure high voltage storage devices are clearly identified and marked with a suitable warning label to mitigate against injury to uninvolved people • Ensuring all flight activities are logged and held securely on an electronic record • Ensuring battery health and capacity is monitored • Provide processes and procedures to identify the operational volume, flight volume, contingency volume and emergency buffer for every flight location • Provide processes and procedures to ensure the UA does not leave the operational volume • Provide processes and procedures to describe each proposed area of operation utilising maps, diagrams, charts, photographs, as deemed necessary. • Development of processes and procedures to provide a brief description for every proposed operating area • Ensuring all occurrences are reported • Ensuring insurance is in place for every flight • Ensuring the persons and property are not endangered • Ensure a training log is utilised in order to evidence remote pilots training accomplishments.

1.6.2 Remote pilot

Remote pilots operate the UAS through the use of flight controls.

Remote Pilot	Details
Regulation	UK Regulation (EU) 2019/947, UAS.SPEC.060 Responsibilities of the remote pilot
Responsibilities	<ul style="list-style-type: none"> ● Not be under the influence of psychoactive substances or alcohol ● Be fit to fly ● Be in possession of a UK GVC ● Be in possession of a UK CAA Flyer ID ● Carry evidence of their qualification and competency while operating the UAS ● Be familiar with the manufacturers operating instructions ● Obtain updated information regarding any geographical zones ● Ensure that the operating environment is compatible with the authorised limitations and conditions stated in any UK CAA operational authorisation, PDRA, this operations manual and any UAS being operated ● Ensure the UAS is in a safe condition to be flown ● Ensure any remote identification is activated and up-to-date (when/if applicable) ● Ensure information about the operation has been made available to the relevant air traffic service (ATS) units, other air users and relevant stakeholders, as required by the operational authorisation or by conditions designated in Article 15 of the Implementing Regulation ● Comply with authorised limitations and conditions ● Avoid risk of collision with any manned aircraft ● Discontinue a flight if there is any risk of endangerment to other aircraft, people, animals, environment or property ● Comply with the operational limitations in geographical zones designated in Article 15 of the Implementing Regulation ● Comply with the operators procedures detailed within this operations manual ● Must not fly close to or inside areas where an emergency response effort is occurring, unless permission has been given by the responsible emergency response services

1.6.3 Support personnel

1.6.3.1 Visual observers

Airspace observers and unmanned aircraft observers are both types of visual observer who can support the remote pilot with the UAS operation. One person can conduct both roles, if deemed appropriately competent by the UAS operator.

Visual observer	Details
Responsibilities	<ul style="list-style-type: none"> Follow instructions from the remote pilot by performing unaided visual scanning of the airspace in which the unmanned aircraft is operating for any potential hazard in the air or on the ground. Monitoring the flight path of the UAS to ensure there are no obstacles Communication with the remote pilot with regards to airspace, hazards, obstacles and uninvolved people Communication with uninvolved people Understand how to recover the UAS safely to the ground in case of pilot incapacitation Know what to do in other emergencies (cordon breach, air incursion, fire, etc)

1.6.3.1.1 Airspace observer

[UK Regulation \(EU\) 2019/947, Article 2, \(25\)](#) definition:

'airspace observer' means a person who assists the remote pilot by performing unaided visual scanning of the airspace in which the unmanned aircraft is operating for any potential hazard in the air;

1.6.3.1.2 Unmanned aircraft observer

[UK Regulation \(EU\) 2019/947, Article 2, \(24\)](#) definition:

'Unmanned aircraft observer' means a person, positioned alongside the remote pilot, who, by unaided visual observation of the unmanned aircraft, assists the remote pilot in keeping the unmanned aircraft in VLOS and safely conducting the flight;

1.6.3.2 Safety marshal

Safety marshal	Details
Responsibilities	Follow instructions from the remote pilot. Manage uninvolved people to keep ground safety cordons secure.

1.6.3.3 Maintenance personnel

Maintenance Personnel	Details
Responsibilities	<ul style="list-style-type: none"> Maintain the UAS to ensure it is safe to be flown Log maintenance, repairs and modification activities

1.7 Qualification, role training, currency and competency

A training log is utilised in order to evidence training and qualification accomplishments of the flight crew.

The University of Portsmouth uses an online records system to manage all UAS related records. We have a form for pilot registration that capture all formal training received and we have a flight logging form that captures pilot flight records and therefore currency. Using this system ensures records are kept and managed for the required data retention periods and are available immediately to the accountable manager. We maintain dashboards that are updated weekly from the online system in order to provide concise summaries for the accountable manager.

We maintain an annual record of attendance at our Hazard Response Training that is kept in our Content Management System with appropriate retention.

All records are retained in line with the UoP GDPR policy.

1.7.1 UAS operator

UAS Operator	Qualification requirement
Regulatory requirement	<ul style="list-style-type: none"> Be over 18 years of age Registered with the UK CAA as a UAS operator
Compulsory reading	<ul style="list-style-type: none"> PDRA01 operations manual (this document) CAP 722H UK Regulation (EU) 2019/947, UAS.SPEC.050 The UAS operator's PDRA01 operational authorisation *

* The UAS operator's PDRA01 operational authorisation can only be read when it has been issued by the CAA.

1.7.2 Remote pilot

1.7.2.1 Qualifications

Remote Pilot	Qualification requirement
Qualifications and certificates	<ul style="list-style-type: none"> UK CAA Flyer ID UK CAA GVC for fixed wing UK CAA GVC for multirotor
Compulsory reading	<ul style="list-style-type: none"> UAS manufacturers user manual/s Payload manufacturers user manual/s Ancillary equipment manufacturers user manual/s PDRA01 operations manual (this document) CAP 722H UK Regulation (EU) 2019/947, UAS.SPEC.060 The UAS operator's PDRA01 operational authorisation *
Training provided by UAS operator	<ul style="list-style-type: none"> UAS system training, either in-house, with the manufacturer or an RAE Procedures for flight planning, flight logging and admin Standard operating procedures Emergency procedures Occurrence reporting procedure
Additional qualifications	<ul style="list-style-type: none"> Must be fit to operate Mandatory internal UAS Training**

* The UAS operator's PDRA01 operational authorisation can only be read when it has been issued by the CAA.

** The internal training complements the training information required for the CAA Flyer ID. Additionally, the training focuses on the internal UAS policies and procedures. The training is for staff internal processes only and does not issue any certificates indicating competency outside of the university. The University does not consider itself to be a Recognised Assessment Entity.

1.7.2.2 Currency

The remote pilot must remain current to be considered competent to conduct a UAS flight operation with a PDRA01 operational authorisation.

To be considered current a remote pilot must have completed the following:

- A minimum of 2 hours **must** be logged on fixed wing UAS in the last 3 months, for remote pilots who hold a fixed wing UK GVC
- A minimum of 2 hours **must** be logged on multirotor UAS in the last 3 months, for remote pilots who hold a multirotor UK GVC
- Remote pilots conducting test flights on novel UAS **must** conduct their currency flights on a similar UAS type
- All currency flights **should** be 'live' and not simulated
- All flights **must** be logged and conducted in accordance with the regulatory requirements

"Currency gained with multi rotor aircraft can be considered towards currency for a hybrid aircraft if primary system of generation of lift is multi rotor" CAA comms 31/10/2024

To determine the primary system of generation of lift for a hybrid aircraft, the aircraft manufacturer will be contacted

If the remote pilot's currency lapses, they must complete the required time deficit. For example, if the remote pilot has only conducted 30 minutes of flying on a multirotor within the last 3 months, they must conduct a further 1.5 hours of practical flying in a safe environment, to regain currency.

All flights must be recorded in the remote pilot's logbook to comply with [UK Regulation \(EU\) 2019/947, UAS.SPEC.090](#) and [UAS.SPEC.050, 1, \(d\)](#).

1.7.2.3 Competence

The remote pilot is only considered to be competent when they can fulfil the following requirements:

- Has a current and in-date UK CAA GVC
- Has a current UK CAA Flyer ID
- Has completed and understood all of the compulsory reading
- Has completed training provided by the UAS operator
- Has obtained all additional qualifications required by the UAS operator
- Is current

1.7.3 Support personnel

1.7.3.1 Visual observers

An airspace observer or unmanned aircraft observer can be any competent person who has been briefed by the remote pilot on the following:

Visual observer	Qualification requirement
Qualification	<ul style="list-style-type: none"> • Must be a suitably competent person • Must be sufficiently fit to assist the remote pilot • Must have been sufficiently briefed by the remote pilot as to their duties and/or trained in their responsibilities • Must be able to communicate with the remote pilot • Must stand next to the remote pilot

1.7.3.2 Safety marshal

Safety marshal	Qualification requirement
Qualification	Must be a suitably competent person

1.7.3.3 Maintenance personnel

Maintenance Personnel	Qualification requirement
Responsibilities	<ul style="list-style-type: none"> • Must be a suitably trained and qualified person • Must have conducted training that follows the manufacturers maintenance, repair and modification procedures • Training may be conducted by the manufacturer, a training entity or in-house • Maintenance personnel must comply with any currency requirements implemented by regulation or the UAS manufacturer • Logs and records are to be kept of all maintenance, repair and modification activity • Must be able to follow a procedure to identify what activities can be conducted by in-house maintenance personnel, and when to send the UAS to a specialist, such as the manufacturer, dealership or other suitable entity • All maintenance, repairs or modifications must be validated to ensure the UAS remains safe to be flown • All UAS must be test flown after any maintenance, repairs or modifications that may affect the flight characteristics of the UAS, to ensure the UAS remains safe to be flown

1.8 Crew health

The UAS operator has a duty of care to ensure the flight crew are fit for duty by ensuring sensible working hours and the provision of adequate rest periods to prevent fatigue.

The flight crew must ensure they are fit to take part in a UAS operation.

The University provides an occupational health service that gives timely, effective advice to managers and staff on health issues where medical concerns have been raised by line managers. All crew should raise health concerns with the occupational health service via line manager referral, as per UAS guidance (UoP-CGHS-G-10). The University UAS

guidance also designates staff operating UAS as a dry role, as defined in the University Employee Alcohol and Drugs Policy.

The mnemonic IMSAFE is used to check flight crew's health.

Item	Question	Required Response
Illness	Do I have an illness or any symptoms?	No
Medication	Have I been taking drugs or medication which may affect my performance?	No
Stress	Am I under psychological pressure?	No
Alcohol	Have I been drinking within the past 12 hours?	No
Fatigue	Am I tired and not adequately rested?	No
Eating	Am I hungry or thirsty?	No

If a 'yes' response is given to any of the above, a risk assessment shall be conducted by the remote pilot, in order to decide if the flight crew member is able to participate in the planned operation.

1.9 Security and privacy

The UAS operator shall ensure that the UAS is protected from the following:

1.9.1 Security

1.9.1.1 Physical security

The UAS operator must protect the UAS from physical tampering by a third party. Therefore, only competent persons shall be authorised to handle the UAS.

1.9.1.2 Cyber security

The UAS operator shall ensure the risk of cyber attack on the UAS is at an acceptably low level. Only competent persons shall be authorised to access the UAS, firmware, software and control frequencies.

1.9.2 Privacy

UAS flights will not be conducted if an uninvolved person's right to privacy is likely to be breached. If the UAS is in flight, the remote pilot shall change the flight path or cancel the flight, before a breach of privacy occurs.

All data captured shall be handled and controlled in line with the [information commissioner's office](#).

Section 2 – Flight operations

2.1 UAS operation locations

UAS operations shall be conducted in the following non-specific locations:

- Uncongested areas
- Congested areas

2.2 Type of operation

2.2.1 VLOS

[UK Regulation \(EU\) 2019/947, Article 2, \(7\)](#) definition of VLOS:

‘Visual line of sight operation’ (VLOS) means a type of UAS operation in which, the remote pilot is able to maintain continuous unaided visual contact with the unmanned aircraft, allowing the remote pilot to control the flight path of the unmanned aircraft in relation to other aircraft, people and obstacles for the purpose of avoiding collisions.’

All UAS operations using a PDRA01 operational authorisation shall be within visual line of sight (VLOS) of the remote pilot and/or unmanned aircraft observer.

The following aids **must** not be used to aid VLOS:

Electronic aids:

- Telemetry
- Video feeds
- Electronic maps
- Any other electronic item

Non electronic aids:

- Binoculars
- Telescopes
- Any other similar item

The UAS orientation and attitude **must** be easily discernible to the remote pilot and/or unmanned aircraft observer at all times, unaided by any instrument.

The VLOS limit is dictated by many factors, including:

- The remote pilot’s or visual observer’s eyesight
- The size of the UAS
- Shape of the UAS
- The colour of the UAS
- Navigation lights
- Light levels
- Contrast of the UA with the background

The remote pilot shall maintain unaided VLOS at all times, unless they are looking at a screen for extended periods of time or wearing video goggles, in which case a competent unmanned aircraft observer **must** be used. The unmanned aircraft observer shall stand next to the remote pilot to monitor the ground and airspace for any hazards. If a hazard is identified, they **must** communicate any navigation actions to the remote pilot.

2.2.2 PDRA01 limitations

UAS operating limitations are contained within [CAP 722H, 2.1 UKPDRA01](#).

UKPDRA01 enables the following operations:

- VLOS only
- Day and night operations (night operations are subject to additional requirements)
- The use of an observer who is stood next to the remote pilot is permitted if the remote pilot needs to look at a screen for extended periods of time or wear video goggles
- Maximum height not to exceed 120 metres or 400 feet above the surface
- Obstacles taller than 105m may be overflown by a maximum of 15m provided that:
 - The person in charge of the obstacle has requested the flight
 - The UAS must not be flown more than 50m horizontally from the obstruction
 - VLOS is maintained at all times
- UAS operation is permitted within 150 metres of any Residential, Commercial, Industrial or Recreational Area
- No flight within 30 metres distance of uninvolved people during take-off and landing
- No flight within 50 metres of any uninvolved person
- No flight over or within 50 metres horizontal distance of assemblies of persons
- No flight within FRZs or restricted airspace unless permitted has been granted by the responsible entity
- Dangerous goods may not be carried
- Dropping of articles is prohibited

2.2.3 Night operations

The standard University of Portsmouth insurance does not cover night operations. Night operations can only be conducted if the following requirements are fulfilled:

- A separate Regulation (EC) No 785/2004 compliant insurance **must** be in place for the operation
- Night operations **must** be signed off by the accountable manager
- An onsite survey **must** be completed during the day in order to identify and mitigate any hazards that may be unseen at night
- Flight plans **must** account for the fact that the VLOS distance at night may be considerably less than during the day
- The TOLA and any emergency landing areas **must** be illuminated for the duration of the flight
- Navigation lights **must** be used in order to indicate the relative path and orientation of the UAS to the flight crew
- Lights on the UAS **must** not emit glare to endanger other air users
- Lights on the UAS **must** not be fitted if they could be mistaken for an aeronautical ground light such as approach lighting near a runway

- A method of recording wind strength and direction **must** be available to determine the take-off and landing direction for fixed wing UAS

2.3 Multiple simultaneous operation of UAS

Multiple simultaneous operation of UAS by a single remote pilot is not permitted. Each remote pilot **must** only operate a single UAS at any one time.

2.4 Radio licencing requirements

2.4.1 Command and control

The UAS operator is responsible for ensuring the C2 and payload communication equipment complies with the Ofcom requirements, and any licences required are obtained.

2.4.2 Electronic conspicuity devices

The UAS operator is responsible for obtaining any licenses for EC devices and transponders or other aviation equipment that transmits on the aeronautical band.

2.4.3 Communication devices

The UAS operator is responsible for any Ofcom licences required for communication equipment, such as radios. If aviation radios are used, the radio operator requires a Flight Telephony Operators Licence.

2.5 Methods to determine the feasibility of the operation

A feasibility study shall initially be conducted as part of the flight planning to identify potential hazards in and around the AOO.

The feasibility study shall comprise of the following:

- Identification of the AOO, TOLAs, holding/loiter areas and emergency landing areas
- Identification of the landowner for TOAL and any permissions required
- Identification of the airspace, the likely amount of air traffic and any permissions required
- Identification of public access points
- Onsite hazards
- Offsite hazards

A feasibility form is used for this stage of flight planning. This is located in Annex 1.

Tools used to assess the feasibility of the operation include and is not limited to the following:

- Aviation charts
- [UAS restrictions map](#)
- [Non-Standard Flight \(NSF\) applications](#)
- [NATS AIP](#)
- [Military AIP](#)
- Ordnance survey maps
- UAS flight planning apps
- Weather forecast apps

Website, app or tool	Details	Link
Dronesafetymap	"Built by Altitude Angel to give drone pilots, everywhere, the opportunity to access the information they need to stay safe, fly safe and fly efficiently in virtually all airspace worldwide."	https://dronesafetymap.com/#loc=50.8213932,-1.0614633,10.29809543761016&ts=0
Drone Assist App	"Drone Assist, by Altitude Angel, is a leading worldwide drone safety app, and the #1 app for drone planning in the UK. It provides an interactive map of the sky and is used by general aviation, balloon pilots, other airspace users and of course, drone pilots! It's tailored specifically for the UK audience. It allows you to see areas to avoid or in which extreme caution should be exercised, as well as ground hazards which may pose safety, security or privacy risks when flying your drone."	https://www.altitudeangel.com/solutions/drone-assist?hsCtaTracking=955e5b59-6070-4c31-a8cf-10670d7db304%7C99df2dfc-70b9-4fe8-99ed-a08fa85a1e50
DronePrep	Information on land ownership for flight planning	https://droneprep.uk/
DEFRA Magic Map	Site for checking statutory designations such as SSSI.	https://magic.defra.gov.uk/MagicMap.aspx
DEFRA OGC Preview	View the EA Vegetation Object Model for tree heights	https://environment.data.gov.uk/explore/ecae3bef-1e1d-4051-887b-9dc613c928ec
Footpath Map	Map of public footpaths, bridleways and byways in Great Britain	https://footpathmap.co.uk/

2.6 Pre-notification to third parties

Third parties shall be contacted for the following reasons:

- To ask for permission to enter specific parts and types of controlled airspace
- Out of courtesy, to inform them of the planned UAS operation
- As a safety action, to inform air users of your planned operation

When required, the following third parties shall be contacted:

Third party	When to be contacted	Reason
Aerodrome	When the AOO is within a CTR, but outside the FRZ, at any time	Courtesy
Aerodrome manager	When the AOO is within a FRZ outside of ATC operating hours	To obtain permission
Aerodrome ATC/FIS	When the AOO is within a FRZ during ATC operating hours	To obtain permission
Danger Area, range control	When the AOO is within a Danger Area, at any time	To obtain permission
Landowner	Every time	To obtain permission for TOAL
Local authority	When the AOO is on public land	To obtain permission for TOAL
MAMC	When the AOO is within a LFA or TTA	Safety action
NOTAM owner for temporarily restricted airspace	When the AOO is within temporary restricted airspace and within the times indicated by the NOTAM	Safety action
Police	When the AOO is within, or close to, a congested area that could be deemed to be sensitive in nature (e.g., a school, hospital, prison, etc.), at any time	Courtesy
Prohibited Area, CAA Airspace Regulation Operations	When the AOO is within a Prohibited Area, at any time	To obtain permission
Prohibited place	When the AOO is within or within the vicinity of a prohibited place, as defined in the National Security Act 2023.	To obtain permission
Restricted Area, CAA Airspace Regulation Operations	When the AOO is within a Restricted Area, at any time	To obtain permission
Uninvolved people	When the AOO is close to uninvolved people	Courtesy

In addition to the table above, local bye-laws must be adhered to. The UAS operator is responsible for ensuring that the required landowner and airspace permissions are always obtained.

2.6.1 Obtaining contact details for third parties managing airspace

Contact details for all managed airspace within the flyaway range of the UAS shall be gathered by the remote pilot during the flight planning. The flyaway range is calculated as the maximum distance the UAS can fly in a straight line with full batteries/full tank of fuel. This distance is often included in the manufacturer's specification sheet for the UAS.

2.6.1.1 Civilian operated aerodromes, heliports and space sites

2.6.1.1.1 Civilian aerodromes

Contact information for civilian operated aerodromes can be found in the NATS AIP <https://nats-uk.ead-it.com/cms-nats/opencms/en/Publications/AIP/>:

Civilian aerodromes	
1	NATS AIP
2	Part 3
3	AD2 Aerodromes
4	Select the aerodrome from the list
5	AD2.2 Aerodrome Geographical and Administrative Data

2.6.1.1.2 Civilian heliports

Contact information for civilian operated heliports can be found in the NATS AIP:

Civilian heliports	
1	NATS AIP
2	Part 3
3	AD3 heliports
4	Select the heliport from the list
5	AD3.2 Aerodrome Geographical and Administrative Data

2.6.1.1.3 Space sites

There is currently no information on the NATS AIS for space sites. Details can instead be found on the [UAS Restrictions Zones](#) map.

2.6.1.2 Government aerodromes and heliports

2.6.1.2.1 Military aerodromes

Contact information for government operated aerodromes and heliports can be found in the UK Military AIP:

Military aerodromes	
1	UK Military AIP
2	AD
3	AD2 Aerodromes

4	Select the aerodrome from the list
5	AD2.2 Aerodrome Geographical and Administrative Data

2.6.1.2.2 Military heliports

Contact information for government operated aerodromes and heliports can be found in the UK Military AIP:

Military heliports	
1	UK Military AIP
2	AD
3	AD3 heliports
4	Select the heliport from the list
5	AD3.2 Aerodrome Geographical and Administrative Data

2.6.1.3 Restricted airspace

Restricted Airspace includes:

- Danger Areas
- Restricted Areas
- Prohibited Areas

Contact information for restricted airspace can be found in the NATS AIP:

Restricted airspace	
1	NATS AIP
2	Part 2 En-route (ENR)
3	ENR 5 Navigation Warnings
4	ENR 5.1 Prohibited, restricted and danger areas
5	Search the alphanumerical list to find the ID number of the restricted airspace and the contact details within it

2.6.1.4 Temporarily restricted airspace

Contact details for temporarily restricted airspace can be found within NOTAM information.

NOTAMS **must** be checked by the remote pilot before flight operations commence.

NOTAMs	
Website	NATS Pre-flight Information Bulletins
Weblink	https://nats-uk.ead-it.com/cms-nats/opencms/en/Briefing/internet-briefing-system/
Mobile app	Drone Assist

2.6.1.5 Military Airspace Management Cell

The Military Airspace Management Cell (MAMC) Low Flying Training Timetable should be consulted before flying in any Low Flying Area (LFA) or Tactical Training Area (TTA), to check for aircraft movements and usage.

MAMC should be informed of any planned UAS operations within their LFAs and/or TTAs.

Contact details for MAMC and low flying information resources can be found in the following table:

MAMC	
Low flying training timetable	https://www.gov.uk/government/publications/operational-low-flying-training-timetable
Military low flying	https://www.gov.uk/guidance/military-low-flying
Email for MAMC	swk-mamclfcoord@mod.gov.uk
Phone	01489 443100

2.6.2 Obtaining contact details for landowners

The UAS operator **must** consider the need to obtain landowners permission before taking off and **must** avoid committing offenses, such as aggravated trespass or nuisance.

Private land may belong to an organisation or an individual.

Public land belongs to the local authority, so they shall be contacted in such an instance.

2.7 Communications

The UAS operator must develop a standard communication procedure for all flight operations.

2.7.1 Communication between the flight crew

2.7.1.1 Remote pilot and flight crew

The remote pilot and support personnel, such as an unmanned aircraft observer and/or airspace observer shall be stood next to one another, so no communication equipment will be required.

2.7.1.2 Support personnel

Safety marshals shall be used in situations where crowd control or monitoring of uninvolved people is required, in order to keep them safe.

If the distances involved do not permit unaided communication, whistles, radios or mobile phones shall be used (where appropriate). Whistle signals and other communication language shall be agreed beforehand during the pre-flight briefing. If a mobile phone is to be used, the signal shall be checked on a [the OFCOM website](#) as part of the flight planning.

Mobile phone signal resource	
Website	OFCOM
Weblink	https://checker.ofcom.org.uk/en-gb/mobile-coverage
Mobile app	n/a

2.7.1.3 Communication language

Communication language used between crew members shall be clear and concise.

Specific communication language used is indicated in the table below:

Communication phrase	Meaning
Call: Eyes on	Between RP and observer, to indicate that the observer should maintain VLOS, observer must confirm eyes on. Observer will maintain visual line of sight until the RP has confirmed that they have VLOS. Used when the RP needs to break VLOS, e.g. to interact with C2 UI, or frame a shot.
Props clear	UAS is being powered up
Lifting	Initiating UAS take-off procedure
Landing	Initiating landing procedure
Aircraft hot	UAS has landed, but not powered down
Aircraft safe	UAS has been powered down
ERP calls	Refer to ERP cards

Plain language shall be used in addition to the specific communication phrases detailed above.

2.7.2 Communication with ANSP, restricted airspace and temporarily restricted airspace managers

Communication shall be conducted via the following methods:

- In person
- Email
- Telephone
- NATS NSF portal

The procedure for seeking permission to operate within a FRZ or temporarily restricted airspace is detailed in the table below:

Procedure for obtaining permission for the use of managed airspace	
1	RP to contact airspace manager with details of the flight plan, including place, date, time and altitude
2	Airspace manager to assess the risk to other air traffic
3	Airspace manager to issue a GO/NO GO decision
4	If GO, a communication procedure for the UAS operation shall be agreed with the RP
5	If NO GO, a different time or day shall be found when it is possible for the UAS flight to be conducted

Some aerodromes and restricted airspaces require initial contact to be made via a Non-Standard Flight (NSF) application:

[NSF | Non-Standard Flight applications \(nats.aero\)](https://nats.aero)

Temporary restricted airspace managers contact details can be found within NOTAMs.

2.7.3 Communication with emergency services

Communication with emergency services shall be conducted via telephone:

- Non-emergency: 101
- Emergency: 999

Prenotification communications for the police may be conducted by telephone (101), on a web portal, via email or in person.

2.8 Assessment of environmental conditions

2.8.1 Atmospheric weather

The following weather conditions shall be checked before flight and monitored throughout the flight:

- Wind strength at the operating height
- Wind direction
- Urban effects (wind shear, vortices and turbulence)
- Precipitation
- Visibility

Consideration must be made to the wind strength at altitude which will be stronger than at ground level.

2.8.1.1 Checking weather before a flight

Atmospheric weather can be checked before flight using online resources:

- TAF issued by a local aerodrome
- MetOffice
- Windy
- UAV Forecast

2.8.1.2 Checking wind strength and direction on site

The remote pilot shall check the wind strength on site using one or more of the following methods:

- Checking the METAR from the local aerodrome
- Vegetation motion
- Anemometer
 - An anemometer must be used to measure wind and gusts for 1 minute on site arrival, and at least every 4 hours, or when the wind noticeably changes
- Wind direction can be ascertained by standing with the back to the wind
- Direction can be ascertained from a compass or in relation to map features

2.8.2 Space weather

Space weather is a global phenomena. A Kp index of 5 or more is classed as a solar storm. Solar storms can affect the safe operation of a UAS, due to the following:

- Degradation of GNSS accuracy
- Electromagnetic interference to compasses and/or other electronics
- Radio frequency interference to command, control and communication signals

A space weather prediction forecast must be consulted before UAS operations for possible adverse effects that may prevent the UAS flight from being conducted safely

Space weather forecast resource	
Website	British Geological Society
Weblink	https://geomag.bgs.ac.uk/education/current_activity.html

Mobile app	UAV forecast
------------	--------------

The remote pilot must make a NO GO decision if the flight cannot be conducted safely.

2.8.3 Environmental conditions limitations

The environmental conditions must be suitable for the proposed UAS flight. The conditions must be within limitations of the following:

- All parts of the UAS system/s to be operated
- The flight crew
- No adverse space weather effects

The remote pilot **must not** fly the UAS if the weather is beyond limits for any of the above.

2.9 Onsite procedures

An onsite survey shall be conducted by the remote pilot to ensure the UAS flight operation is still feasible. The feasibility study form shall be consulted as part of the onsite survey process, to look for any unplanned hazards that may affect the operation.

If a night flight is planned, the onsite survey **must** be conducted during the daytime.

The remote pilot shall conduct an onsite survey that includes the following:

- Date and time the onsite survey was conducted
- Environmental conditions
- TOLA including alternatives
- Operating volume
- Contingency volume
- Sources of interference that may affect C2 and/or compass (i.e. ferrous metal structures, microwave dishes, etc)
- Holding/loiter areas
- Emergency landing areas
- Placement of cordons to protect uninvolved people
- Identification of onsite hazards
- Awareness of direction and distance of offsite hazards
- Risk assessment

The purpose of an onsite survey is to obtain a GO or NO GO decision.

An onsite survey form is used for this stage of flight planning. This can be found in Annex 2.

2.9.1 Onsite survey outcome - GO

If the remote pilot decides the onsite survey outcome is a GO, the operation can move onto the next stage.

2.9.2 Onsite survey outcome - NO GO

If the remote pilot decides the onsite survey outcome is a NO GO, the remote pilot needs to decide if there is anything that can be done to change the outcome.

This may mean waiting for a better weather window of opportunity, changing the time of day to when there are less uninvolved people around or changing the flight plan. An alternative operating site may be required in order to mitigate any hazards resulting in a NO GO decision.

If anything is changed, the onsite survey must be updated.

2.9.3 Pre-flight briefing

Once the onsite survey has been completed, the remote pilot shall give the flight crew a briefing before flight operations begin.

Subjects to be covered include and is not limited to the following:

- UAS operation details
- UAS system
- Environmental conditions
- Safety objectives
- Mission timings
- Roles and responsibilities of the flight crew
- Airspace
- Cordons including TOLA, AOO and emergency landing areas
- Communications
- Hazards
- Emergency procedures
- Permissions and notifications
- Flight crew health
- Questions

A pre-flight briefing form is supplied in Annex 3 to assist the remote pilot.

2.10 Cordon procedure

Cordons are established to protect uninvolved people from the UAS operation. The onsite survey should identify public access points that need to be constantly monitored throughout the operation.

Cordons are boundaries for the following:

- Ground and air hazards entering the area of operation
- The UA leaving the area of operation

2.10.1 Cordon types

There are two types of cordon that shall be used:

- **Hard cordon**
A hard cordon consists of a physical barrier. For example, this could be a fence, a hedge or barrier tape.
- **Soft cordon**
A soft cordon does not consist of a physical barrier, but is known to the flight crew. Strategically placed traffic cones, signs or ground stakes can be used if required where the public have access.

The cordon defines the operational volume and must maintain the following:

- **TOLA**
A minimum distance of 30 metres in all directions around the TOLA.
- **Uninvolved people**
A minimum distance of 50 metres from uninvolved people.
- **Assemblies of people**
A minimum horizontal distance of 50 metres from assemblies of people. UA flown more than 50 metres above the ground must follow the 1:1 rule (i.e. the horizontal distance must not be less than the height of the UA).

If a geo-fencing feature is available on the UAS, it must be set to the appropriate distance to keep the UA the required distance away from the assembly of people.

When the remote pilot is operating alone (with no unmanned aircraft observer), the aircraft must have an appropriately set minimum RTH battery level. Any automatic recovery system such as a return to home function, must not allow the UA to fly over or within 50m of an assembly of uninvolved people (or the appropriate 1:1 distance if operating above 50 metres).

- **Altitude**
Any minimum or maximum altitudes must be adhered to accordingly by the remote pilot.
- **Distance**

Any minimum or maximum distances must be adhered to accordingly by the remote pilot.

Geo-fencing features on the UAS should be used to set the boundaries (distance and altitude) for the flight volume, taking into account that the manufacturer will have their own safety buffer for geofences, and that the UA may stop tens of metres before the geofence is reached. The cordon boundaries must be known to all members of the flight crew.

Where used, flight crew shall be used to assist the remote pilot in securing any cordons. Safety marshals shall be used where large volumes of uninvolved people may be present.

If the cordon is breached, the remote pilot shall be informed immediately, and emergency procedures followed. This will result in the UA being moved away from uninvolved people and placed in a safe holding area until the situation can be resolved. If the situation cannot be resolved, the remote pilot shall land the UA in a pre-identified emergency landing area.

Uninvolved people cannot be prevented from entering a public place or physically restrained, so the UAS operation must be planned around their possible presence.

2.10.2 Contingency volume

A contingency volume shall be used to ensure there is reaction time to prevent cordons from being breached, either by the UA, other aircraft or uninvolved people.

The contingency volume must be large enough to allow the UA to turn around whilst travelling with forward motion. Fixed wing UA require a larger contingency volume than multicopter UA, because unless they have VTOL capability, they cannot hover or travel in reverse.

The size and position of the contingency volume must be included as part of the flight planning for the feasibility study and onsite survey.

2.11 Pre-flight procedures: Assembly and function checks

2.11.1 Assembly

The UAS system shall be assembled and checked it is safe to be flown by the remote pilot. Materials to assist with this include the following:

- Manufacturers guidance
- The user manuals for the UAS, payload and ancillary equipment
- In-house procedures and checklists

Components are checked for wear damage or functionality as part of the assembly process. Any items that are damaged or not functioning correctly, that have the potential to affect the safety of the operation, shall be risk assessed by the remote pilot and replaced or repaired before moving to the next stage. Any such remedial actions shall be recorded in the maintenance log.

2.11.2 Refuelling

All fuel must be suitable for use.

Liquid fuels must be:

- Clean
- Uncontaminated
- Stable

Electrical batteries must:

- Be undamaged
- Have sufficient capacity for the intended flight, including a contingency for use in an emergency
- Have balanced cells

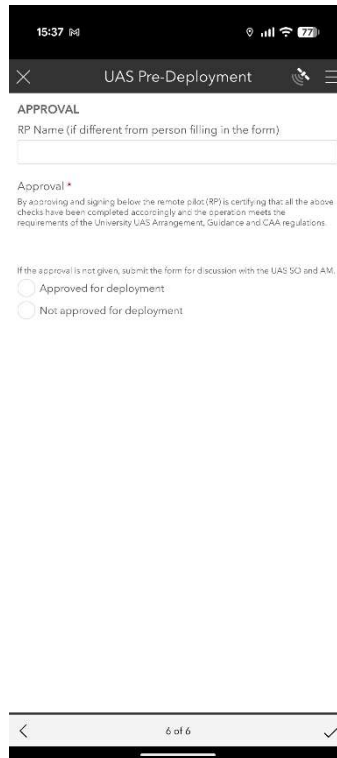
2.11.3 Pre-flight checklists

Check lists are provided as printable word documents or alternatively as a digital form for mobile devices. The questions are the same and only the app version is included here.

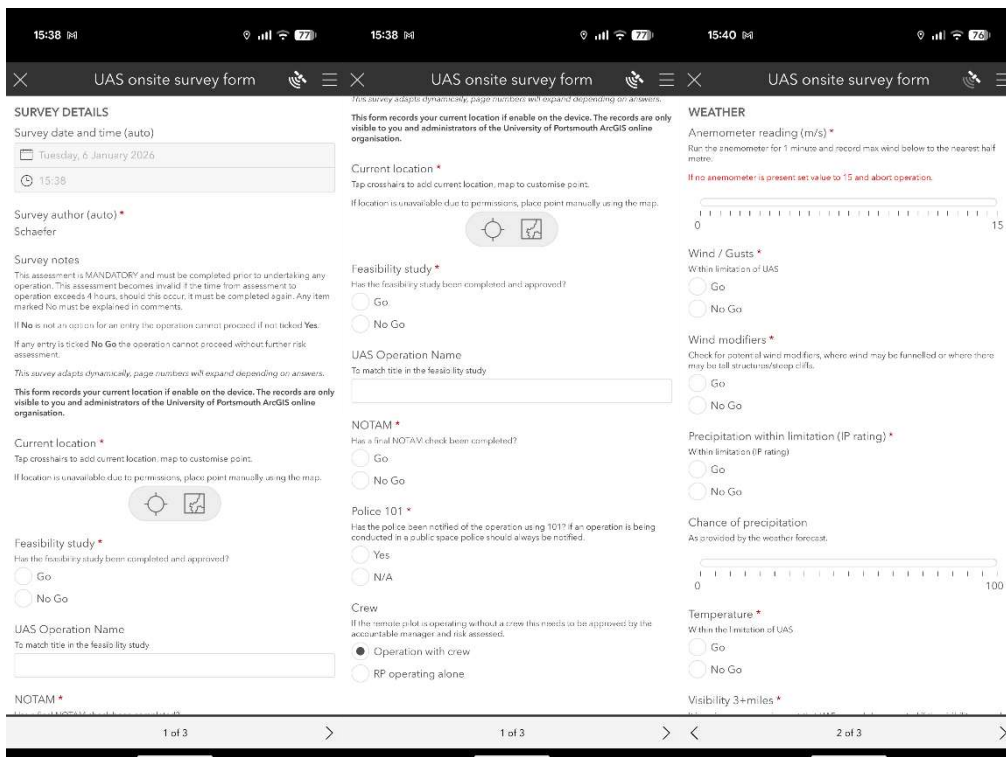
2.11.3.1 All registered UAS

2.11.3.1.1 Pre-deployment check list

The image displays two screenshots of the 'UAS Pre-Deployment' mobile application interface. The first screenshot shows the first page of the form, titled 'UAS Pre-Deployment', with a progress indicator '1 of 6'. It is divided into three main sections: 'SURVEY DETAILS', 'SAFETY', and 'DOCUMENTATION'. Each section contains several questions with radio button options for 'Yes', 'No', or 'N/A'. The 'SURVEY DETAILS' section includes fields for survey date and time, author, and notes. The 'SAFETY' section covers items like comms kit, first aid kit, fire blanket, PPE, anemometer, sunglasses, and landing mat. The 'DOCUMENTATION' section includes questions about navigation maps, emergency numbers, permissions, risk assessment, feasibility study, forms, log books, and pens. The second screenshot shows the fourth page of the form, titled 'UAS Pre-Deployment', with a progress indicator '4 of 6'. It contains three columns of questions related to the UAS itself, including firmware updates, damage checks, Operator ID confirmation, CU charging status, battery logs, storage memory, offline maps, spares, routine maintenance, calibration, and transport case protection.



2.11.3.1.2 On-site check list



The screenshot shows a mobile application interface for a 'UAS onsite survey form'. The form is divided into three columns, each with a title and a set of questions. The top of the screen shows the time as 15:41 and various status icons. The bottom of the screen shows navigation arrows and page indicators (2 of 3, 3 of 3, 3 of 3).

Column 1:

- No Go** (radio button)
- Wind modifiers ***
Check for presence of wind modifiers, where wind may be funnelled or where there may be tall structures that keep it still.
 Go
 No Go
- Precipitation within limitation (IP rating) ***
Within limitation (IP rating)
 Go
 No Go
- Chance of precipitation**
As provided by the weather forecast.
A horizontal scale from 0 to 100 is shown.
- Temperature ***
Within the limitation of UAS
 Go
 No Go
- Visibility 3+ miles ***
It is an insurance requirement that UAS can only be operated if the visibility exceeds 3 miles or 5km.
 Go
 No Go
- Kp index ***
The Kp index quantifies solar winds. A Kp index of 5 or more indicates that there may be GNSS (GPS) interference. Kp can be obtained from some weather sites, e.g. AvData UUV.
 Go
 No Go

Column 2: GENERAL SAFETY

- Remote pilot IMSAFE ***
Are all remote pilots safe to operate.
 Go
 No Go
- Permissions ***
Are all permissions as identified in the feasibility study granted for the operation. E.g. Non Standard Flight (NSF) permissions, an FRZ, landowner permission, SSS or timing permits.
 Go
 No Go
- Brief client or customer ***
Has the client or customer been briefed and have all agreed preparations been made.
 Yes
 No
 N/A
- Brief landowner or occupier ***
Has the landowner or occupier been briefed and have all agreed preparations been made.
 Yes
 No
 N/A
- Check in with ATC (if required) ***
If required, has contact been made with ATC and approval been given for the operation to proceed.
 N/A
 Go
 No Go
- Phone Reception Signal ***
Do you have enough signal to make an emergency phone call.

Column 3:

- Phone Reception Signal ***
Do you have enough signal to make an emergency phone call.
 Go
 No Go
 Lack of signal addressed in RAMS
- Air hazards ***
Assess air hazards, e.g. Area of Increased Aerial Activity (AAAA) is the operating volume clear.
 Go
 No Go
- Ground hazards ***
E.g. schools, industrial, natural, livestock
 Go
 No Go
- Wildlife ***
Is there wildlife present that may impact on the safety of the UAS, e.g. raptors, or that would be disturbed, e.g. Schedule 1 birds.
[This flight to K&L means we 'take' any wild birds into our damage footprint of any wild bird/wildlife as a consequence. The birds listed in Schedule 1 of the Wildlife and Countryside Act 1981 are further protected by Special Protection areas \(SPA\) for birds in Part 1 and require a special licence to shoot for those listed in Part 2.](#)
 Go
 No Go
- Terrain ***
Evaluate the risk of slips, trips and falls during the operation.
 Go
 No Go
- Inspect take-off & landing sites and alternatives ***
Are the TO/LA clear and usable.
 Go
 No Go
- Obstructions ***

The image displays three screenshots of a mobile application titled "UAS onsite survey form".

Top Screenshot (15:41): Shows the "Equipment" section with the following questions and options:

- Inspect take-off & landing sites and alternatives ***
Are the TOLA clear and usable.
 Go
 No Go
- Obstructions ***
Check the operating volume for potential obstructions, e.g. masts, wires, trees, buildings.
 Go
 No Go
- View limitations ***
Are there any features in the operating volume that could obstruct visual line of sight.
 Go
 No Go
- Uninvolved people ***
Consider the presence of uninvolved people in relation to the operating category.
 Go
 No Go
- Public access or incursion locations ***
Identify potential access points for uninvolved people.
 Go
 No Go
- Distance requirements ***
Consider if the operating volume will maintain the safety distances in relation to the operating category, e.g. distance from buildings, congested areas, vehicles.
 Go
 No Go
- AGL below standard 120m**
 Yes
 No
- AGL below standard 120m**
 Yes
 No
- Decide RTH height setting ***
AGL to the nearest 5m.
A horizontal slider scale from 0 to 120 is shown.
- Equipment**
 - Make fire equipment accessible ***
A fire blower or extinguisher if the requirement is identified in the RAMS. This can include equipment on-site.
 Yes
 Not present
 - Make First Aid Kit easily accessible ***
 Yes
 Not present
 - Check airframe for damage in transit ***
 Go
 No Go

Middle Screenshot (15:43): Shows the "CREW SAFETY" section with the following questions and options:

- CREW SAFETY**
 - Crew IMSAFE ***
Are all crew safe to operate.
 Go
 No Go
 - Site/mission details conveyed ***
 Yes
 - Crew responsibilities explained ***
 Yes
 - Issue PPE as required ***
 Yes
 - Setup cordon, signs and safety tape (if required) ***
 Yes
 N/A

Bottom Screenshot (15:44): Shows the "RISK ASSESSMENT" and "APPROVAL" sections.

RISK ASSESSMENT

- Risk assessment updates ***
Are there any dynamic updates to the risk assessment.
 Yes
 No
- Risk assessment updates ***
Note any details, one from or updates to their risk assessment.
A text input field is present.
- Unanticipated hazards ***
Is the operation risk still as low as reasonably practicable, have all unanticipated hazards been mitigated.
 Go
 No Go

APPROVAL

- FINAL ASSESSMENT ***
Can the operation proceed.
 Go
 No Go
- Remote pilot 1 ***
A text input field.
- Remote pilot 1 signature ***
A signature icon.
- Additional remote pilot**
 Yes
- Remote pilot 2 (if applicable) ***
A text input field.
- Remote pilot 2 signature ***
A signature icon.

2.12 In-flight procedures

In-flight procedures are conducted using checklists and dynamic risk assessments. If a hazard or abnormality is identified during any stage of flight, the emergency checklists shall be followed. The app used by the university follows a complex decision tree to avoid duplicate apps for every UAS type. To avoid duplicating the app screenshots for all different permutations, we include in the appendix the decision trees for the app workflow.

2.12.1 Take-off checklist

The flight crew are responsible for assisting the remote pilot with the take-off checklist.

The remote pilot is responsible for dynamically risk assessing any hazards or abnormalities identified during this stage of flight and executing any required emergency actions.

2.12.1.1 All registered UAS

Any items that are not functioning correctly must be rectified before progressing to the next stage. This may mean landing and restarting the pre-flight or take-off checklist after remedial action.

2.12.2 In-flight checklist

The in-flight checklist **must** be memorised by the remote pilot. However, flight crew are also responsible for assisting the remote pilot with this checklist and can prompt the remote pilot for a response, to ensure the safety of the UAS operation.

The remote pilot is responsible for dynamically risk assessing any hazards or abnormalities identified during this stage of flight and executing any required emergency actions.

2.12.2.1 All registered UAS

Any item that becomes a failure in flight must be rectified immediately. This may mean pausing the flight, putting the UAS into a hover or loiter position, returning to home or executing an emergency action.

2.12.3 Landing checklist

The landing checklist **must** be memorised by the remote pilot. However, flight crew are also responsible for assisting the remote pilot with this checklist and can prompt the remote pilot for a response, to ensure the safety of the UAS operation.

The remote pilot is responsible for dynamically risk assessing any hazards or abnormalities identified during this stage of flight and executing any required emergency actions.

2.12.3.1 All Registered UAS

Any item that becomes a failure in flight must be rectified immediately by using the emergency response plan. This may mean pausing the flight, putting the UAS into a hover or loiter position, landing at a predesignated emergency landing area or executing an emergency action.

2.12.4 Shut down checklist

The remote pilot is responsible for running the shut down checklist.

2.12.4.1 All Registered UAS

2.13 Safety feature operating procedures

The procedures for the operation of any safety feature used on the UAS to mitigate risk are detailed below.

2.13.1 Return to home – Manual activation

The remote pilot may choose to activate the return to home feature of the UA.

2.13.1.1 All registered UAS

Any item that becomes a failure in flight must be rectified immediately. This may mean pausing the flight, putting the UAS into a hover or loiter position, or executing an emergency action.

2.13.2 Return to home – Automatic activation

The RTH will automatically be activated in the following situations:

- Loss of C2 link
- Aircraft excursion from the geo-caged flight volume
- Critical battery alarm

2.13.2.1 All registered UAS

2.13.3 Return to home – Manual cancellation

The remote pilot may choose to cancel the return to home feature of the UA.

2.13.3.1 All registered UAS

Some UAS may require the remote pilot to select the correct operation mode and set the throttle to the appropriate level to ensure the UA remains airborne, when cancelling RTH.

All registered UAS do not require the remote pilot to select the correct operation mode and set the throttle to the appropriate level to ensure the UA remains airborne, when cancelling RTH

2.13.4 Low battery auto-land

The low battery auto-landing failsafe will activate automatically when the UA battery capacity is drained to:

DJI: Set Critical low battery to 15%, but to prevent auto-landing take action once the UA issues a low battery warning, as the UA has calculated the battery needed to RTH.

Wingtra: At <2000m UA will initiate low battery RTH at 15-25%.

2.13.4.1 Insert make and model of UAS

Use landing option C on the checklist.

When the UA enters auto-landing mode it should not be cancelled, as the UA may not have sufficient fuel or power to remain flying.

2.13.5 Strobes – Switch on

Strobes may be used in order to make the UA visually conspicuous.

The procedure to switch on the strobes is included in the take-off checklist.

Strobes are switched on after preflight checks and the test flight to prevent dazzling the remote pilot and flight crew. This is particularly important at night.

2.13.6 Strobes – Switch off

The procedure to switch off the strobes is included in the landing checklist.

Strobes are switched off before landing to prevent dazzling the remote pilot and flight crew. This is particularly important at night.

2.13.7 Flight volume limitation systems

Systems may be used to limit height/altitude and/or range, to prevent the UA leaving the flight volume.

Limitation systems are set as part of the preflight checklist.

Geo-caging, placing a virtual boundary around the flight volume using GNSS co-ordinates, may also be used to contain the UA.

Parameters set by the RP must allow sufficient room for the UA to turn at the end of any waypoints without leaving the flight volume. This is particularly important for fixed wing UA which will require a larger turning radius than multirotor UA.

A geo-cage should not be modified whilst the UAS is in flight and should be shaped in such a way that the UA will not fly outside of the flight volume in the event of a return to home activation.

Care should be taken by the remote pilot not to confuse the geo-cage boundaries with those created by mapping software, which may only display the area for data capture and not necessarily the flight volume required for the UAS operation.

2.14 Post-flight and between flight checks

2.14.1 Post-flight inspection

The UAS system shall be inspected by the remote pilot after every battery change for the following:

- **Loose or missing parts**

The aircraft shall be inspected for any loose or missing parts.

The remote pilot must risk assess the affect any loose or missing parts may have upon the safe operation of the system. If the outcome reveals a safety risk, the remote pilot must report the finding to UAS operator and an MOR submitted.

In this instance, the aircraft shall be grounded until remedial actions have been taken. Any repairs shall be recorded in the maintenance log and any modification recorded in the operations manual.

- **Damage**

The aircraft shall be inspected by the remote pilot for any damage.

The remote pilot must risk assess the affect any damage may have upon the safe operation of the system. If the outcome is that there is a safety risk, the remote pilot must report the finding to UAS operator and an MOR submitted.

In this instance, the aircraft shall be grounded until remedial actions have been taken. Any repairs shall be recorded in the maintenance log and any modification recorded in the operations manual.

- **Cleanliness**

Any dirt or grime shall be cleaned off the propellers, navigation sensors, payload sensors, LED lights and strobes.

- **Freedom from moisture**

The system shall be wiped down and left intact until it is fully dry to prevent unwanted moisture ingress.

2.14.2 Debrief

The remote pilot shall debrief the flight crew after the operation has been complete, or in between flights, if items have been identified that will benefit the safety and efficiency of the current operation.

The aim of the debrief is to allow all members of the flight crew to offer their feedback and analyse the operation to identify scope for improvement. The flight crew are encouraged to offer feedback as part of just culture.

A debrief form is included in Annex 4.

2.14.3 Flight logs

Flight logs must be kept by the following personnel:

- The UAS operator
- The remote pilot

As a minimum, flight log details must include:

- Date
- Location
- Task
- Flight crew
- UAS system
- Take-off time
- Landing time
- Time of each flight

Flights shall normally be logged during flight operations, or recorded after the flight by either filling the log in manually, or by downloading the flight logs.

UAS operator and remote pilot flight logs are provided **as a word document**.

Remote pilot flight logs are maintained in the UoP online record system. Detailed flight data is collected, along with scans of the operations planning document, the signed risk assessment, the on-site checklists and any permission documents obtained. The logs are retained in compliance with the UoP GDPR policy.

2.15 Flight Safety Program

The flight safety program shall be followed by the flight crew in the event of any hazard or abnormal situation affecting or having the potential to adversely affect the safety of the UAS flight operation.

The flight safety program consists of the following:

- Threat and error management
- Emergency response actions
- Emergency procedures

2.15.1 Threat and error management

Emergency Response Actions (ERAs) form the basis of threat and error management for UAS flight operations.

ERAs ensure the remote pilot does not endanger any person or property with the UAS. In the event of an emergency, the ERA shall be initiated.

The goal of the ERA is to:

- Take control of the situation
- Prevent the situation from escalating (getting worse)
- Minimise the severity of any outcome
- Prioritise the safety of people, whether involved or not
- Bring the situation back to 'condition normal'

The mnemonic '**SEA**' forms the three parts of an ERA:

- **S - See**
Look at what is occurring or could occur
- **E - Evaluate**
Consider what needs to be done to prevent an undesirable outcome
- **A - Action**
Move the UAS away from the hazard to deconflict the risk, or in the event of loss of control, move people out of harms way

Details of ERAs:

- The remote pilot **must** move the UAS away from all hazards
- In the event of an unplanned controlled airspace incursion or excursion, the relevant ATC **must** be informed immediately
- In the event of injury to a person or persons, damage to property or fire, medical treatment **must** be prioritised and the relevant emergency service/s shall be informed immediately (999)
- In the event of an airprox, the Airprox Board **must** be notified with 7 days
- In the event of any occurrence, the remote pilot **must** complete an MOR and/or contact the AAIB within 72 hours

The ERA shall be activated:

- Any time an unmitigated hazard is identified with the UAS system on the ground with engine on or propellers turning
- Any time an unmitigated hazard is identified when the aircraft is in flight
- Any time an abnormal situation occurs
- Anytime there is risk of endangerment to people
- Anytime there is risk of endangerment to property
- Anytime there is risk of endangerment to the environment
- Anytime there is a potential for legal limitations to be broken, such as the minimum distance from uninvolved people

Some ERAs may result in the deliberate destruction of the UAS, by the remote pilot, in order to protect people and/or property (controlled flight into terrain).

2.15.2 Emergency procedure training

Training is conducted in-house in order to practice the use of ERAs and specific emergency procedures detailed in this operations manual.

These training flights shall be recorded in the training log.

2.16 Specific emergency procedures

The specific emergency procedure checklists detailed in this operations manual shall be memorised by the remote pilot. However, flight crew are also responsible for assisting the remote pilot with the checklist and can prompt the remote pilot for a response, to ensure the safe enactment of an ERA. The UAS SO team have produced ERA cards for use on location and are available to any UoP RP.

- 2.16.1 Abnormal environmental conditions - Visibility
- 2.16.2 Abnormal environmental conditions - Wind
- 2.16.3 Air incursion
- 2.16.4 Air excursion
- 2.16.5 Control signal loss
- 2.16.6 Fire
- 2.16.7 Flyaway
- 2.16.8 GNSS signal loss
- 2.16.9 Ground incursion
- 2.16.10 Landing gear failure - Fixed wing
- 2.16.11 Landing gear failure - Multirotor
- 2.16.12 Loss of control
- 2.16.13 Power loss - CU
- 2.16.14 Power loss (partial)
- 2.16.15 Power loss (full)
- 2.16.16 Propulsion system loss (full or partial) - Fixed wing
- 2.16.17 Propulsion system loss (full) - Multirotor
- 2.16.18 Propulsion system loss (single motor) - Insert UAS make and model
- 2.16.19 Propulsion system loss (multiple motors) - Insert UAS make and model
- 2.16.20 Navigation light failure at night
- 2.16.21 Pilot incapacitation
- 2.16.22 Structural failure

2.16.1 Abnormal environmental conditions - Visibility

Visibility may be reduced due to low clouds, smoke, mist, fog or light levels.

Abnormal environmental conditions - Visibility		Any UAS	MR	FW
ID	Requirement			
1	Communication 'Bad vis'			
2	Move UA closer to RP to ensure clear visibility			
3	Terminate flight operation is there is a risk of VLOS not being able to be maintained			

2.16.2 Abnormal environmental conditions - Wind

Abnormal environmental conditions may occur when the UA is in flight. For example, when operating from a cliff top or in an urban environment. In such cases, wind can behave unpredictably due to wind shear.

If the UA is adversely affected by the wind, the remote pilot may be tempted to retrieve the UA as quickly as possible by flying the aircraft manually. However, this could result in battery failure, resulting in the total loss of power and propulsion. In this situation, the RTH failsafe must be activated to allow the FMS to automatically control the current draw required by the UA in order to minimise the risk of the emergency escalating.

Abnormal environmental conditions - Wind		Any UAS	MR	FW
ID	Requirement			
1	Communication 'Wind'			
2	Pause the flight and hover (MR) or enter loiter mode (FW)			
3	Note wind direction and strength			
4	Try to regain control			
5	If control is not regained, engage RTH			
6	Identify landing site			
7	Immediately clear the area of people			
8	UAS will automatically land and shut the motors off			

2.16.3 Air excursion

An air excursion is when the UA has left the operational volume. If the control of the UA has been lost, the emergency procedure for a flyaway must be followed.

Air excursion		Any UAS	MR	FW
ID	Requirement			
1	Communication 'All stop, all stop, all stop'			
2	Pause the flight and hover (MR) or enter loiter mode (FW)			
3	Regain control			
4	Check airspace is clear			
5	Navigate the UA back into the operational volume			
6	Abort or continue with the mission as required			

2.16.4 Air incursion

An air incursion is when an aircraft, bird or wind-blown rubbish has the potential to enter or enters the area of operation without adequate separation. If an air incursion occurs with another aircraft (either crewed or another UA), the incident shall be reported to the UK Airprox Board within 7 days.

Air incursion		Any UAS	MR	FW
ID	Requirement			
1	Communication 'Air incursion'			
2	Assess the heading, speed and altitude of the incursion			
3	Assess the heading, speed and altitude of the UA			
4	Acquire orientation of the UA			
5	See and avoid the incursion by changing altitude and moving the UA at 90° to the incoming hazard's flight path			
6	In extremis, activate motor-switch off if collision is otherwise unavoidable			

2.16.5 Control signal loss

The UAS is programmed by the remote pilot during the pre-flight checks to ensure the RTH failsafe is automatically activated if the C2 link is lost.

Control signal loss		Any UAS	MR	FW
ID	Requirement			
1	Communication 'C2 lost'			
2	Check antenna			
3	Try to regain control			
4	If control is not regained, RTH should automatically engage			
5	Identify landing site			
6	Immediately clear the area of people			
7	UA will automatically land and shut the motors off			

If the C2 link does not re-establish and the UAS failsafe does not engage, the emergency procedure for a flyaway must be followed.

2.16.6 Fire

If the UA catches fire whilst in flight, the primary objectives must be to protect uninvolved people and to prevent the fire from spreading. Particular care must be taken when operating in rural areas with dry crops, such as wheat or barley.

Fire		Any UAS	MR	FW
ID	Requirement			
1	Communication 'Fire, fire, fire'			
2	Identify a non-flammable area landing area			
3	Immediately clear the area of people			
4	Land as soon as possible			
5	If battery fires cannot be tackled by available means, only concentrate on areas set alight by a burning battery. Put out fire, if trained, equipped and safe to do so			
6	Call the emergency services if required			

2.16.7 Flyaway

A flyaway occurs when the UA fails to respond to any navigation inputs due to a malfunction or C2 signal interference. A flyaway is normally linear (in a straight line), but it can also result in the UA changing direction and/or altitude.

The landing/crash site of the UA for a linear flyaway can be predicted using the equation below:

Speed in m/s x estimated remaining battery time in minutes x 60 = Distance in metres

Flight logs, the map and video telemetry can all be used to assist with finding the crashed UA. It is essential that the command unit is left switched on to capture the flight log data.

Flyaway		Any UAS	MR	FW
ID	Requirement			
1	Communication 'Flyaway'			
2	Note time			
3	Note heading			
4	Calculate remaining flight time			
5	Plot potential crash site using the equation above			
6	Leave the command unit on and monitor the telemetry			
7	Inform the appropriate ATC and/or other airspace managers in the direction of the flyaway			
8	Inform police			
9	Remain at the AOO until the UAS either returns due to the RTH failsafe activating, or runs out of fuel			
10	Find crash site using map built in command unit or obtain latitude and longitude from the command unit's digital flight log			

2.16.8 GNSS signal loss

If the GNSS signal is lost the UA will automatically enter altitude mode, which means it will hold its altitude but not its position. Telemetry position data will be lost. Navigation using waypoint modes and the RTH failsafe will not work.

The UA will drift with the wind and will need manual control inputs from the remote pilot to control its flight path.

GNSS signal loss		Any UAS	MR	FW
ID	Requirement			
1	Communication 'GNSS lost'			
2	Gain altitude, if required to avoid collision with obstacles			
3	Note wind direction and strength			
4	Obtain control of the UAS			
5	Identify landing site			
6	Immediately clear the area of people			
7	Land			

2.16.9 Ground incursion

If an uninvolved person breaches the cordon around the area of operation, TOLA or emergency landing area, the minimum legal distances must be maintained by the remote pilot.

Ground incursion		Any UAS	MR	FW
ID	Requirement			
1	Communication 'Cordon breach'			
2	Move UAS to a holding area at a safe and legal distance away from the uninvolved person/s			
3	Clear area of uninvolved person/s, if possible			
4	Resume mission if the area of operation is cleared of uninvolved person/s or Land at alternative location if uninvolved person/s cannot be cleared			

2.16.10 Loss of tail fin (tail sitter VTOL) – Fixed wing

If the landing gear fails, the UA can still be landed, but the location may need to change. The UA may need to be landed on a soft target with all gear up to minimise damage.

Landing gear failure – Fixed wing		Any FW UAS	FW
ID	Requirement		
1	Communication 'No fin'		
2	Identify landing site		
3	Immediately clear the area of people		
5	Hover VTOL as low as possible over the soft target		
6	Land		
7	Cut motors		

2.16.11 Landing gear failure - Multirotor

If the landing gear fails, the UA can still be landed, but the location may need to change. The UA may have to be landed on a soft target to minimise damage.

Landing gear failure - Multirotor		Any MR UAS	MR
ID	Requirement		
1	Communication 'Legs lost'		
2	Identify landing site		
3	Immediately clear the area of people		
4	Point the payload gimbal up to protect any sensor lenses (if possible)		
5	Find or make a soft target to land on		
6	Hover as low as possible over the soft target		
7	Cut the motors		

2.16.12 Loss of control

A loss of control is declared if the UA fails to respond to navigation inputs due to a malfunction or C2 signal interference.

Loss of control		Any UAS	MR	FW
ID	Requirement			
1	Communication 'Loss of control'			
2	Switch flight mode			
3	If UA does not respond activate RTH failsafe			
4	If UA responds, clear area and let the failsafe automatically land the UA			
5	If UA is in operational envelope and not moving out of it, reboot the command unit			
6	If the UA does not respond and the area is clear of uninvolved people, cut propulsion			
7	If the propulsion does not shut down, reboot the command unit			
8	If control cannot be regained, follow the emergency procedure for a flyaway			

2.16.13 Power loss – Command unit

The UAS is programmed by the remote pilot during the pre-flight checks to ensure the RTH failsafe is automatically activated whenever the C2 link is lost, which may be due to command unit power failure.

Power loss – Command unit		Any UAS	MR	FW
ID	Requirement			
1	Communication 'Dead stick'			
2	Wait for RTH to automatically engage			
3	Identify landing site			
4	Immediately clear the area of people			
5	UAS will automatically land and shut the motors off			

2.16.14 Power loss - UA (partial)

If a partial loss of power is experienced, such as the failure of a battery on a UA that has more than one, the UA will continue to fly. However, it may not be able to fly against the wind, or as fast and should be landed as soon as possible. The remote pilot may have to make a controlled flight into terrain in order to protect uninvolved people.

If partial power is lost, the remote pilot may be tempted to retrieve the UA as quickly as possible by flying the aircraft manually. However, this could result in battery failure, resulting in the total loss of power and propulsion. In this situation, the RTH failsafe must be activated to allow the FMS to automatically control the current draw required by the UA in order to minimise the risk of the emergency escalating.

Power loss (partial)		Any UAS	MR	FW
ID	Requirement			
1	Communication 'Power failure'			
2	Check power/fuel status			
3	If the area is clear of uninvolved people below the UAS, land immediately			
4	If the area below the UA is not clear, navigate the UA gently downwind to the next available area and land immediately.			
5	If the area below the UA is not clear and there are no suitable alternative landing sites down wind, activate the RTH failsafe.			
6	Immediately clear the area of people			
7	UA will automatically land and shut the motors off			
8	If the UA cannot make headway against the wind in RTH mode, identify a crash landing site down wind			
9	Immediately clear the area of people			
10	Make a controlled flight into terrain			

2.16.15 Power loss – UA (full)

If a full loss of power occurs, the UA will no longer maintain lift as all propulsion will be lost along with any control, resulting in a crash landing. A multirotor will descend uncontrollably, whereas a fixed wing UA may continue to glide before impacting terrain.

Power loss (full)		Any UAS	MR	FW
ID	Requirement			
1	Communication 'Dead stick'			
2	Identify the likely crash landing site			
3	Immediately clear the area of people			
4	If the UA catches fire upon impact, follow the relevant sections of the 'fire' emergency procedure			

2.16.16 Propulsion system loss (total or partial) - Fixed wing

If propulsion is lost the UA will glide. There may be some remaining control that the remote pilot can use to navigate the UA to an emergency landing area. The remote pilot may have to deliberately fly the UA into a structure or the ground in order to protect uninvolved people.

Propulsion system loss		Any FW UAS	FW
ID	Requirement		
1	Communication 'Power lost'		
2	If flying UA without direct flight control, e.g. Wingtra, follow Power Loss – UA (Full)		
3	Use remaining flight control		
4	Identify landing site		
5	Immediately clear the area of people		
6	Land		
7	If the UA catches fire upon landing, follow the relevant sections of the 'fire' emergency procedure		

2.16.17 Propulsion system loss (single motor) - Multirotor

No current university UA has a motor recovery mode

2.16.18 Propulsion system loss (multiple motors) - Multirotor

No current university UA has a motor recovery mode

2.16.19 Propulsion system loss (full) - Multicopter

If propulsion is lost the UA will fail to maintain lift and will descend in an uncontrolled manner.

Propulsion loss (full)		Any MR UAS	MR
ID	Requirement		
1	Communication 'Power lost'		
2	Identify landing site		
3	Immediately clear the area of people		
4	If the UA catches fire upon impact, follow the relevant sections of the 'fire' emergency procedure		

2.16.20 Navigation light failure at night

If navigation lights fail during flight at night VLOS shall be lost. There are several ways that the remote pilot can ascertain the approximate position of then UA. These include the following:

- Map feature on the command unit
- Onboard camera or payloads
- Strobes (if fitted and working)

If navigation lights are lost the remote pilot should immediately pause the flight by hovering (MR) or loitering (FW).

The altitude telemetry should be checked and if required, additional altitude given to prevent collision with any obstructions. The RTH failsafe should then be activated to retrieve the UAS to the landing zone. Flight crew should use torches to illuminate the aircraft. Reflective tape attached to the airframe will help make the UA visible in this situation.

Once illuminated, a steady and controlled landing should be made. This may mean deactivating the RTH and manually landing.

Navigation light failure at night		Any UAS	MR	FW
ID	Requirement			
1	Communication 'Nav lights dark'			
2	Hover (MR) or loiter (FW)			
3	Check navigation lights are switched on			
4	Turn on any strobes or additional lighting			
5	Gain altitude, if required to avoid collision with obstacles			
6	Activate RTH failsafe			
7	Allow RTH failsafe to return UA to the landing site			
8	Illuminate with torches or other light sources			
9	Land			

2.16.21 Pilot Incapacitation

If the remote pilot becomes incapacitated a member of the flight crew shall recover the UA by activating the RTH failsafe. All members of the flight crew are briefed how to increase altitude and activate the RTH button on the controller as part of the pre-flight brief.

Pilot incapacitation		Any UAS	MR	FW
ID	Requirement			
1	Communication 'Terminate mission'			
2	Increase altitude if required			
3	Activate RTH failsafe			
4	Immediately clear the area of people			
5	UAS will automatically land and shut the motors off			
6	Seek medical assistance			

2.16.22 Structural failure

If the airframe fails due to component failure, bird strike or collision, the UA is likely to become uncontrollable and crash.

Structural failure		Any UAS	MR	FW
ID	Requirement			
1	Communication 'Crash, crash, crash			
2	Identify landing site			
3	Immediately clear the area of people			
4	If the UA catches fire upon impact, follow the relevant sections of the 'fire' emergency procedure			

2.17 Emergency Response Plan

The Emergency Response Plan (ERP) shall be used after an occurrence.

The priorities are:

1. Protect uninvolved people
2. Protect property
3. Gather evidence
4. Submit and occurrence report
5. Conduct an investigation
6. Deliver outcome actions to prevent a repeat occurrence

2.17.1 Reportable occurrences

The following occurrences shall be reported:

Technical failure

- Technical failure during transfer to/from launch control/mission control stations
- Functional failures
- Loss of C2 link
- Loss of navigation function
- Command unit configuration changes/errors
- Loss of communication between remote pilot stations
- Display failures
- Structural failures that resulted in control difficulties or loss of the aircraft
- Airspace infringement
- Any technical failure that resulted in injury to a third party

Human factors

- Human error during transfer to/from launch control/mission control stations
- Functional failures of the UAS which led to loss of situational awareness
- Mishandling by the pilot in command including mis-selection of flight parameters via the Command Unit (CU)
- Crew resource management failures / confusion
- Human errors
- Pilot incapacitation
- Any human error that resulted in injury to a third party

A full list of reportable occurrences can be found in UK Reg (EU) No 2015/1018 (the UK MOR Occurrences Regulation).

An occurrence/airprox reporting form is included in Annex 5.

2.17.2 Mandatory Occurrence Reporting Scheme (MORS)

All occurrences shall be reported as an MOR within 72 hours in accordance with UK Reg (EU) No 376/2014 (the UK Mandatory Occurrence Reporting Regulation).

MORs are submitted online via ECCAIRS2 web portal:

<https://aviationreporting.eu/>

Any serious accident or incident must also be reported to the Air Accident Investigation Branch:

Air Accidents Investigation Branch
Farnborough House
Berkshire Copse Road
Aldershot
HANTS
GU11 2HH

24 hour accident/incident reporting line: +44 (0) 1252 512299

Administration and general enquiries Tel: +44 (0) 1252 510300

Fax: +44 (0) 1252 376999

E-mail: enquiries@aaib.gov.uk

2.17.3 Occurrence investigation

In the event of an occurrence the UAS operator shall be informed immediately. A full investigation shall be conducted to find out what occurred and why.

To aid the investigation, evidence shall be gathered in the form of:

- Photographs
- Witness statements
- Digital flight logs
- Onsite paperwork, including the risk assessment
- Weather conditions at the time

The remote pilot shall fill in an occurrence reporting form as part of the ERP to ensure all required evidence is collected.

2.17.4 Occurrence outcome actions

All flight crew will be debriefed about the occurrence to ascertain how and why it happened. The results of the investigation will form the basis of new procedures to prevent the same occurrence happening again. All flight crew will be informed of the investigation outcome and trained in any new procedures.

2.17.5 Internal reporting

All occurrences must be reported via the [University HS1 form](#).

All operational events that are not reportable as above should still be logged as a Hazard Response Training event, so they can be discussed at the next meeting.

2.18 Airprox reporting

An airprox is defined as any situation where two aircraft become so close that it is considered to be dangerous. All airprox shall be reported to the UK Airprox Board with 7 days:

[Report an Airprox | UK Airprox Board](#)

Details to be gathered include the following:

- Date and time
- Location
- Airspace class/type
- Type of airspace (FRZ, restricted airspace, etc)
- Was a NOTAM issued?
- Description of all aircraft involved (UAS, helicopter, GA, etc)
- Identification of other aircraft (tail number, etc)
- Speed, heading and altitude of US
- Estimated speed, heading and altitude of other aircraft
- Flight activity being conducted
- Was the UAS operator/remote pilot in communication with the other aircraft?
- Who infringed on the airspace? (UA or other aircraft)
- Airprox details
- Weather conditions
- Visibility (mist, fog, sun, light levels)

An occurrence/airprox reporting form is included in Annex 5.

2.19 Maintenance

2.19.1 Maintenance procedure

The UAS must be kept in a 'safe to be flown' condition. Scheduled maintenance shall be conducted in addition to the inspections conducted as part of the pre and post flight procedures.

Scheduled maintenance shall include checking the following items:

See annex 6 part E

2.19.2 Maintenance schedule

All elements of the UAS shall be maintained in accordance with the manufacturers maintenance procedure. If none is provided by the manufacturer, the UAS operator shall determine the maintenance schedule.

Routine maintenance is conducted on first flight, after major firmware updates, after hard landings and every 3 months or 20h, whichever is sooner.

DJI UAS are sent to an authorised DJI repair centre annually, in addition to the above.

2.19.3 Maintenance personnel

The following personnel have been authorised to conduct maintenance on the UAS:

All UAS	Details
In-house personnel	
RP	All nominated RP
External entities	
Manufacturer	Respective manufacturer
Dealerships	Respective manufacturer

Maintenance, repairs and modifications may only be conducted by maintenance personnel who have been authorised by the UAS operator. Maintenance personnel must be competent and current.

2.19.4 Repairs

Repairs shall be conducted in accordance with the manufacturer's instructions.

Replacement of user serviceable parts, such as propellers, can be conducted in-house.

Advanced repairs shall be conducted by the manufacturer or an authorised repair centre.

The following personnel have been authorised to conduct repairs on the UAS:

All UAS	Details
In-house personnel	
RP	All nominated RP
External entities	
Manufacturer	Respective manufacturer
Dealerships	Respective manufacturer

After a repair, the operator should consider a test flight of the UA prior to subsequent operational deployments to ensure proper functioning.

2.19.5 Maintenance, repair and modification log

All maintenance, repairs and modifications shall be recorded in a technical logbook and made available to the CAA upon request. Each UAS has its own technical logbook.

Maintenance and repairs are logged in the online record system. There is a form that all RP are required to complete after any maintenance.

2.19.6 Storing lithium polymer batteries

Lithium polymer UAS batteries shall be put into storage state when not in use and stored in a suitable container. Battery logs shall be kept for batteries that do not have an internal logging mechanism (often found on smart batteries).

Procedure for putting non-smart batteries into storage state:

Check battery voltage. Batteries should be charged to ca. 40% for storage. Depending on the charger, there may be a storage charging mode, which should be used. This mode will automatically charge/discharge to the required storage level.

Batteries should be checked every 3 months when not in use and topped up if necessary (<25%).

Procedure for putting smart batteries into storage state:

Check automatic discharge level in the C2 app. Ensure the days until discharge are set to an appropriate duration as to not interfere with upcoming operations, e.g. discharging over the weekend for a Monday operation.

Batteries below 25% as indicated by the C2 should be topped up to ca. 40% before storage.

2.19.7 Storage of UAS

The UAS shall be stored in a secure, dry location when not in use.

2.19.8 Use of third-party equipment

The university only allow use of third-party equipment if sourced from a reputable equipment hire company. Use of personal UAS for university business is not allowed.

Third-party equipment shall only be used if:

- It is accompanied by the relevant maintenance logs
- The UAS operator deems the equipment safe to be used
- The remote pilot deems the equipment safe to be used
- The UAS displays the UAS operator ID

The equipment use must not exceed any stated maintenance schedules for either the UAS operator or the third-party owner.

Copies of the maintenance logs for third-party equipment must be kept by the UAS operator in accordance with 2.20 Logs and records.

2.20 Logs and records

Logs and records are required in order to comply with [UK Regulation \(EU\) 2019/947, SPEC.050\(1\)\(g\)](#).

Logs and records are contained within the UAS operator technical logbook.

Records shall be held for:

- UAS operations flight log
- Training of the flight crew personnel and maintenance staff
- Remote pilot qualifications
- UAS maintenance and repair
- Modifications to the system
- Batteries
- Occurrence and airprox reports

Logs and records shall be held electronically or as a hard copy by the UAS operator for a minimum period of three years and shall be made available to the CAA any time they are requested.

Records are kept in the UoP online record system in line with the UoP's GDPR policy

Volume 2

Section 3 – UAS description

Only UA with a MTOM of less than 25kg can be operated with a PDRA01 operational authorisation. Details of compliant UA can be found in this section.

3.1 Details of UAS

Description		DJI Mavic 3M
Make		DJI
Model		Mavic 3M
Type of aircraft		MR
Weblink to aircraft specification		https://ag.dji.com/mavic-3-m/specs
Mass	Empty mass	0.95kg
	Maximum Take-Off Mass (MTOM)	1.05kg (This includes payloads and fuel)
Dimensions for rotorcraft/multirotor	Length of aircraft body	347.5mm
	Width of aircraft body	283mm
	Height of aircraft body	139.6mm
	Propellor dimensions	240mm
	Propellor configuration	Quadcopter



Description		WingtraOne
Make		Wingtra
Model		WingtraOne Gen I
Type of aircraft		Fixed wing
Weblink to aircraft specification		n/a
Mass	Empty mass	3.7kg
	Maximum Take-Off Mass (MTOM)	4.5kg (This includes payloads and fuel)
Dimensions for fixed-wing	Wingspan	1250mm
	Fuselage length	680mm
	Fuselage diameter	120mm



3.2 UA performance characteristics

The flight envelope limitations for each UAS are detailed below.

Description	UAS 1	UAS 2
Maximum Take Off Mass / Flying Weight	1.05kg	4.5kg
Maximum airspeed	21 m/s	16m/s
Minimum airspeed to maintain safe flight	0 m/s	
Maximum bank angle	30 degrees (35 in sport mode)	Not stated
Normal/typical operating height range	<6000m AMSL	<2500m AMSL
Maximum flight time during normal operations	43 minutes	59 minutes
Maximum flight range during normal conditions	39km	57km
Glide distances	0	Not stated. Simplified Ground Risk distance at max airspeed @110m AGL is 133m
Maximum radio range of the C2 Link	8km	10km
Maximum operating height (service ceiling)	6000m AMSL	2500m AMSL
Minimum number of satellites required for GNSS assisted flight	Not stated	Not stated
Any other relevant information		

3.3 UAS environmental limitations

The environmental limitations for each UAS are detailed below:

Description	UAS 1	UAS 2
Wind speed limits including gusts for take off and landing	12m/s	8m/s
Wind speed limits including gusts when cruising	12 m/s	12m/s
IP rating	None	None
Precipitation limits	No IP rating	No IP rating
Maximum air temperature	40°c	40°c
Minimum air temperature	-10°c	-10°c
In-flight icing condition limits	Not stated	Not stated
Space weather limitation	Ensure no adverse effects	Ensure no adverse effects

3.4 Fuel

Description	UAS 1	UAS 2
Fuel		
Type	Electric (batteries)	Electric (batteries)
Quantity	1	2
Means of identifying the fuel	Label on the UA	Label on the UA
List of hazardous fuel substances carried by the UA and their characteristics	Lithium Hazard Classification: UN Number: UN3481 (batteries contained in or packed with equipment) Hazard Class: Class 9 – Miscellaneous Dangerous Goods Hazards: Fire Risk: Can catch fire or explode if damaged, short-circuited, overcharged, or exposed to high temperatures. Thermal Runaway: A self-sustaining reaction that can lead to fire or explosion. Toxic Emissions: Release of toxic gases (e.g., hydrogen fluoride, carbon monoxide) during combustion. Reactivity: Reactive with water in case of rupture; sensitive to mechanical damage and electrical faults.	
Fuel status indicators	LED on battery	LED on battery
Fuel alert messages	CU	CU
Any other relevant information		

The UAS operator **must** ensure all hazardous fuel types used by the UAS are clearly labelled on the UAS, storage containers and/or storage devices.

3.5 Batteries

Description	UAS 1	UAS 2
Batteries		
Type	Smart	Smart
Manufacturer	DJI	Wingtra
Manufacturer SKU code	BWX260-5000-15.4	Wingtra Battery 2
Minimum quantity required for flight	1	2
Maximum quantity that can be used by the UAS for flight	1	2
Chemistry	LiPo	Li-Ion
Connector	Proprietary	XT-60
Voltage	15.4v	14.4
Wattage	77Wh	99Wh
mAh	5000mAh	10,000mAh
Number of cells	4S	4s
C-rating - discharge		
C-rating - burst		
Battery arrangement		
Physical restraint	Pinch clip	Clip
Electrical loads		Max discharge 35 A
Any other relevant information		

The UAS operator **must** ensure all high-powered electrical storage devices used by the UAS are clearly labelled as an electrical hazard.

3.6 Engines and propellers

Description	UAS 1	UAS 2
Engines		
Type of engine	Electric	Electric
Quantity	4	2
Arrangement	Quadcopter	Fixed-wing
Type of propulsion unit	Puller	Puller
Power output (Hp for ICE/GTE and Kv for electric motors)		
Any other relevant information		
Propellers		
Type	Folding	Rigid
Length of blade (tip to tip)	240mm	353mm
Number of blades per engine/motor	2	1
Build material	Plastic	Plastic
Propellor fixing mechanism	Quick release	Screw
Any other relevant information		

3.7 Navigation

Description	UAS 1	UAS 2
Navigation		
Type	Optical, IR	Optical
Quantity	6	2
Location	Omnidirectional Vision System, IR down	Tail rangefinder
GNSS		
GNSS constellations	GPS, Galileo, GLONASS	GPS, GLONASS
Minimum quantity of satellites required	Not stated	Not stated
Automatic flight controls		
Automatic flight control functions	Waypoint, Area route, Linear route, Slope Route	Area Route
Geo-awareness functions	DJI Fly Safe	None
Altitude limitation	User settable maximum altitude	User settable maximum altitude
Horizontal distance limitation	User settable maximum distance	User settable maximum distance, geofence
Any other relevant information		
Redundancy		
Backup Means of Navigation and Guidance	None	None
Human machine interface (HMI)		
Information indicated to the remote pilot during normal operation	Map, icon of UAS showing position, altitude, attitude and distance	Map, icon of UAS showing position, altitude, attitude and distance
Alert messages indicated to the remote pilot when flight volume limitations are reached	UI Warning	UI Warning

3.8 C2 link

Description	UAS 1	UAS 2
C2 link		
Range	8km	10km
Operating frequency used	2.4, 5.8GHz	2.4GHz
Power level of transmitter/transceivers	2.4GHz < 20, 5.8GHz < 14	19.8dBm
Power level of modems	2.4GHz < 20, 5.8GHz < 14	19.8dBm
Latency	200ms	n/a
Any other relevant information		
Third party links		
Third party link service provider		
Optimum data rate		
Minimum data rate required		
Latency		
Any other relevant information		

3.9 Geo-awareness

If geo-awareness is available for use on a UAS, the following procedures shall be followed:

- **Updates**

The geo-awareness data is checked for updates on the UAS as part of the pre-flight checklist. If an update is available, it shall be downloaded and installed immediately.

However, if the update cannot be conducted at the flying location (maybe due to lack of mobile data signal), it shall be downloaded and installed at the next available opportunity before further flight operations are conducted.

- **Reliance**

Resources that give details of permanent and temporary flight restrictions shall be consulted as part of the pre-flight planning to ensure technical geo-awareness of the UAS is not relied upon.

- **Responsibility**

The UAS operator and remote pilot both have a responsibility to ensure the UAS is not operated in airspace that has either temporary or permanent flight restrictions in place.

3.10 Payloads

Payloads must always be securely fixed to the UA.


Payloads must never draw more power than the system can cope with or take the UA above the MTOM. This is particularly important where multiple payloads may be carried by a UA, at the same time.


Payloads that affect the centre of gravity of the UA must have a procedure in place to ensure stability and safe flight.

Payloads should only be fitted in accordance with the manufacturer's instructions.

3.10.1 Payload details

UAS 1 payload is integrated and not user swappable.

Sony RX1R II	Details	Photo of payload
Compatible UA	UAS 2	
Type of payload	Camera	
Make of payload	Sony	
Model	RX1R II	
Description	Full-frame camera	
Weight of payload	575g	
Security mechanism	Screws, rubber catches	
UA centre of gravity affected?	No	
Power consumption	Not stated	

Sony QX1	Details	Photo of payload
Compatible UA	UAS 2	
Type of payload	Camera	
Make of payload	Sony	
Model	QX1	
Description	Lens-style compact camera	
Weight of payload	330g	
Security mechanism	Screws, rubber catches	
UA centre of gravity affected?	No	
Power consumption	Not stated	

RedEdge-MX	Details	Photo of payload
Compatible UA	UAS 2	Insert photo of payload
Type of payload	Camera	
Make of payload	Micasense	
Model	RedEdge-MX	
Description	Multi-spectral camera	
Weight of payload	325	
Security mechanism	Screws, push-click	
UA centre of gravity affected?	No	
Power consumption	Not stated	

MicaSense AltumII	Details	Photo of payload
Compatible UA	UAS 2	Insert photo of payload
Type of payload	Camera	
Make of payload	Micasense	

Model	Altum	
Description	Multispectral&Thermal camera	
Weight of payload	501	
Security mechanism	Screws, push-click	
UA centre of gravity affected?	No	
Power consumption	Not stated	

3.10.2 Carriage of multiple payloads

When a UA can carry multiple payloads at the same time, care must be taken to ensure there is not excessive power drain on the system. The UAs total weight must remain below the MTOM and the centre of gravity must be maintained within operating limits.

3.10.3 Centre of gravity adjustment and calibration

The centre of gravity adjustment and calibration procedure must be conducted in accordance with the manufacturers operating manual.

Neither UAS has a centre of gravity adjustment or calibration procedure.

3.11 Modifications to the system

Modifications to the system are any modification that changes the appearance or operational characteristics of the UAS and its associated command units.

3.11.1 Insert title of modification

Insert description	Details	Photo of modification
System	Insert details	Insert photo of modification
Make	Insert details	
Model	Insert details	
Modification	Insert details	
Conducted by	Insert entity	
Name of engineer	Insert name	
Date of modification	Insert details	
Purpose of modification	Insert details	

Add additional modifications, as required.

Annexes

Annex 1 - Feasibility study form



UNIVERSITY OF
PORTSMOUTH



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PART A (print pages 5-20)

FEASIBILITY STUDY

As part of managing health, safety and well-being within the University, risks in the workplace, on campus and in our activities must be effectively mitigated and controlled to ensure our students and staff health and safety. To do this, thought must be given to what might cause harm to staff, students, the university community, others associated with the University and the public, and to whether reasonable pragmatic steps are taken to prevent that harm from occurring. This due diligence checklist assists the University in ensuring our duty of care has been developed in-line with the Health and Safety at Work etc. Act and associated legislation relevant to Uncrewed Aerial Systems. By filling in this form, you are confirming that the information given is true to the best of your knowledge and belief. Please inform us of any changes that may occur.

Feasibility study ID/title:

Feasibility assessment: Feasible | Not feasible

Document version status: Final for approval | Preliminary for planning

UOP RISK ASSESSMENT

The Risk Assessment form is a separate form available from the [Health and Safety Website](#). A UAS specific template can be requested from drone@port.ac.uk. A completed risk assessment **must** be submitted together with this document for approval.

APPROVAL / SIGNOFF (PART A)

NB: By signing below the remote pilot (RP) is certifying that all checks have been completed accordingly and the operation meets the Requirements of the the [University UAS arrangement](#), [the University UAS Guidance](#), the Open Category or UKPDRA. (UKPDRA01 Produced by the Civil Aviation Authority, CAP722H) and that the UAS is released for service. Where operating under UKPDRA01, the accountable manager (AM) must approve the operation, this authority is also assigned to the UAS Safety Officer(s) who may approve on behalf of the AM. All operations must be notified to the corporate health and safety department via drone@port.ac.uk, where applicable.

REMOTE PILOTS

RP 1 Signature: Name : Date:

RP 2 Signature: Name : Date:

ACCOUNTABLE MANAGER/UAS SO

AM signature: Name : Date:
(Higher risk ops; specific)

or
UAS SO signature: Name : Date:
(All new ops, excl. repeat or routine; specific)

STUDY DETAILS

Study date? [redacted] Ops Date? [redacted] Ops date end (if applicable)? [redacted]

Person completing survey? [redacted] Site / Location? [redacted]

Client (if applicable): [redacted] Client point of contact: [redacted]

Potential for collecting personally identifiable information: Yes | Unlikely Data strategy in place (if Yes)? Yes

MISSION BRIEFING/METHOD STATEMENT?

[redacted]

CREW DETAILS

REMOTE PILOTS

Remote Pilot 1

Staff name or student number: Currency? Choose an item.
 FLYER ID: Further qualifications: GVC | A2of2

Remote Pilot 2

Staff name or student number: Currency? Choose an item.
 FLYER ID: Further qualifications: GVC | A2of2

OPERATOR DETAILS

Operator Name? University of Portsmouth Operator ID? GBR-OP-R482VGGRWJ2Y
 PDRA01 Operational Authorisation (if applicable) Expiry:

VISUAL OBSERVERS & CREW

Visual observer 1: Visual observer 2:
 Crew 1: Crew 2:
 Crew 3: Crew 4:

If more, please outline here:

UAS DETAILS

UAS make / model? UAS serial?
 UAS category for currency: Choose an item. UAS class: Choose an item.
 Maintenance: Choose an item. [Total UAS flying hours:](#) [Next maintenance due:](#)
 Wind limit (m/s): Precipitation limit: No IP Rating or IP Fuel: Choose an item.

ADDITIONAL UAS (if applicable)

UAS make / model? UAS serial?
 UAS category for currency: Choose an item. UAS class: Choose an item.
 Maintenance: Choose an item. [Total UAS flying hours:](#) [Next maintenance due:](#)
 Wind limit (m/s): Precipitation limit: No IP Rating or IP Fuel: Choose an item.

ADDITIONAL UAS (if applicable)

UAS make / model? UAS serial?
 UAS category for currency: Choose an item. UAS class: Choose an item.
 Maintenance: Choose an item. [Total UAS flying hours:](#) [Next maintenance due:](#)
 Wind limit (m/s): Precipitation limit: No IP Rating or IP Fuel: Choose an item.

OPERATIONAL PLANNING

Main TOLA LOCATION

Alternative TOLA and Emergency Landing Area must be marked in the operations sketch.

Latitude & Longitude / Grid reference: or What3Words:

Postcode: Location address:

OPERATING CATEGORY

A1 | A2 | A3 | Specific

AIRSPACE

Airspace classification: Choose an item.

Nearest local aerodrome: Bearing: Choose an item.

Direct line distance (mi): Contact:

Nearest aerodrome with ATC (if different): Bearing: Choose an item.

Direct line distance (mi): Contact:

Contact details for all managed airspace within flyaway zone ([NATS AIP](#)):

AIR PERMISSIONS

Airspace hazards (all that apply)? FRZ | Restricted area | Prohibited area | Danger area | HIRTA | MATZ | AIAA

Is a [Non-Standard Flight authorisation](#) required? Yes No

Non-standard Flight Authorisation granted (if above is Yes)? Yes Reference:

NOTAMS

NOTAM status: Choose an item.

NOTAM #: NOTAM summary:
 NOTAM contact: Notified? Yes No Date:

NOTAM #: NOTAM summary:
 NOTAM contact: Notified? Yes No Date:

NOTAM #: NOTAM summary:
 NOTAM contact: Notified? Yes No Date:

NOTIFICATIONS

Local ATC (Civilian or Mil)? Yes N/A Telephone: Date notified:

Military low flying? Yes N/A Email: **swk-mamclfcoord@mod.gov.uk** Date notified:

Any other notifiable bodies?

OTHER EMERGENCY NUMBERS

Police Air Service 01924 292 252
Military low flying info: 0800 515544
National Grid powerline emergencies: 0800 40 40 90
Gas supply emergencies: 0800 111 999
Civil Nuclear Constabulary: 03303 13 56 95
British Transport Police: 0800 40 50 40
Network Rail Emergency Line 0345 7 11 41 41

GROUND PERMISSIONS

Ops landowner name: [redacted] Permission granted by: [redacted]
Contact: [redacted] Duration of permission: [redacted]

Access type: Choose an item.

Access landowner name: [redacted] Permission granted by: [redacted]
Contact: [redacted] Duration of permission: [redacted]

Sensitivities? (all that apply) SSSI (EA SSSI Permission) | Nature | Local byelaws | Other (outline below)

Details of permissions granted or other sensitivities:

ENVIRONMENT & HAZARDS

- Congested area Yes | No
- Isolated buildings [50m exclusion zone]: Yes | No
- Letter Drop (Please attach a copy of letter): Yes | No
- Potential foreseeable distance breaches (contact AM)? Yes | No
- Potential foreseeable overflight of people (contact AM)? Yes | No
- Potential foreseeable assemblies of people (contact AM)? Yes | No

If Yes to either assemblies, overflight or distance breaches, outline circumstances and contact AM:

Environment (all that apply): Residential | Commercial | Industrial | Recreational | Rural | Wilderness

Other:

Terrain (all that apply): Flat | Sloped | Hills | Mountain | Water | Tidal | Marsh

Obstructions (all that apply): Wind turbines | National Grid Power Lines | Overhead Cables | Masts | Buildings

Trees | Equipment | Vehicles | Other:

Uninvolved people (all that apply): Public Land | Private (with public access) | Roads | Parks | RoW | Paths |

Bridleway | Waterways | Other:

Sources of electromagnetic interference? Yes No Details (if Yes):

EMERGENCY SERVICES

Nearest A&E: Distance (mi):

Remote site 1h+ from emergency care (contact AM)? Yes

For urgent treatment centres phone 111 in case of need.

WELLFARE

Parking: Toilets:

Food&Drink: Shelter:

Electricity: [Mobile phone signal](#):

WEATHER

Weather forecast must be attached to this feasibility document. (www.metoffice.gov.uk, www.windy.com).

Ops document for preliminary planning only, too early for weather

Wind (inc. gusts) within the limitation of UAS? Yes No Precipitation within limitation? Yes No

Temperature within the limitation of UAS? Yes No Visibility within limitation (min 3mi/5km)? Yes No

[Kp-index](#) within the limitation of UAS? Yes No

Sunrise? : Sunset? : Daytime Ops Window +30 minutes max

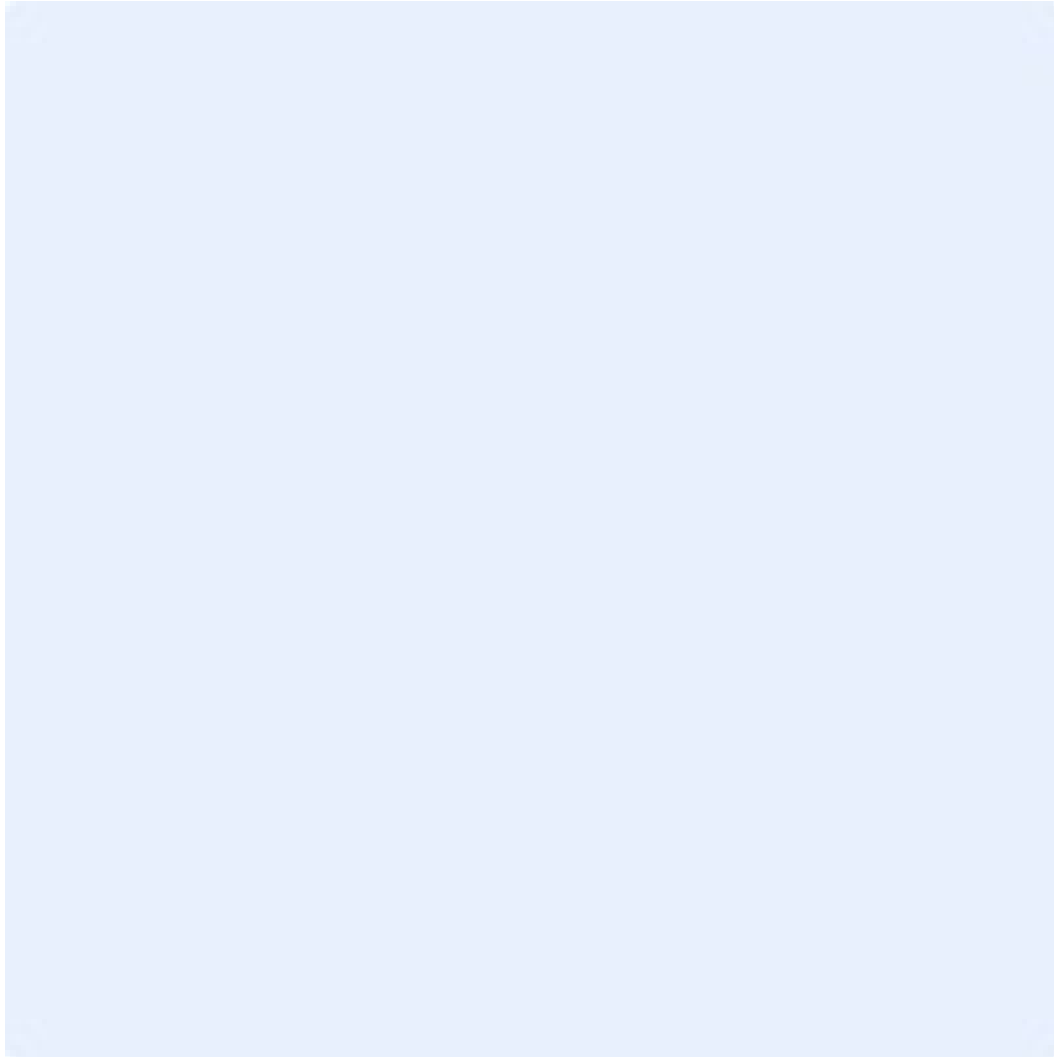
Tides (if applicable): High tide? : Low tide? : (if applicable)

FEASIBILITY STUDY MAPS, IMAGES AND SKETCHES

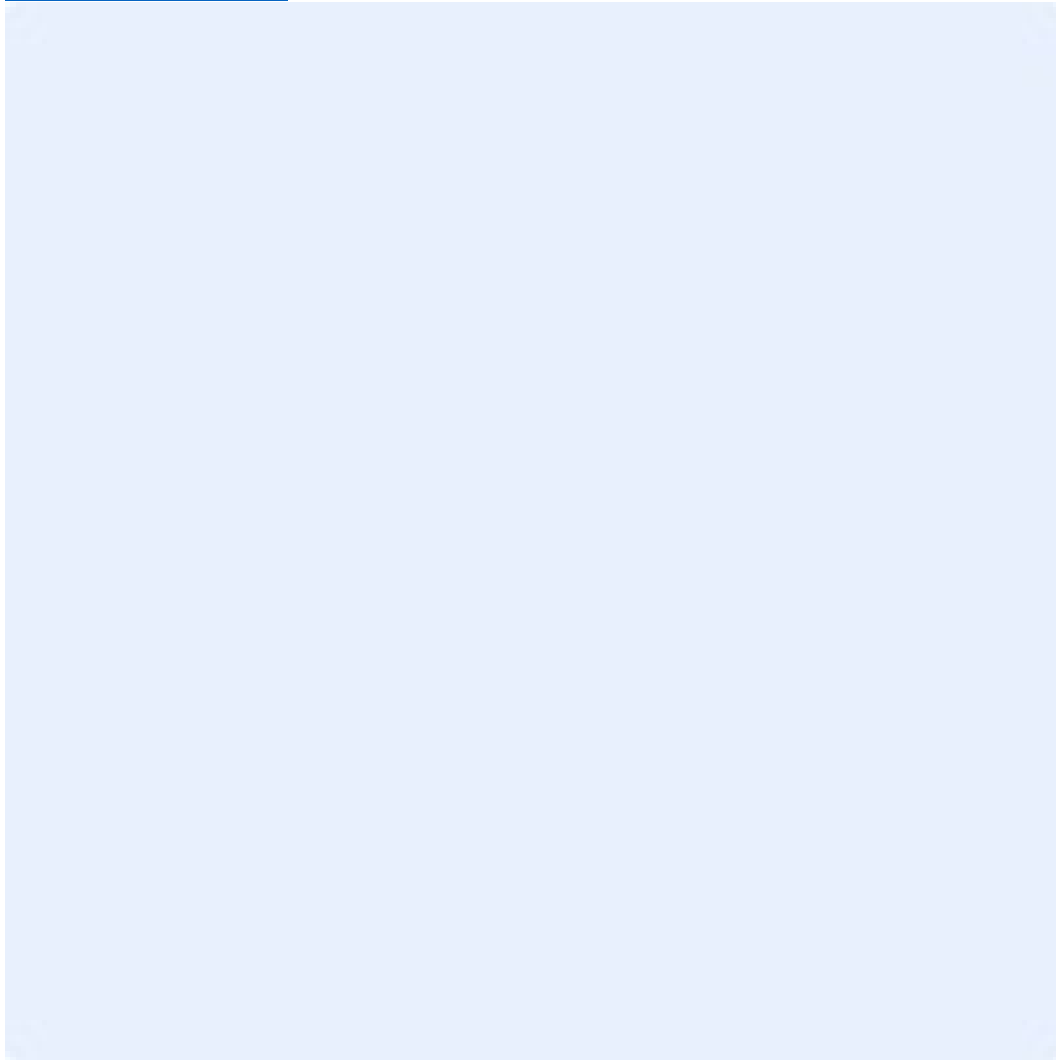
All Required Maps Attached? Yes No

Reason for omission:

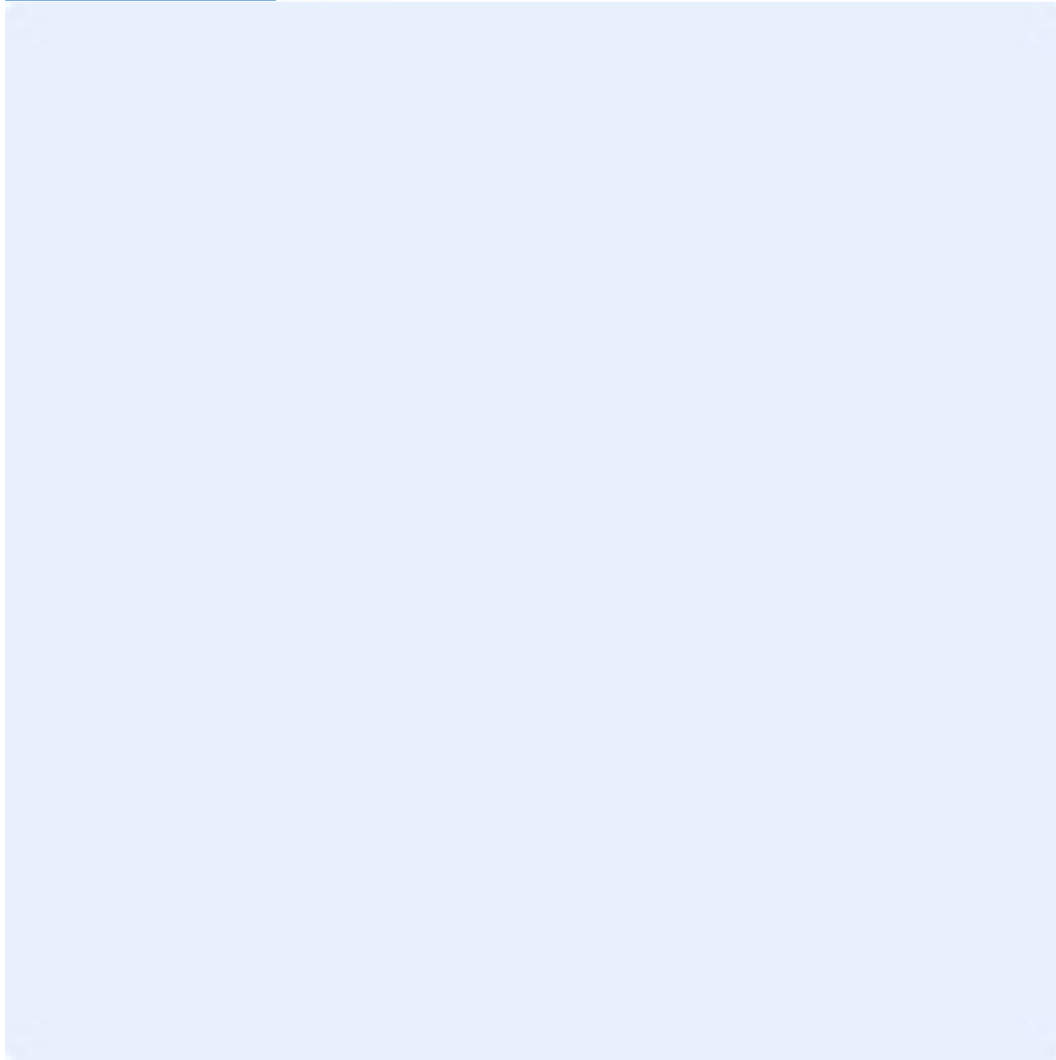
[AIRSPACE CHART\(Required\)](#)



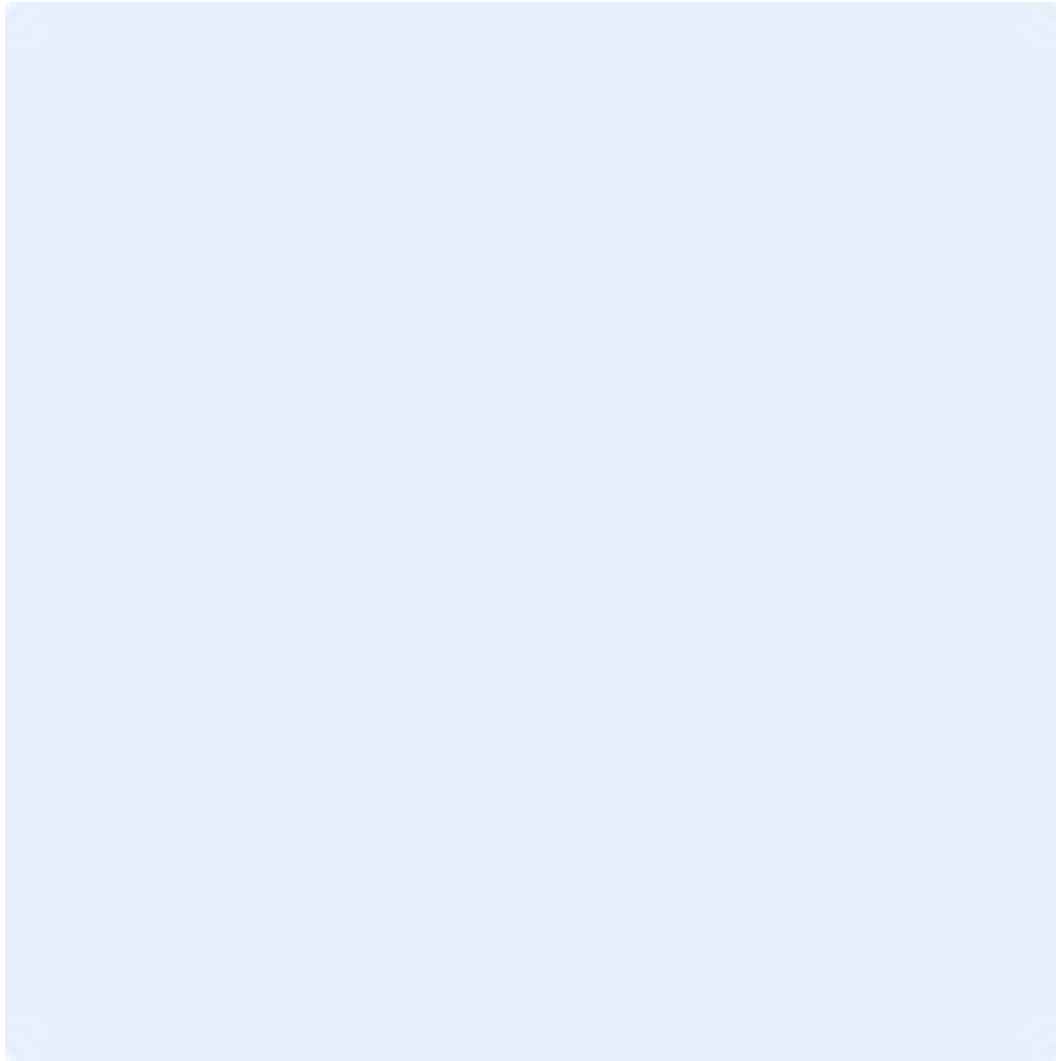
[The Drone Map \(Required\)](#)



ORDNANCE SURVEY MAP *(Required)*

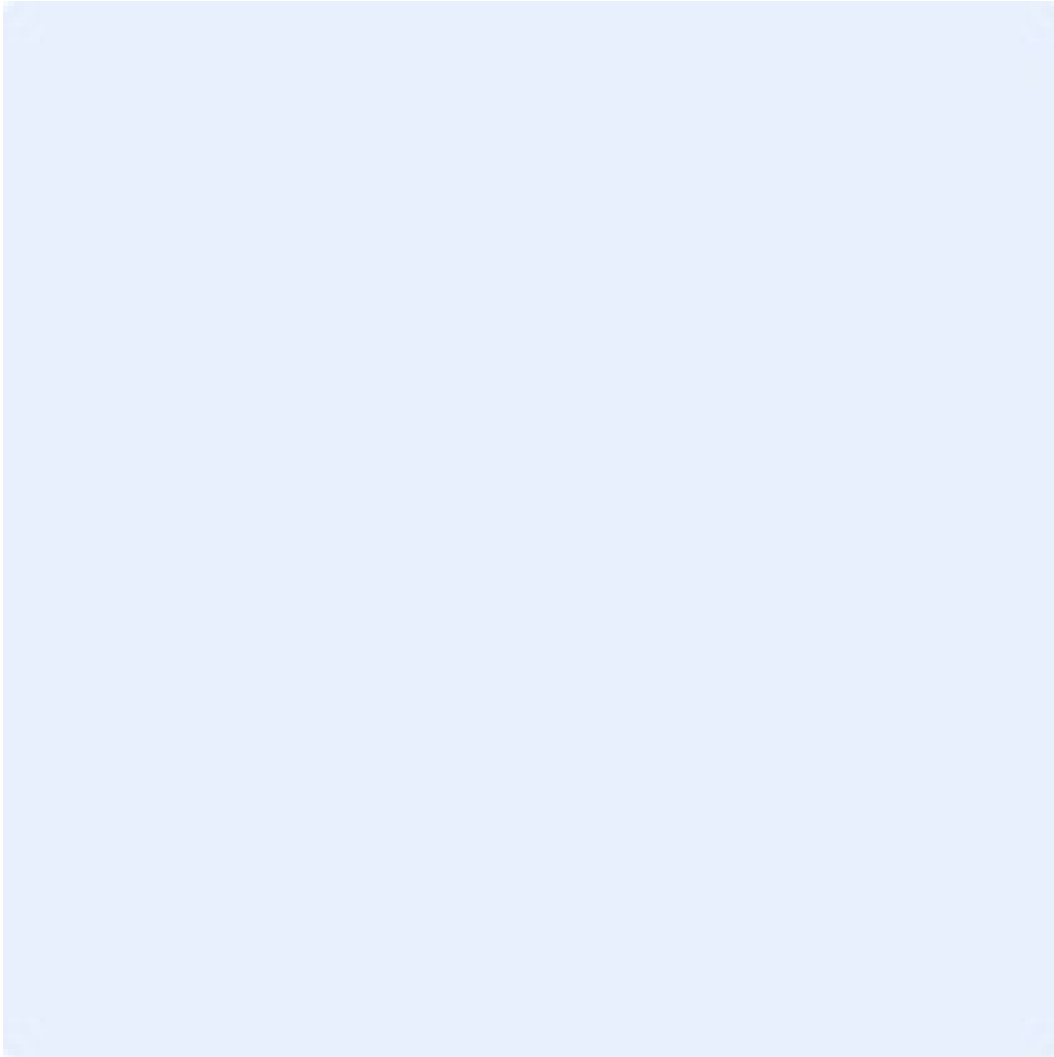


AERIAL / SATELLITE SURVEY MAP (Required)



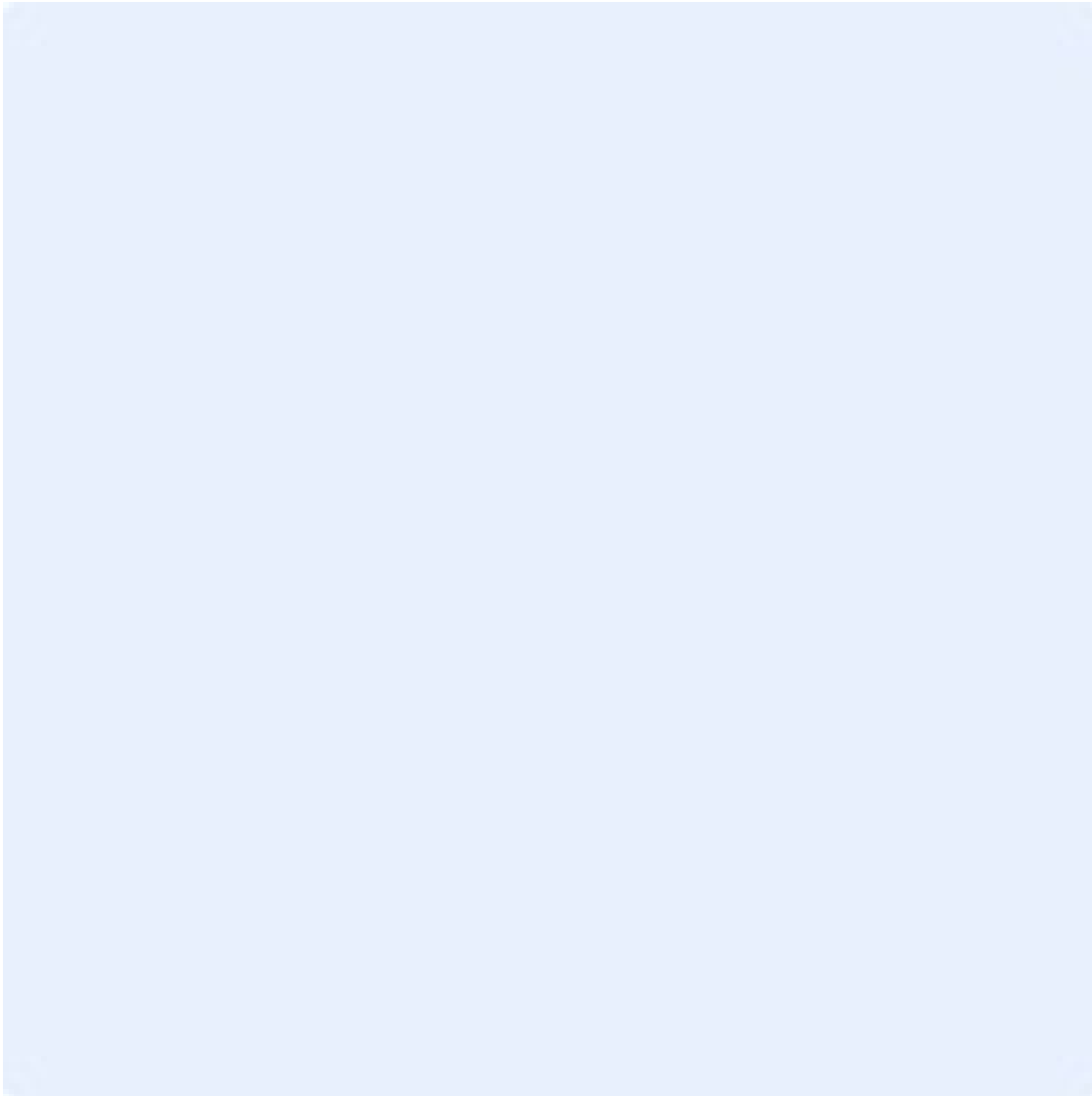
FLIGHT PLANNING MAP (Required)

Sketching at minimum TOLA, alternative TOLA, emergency landing areas, flight volume, contingency volume, holding/loiter area and any optional marshal or cordon positions.



WEATHER FORECAST - 48H MAX (REQUIRED)

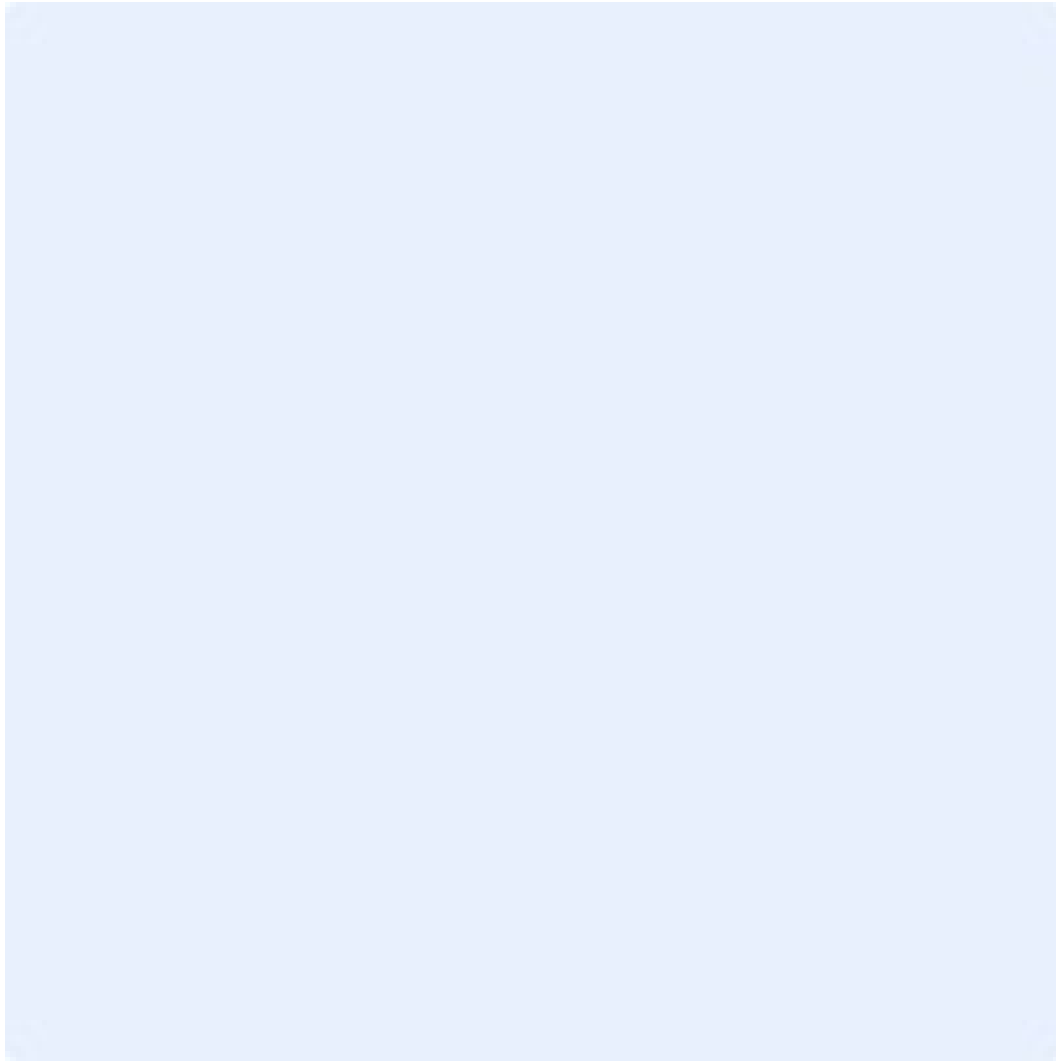
Screenshot



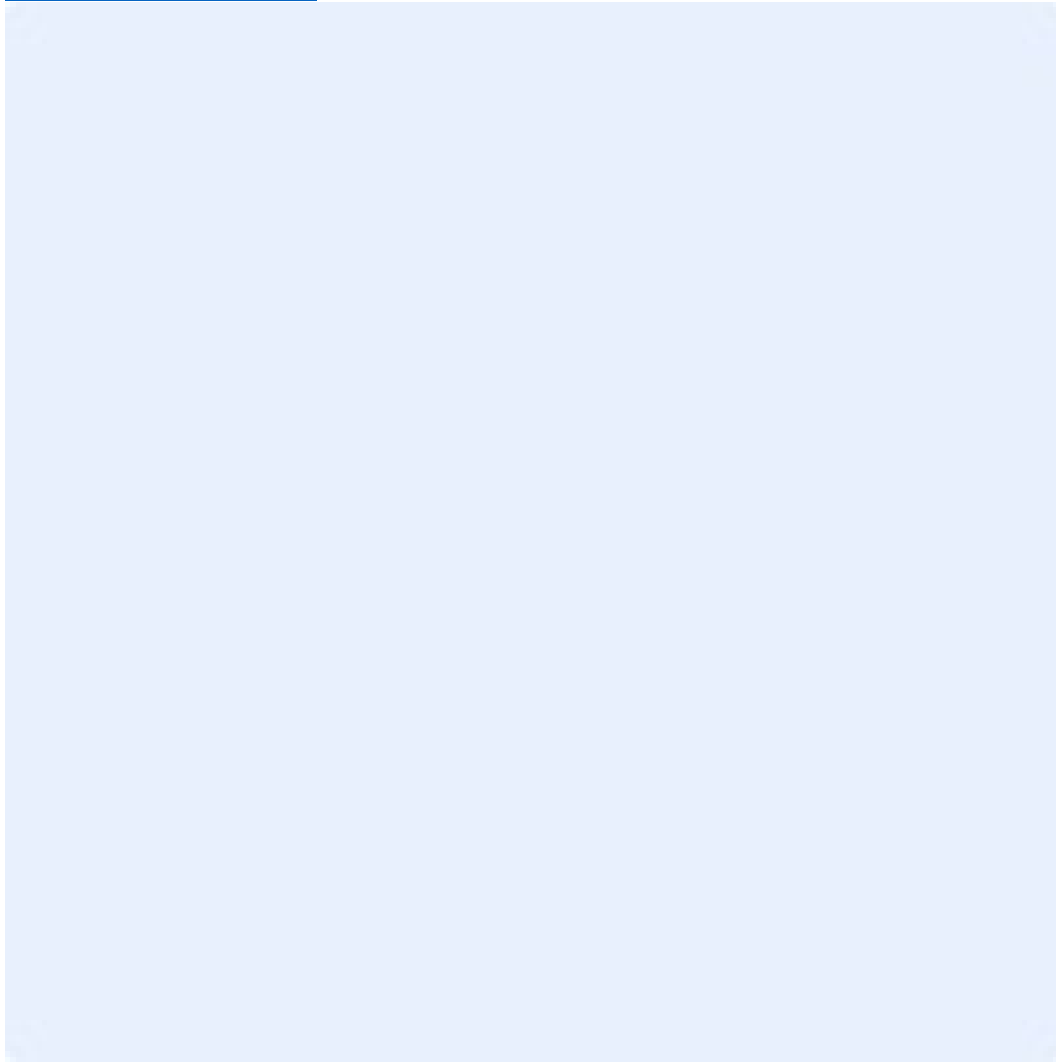
or text (with source)



STREET VIEW IMAGES or PHOTOS

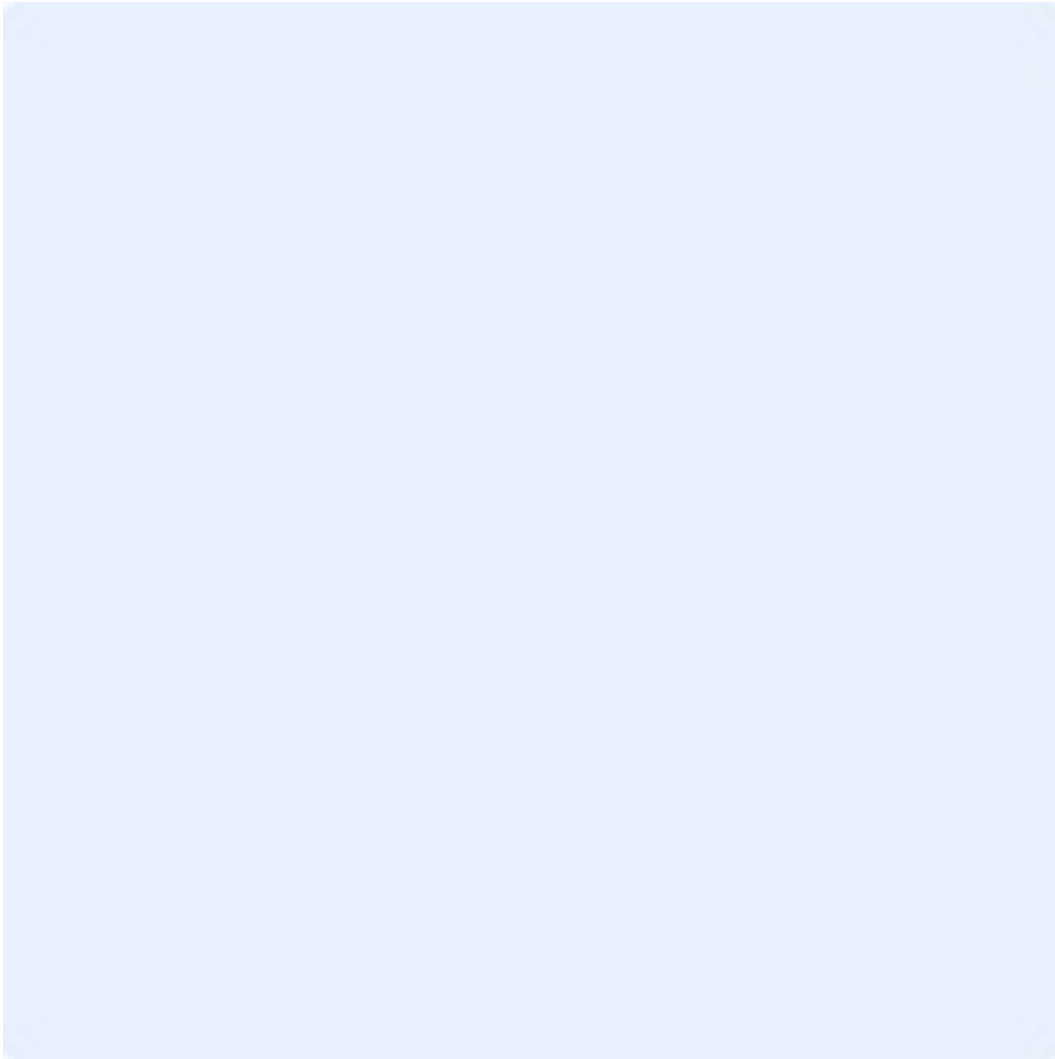


[SENSITIVITIES MAP \(e.g. SSI\)](#)



FLYAWAY MAP

As a circle around the operating volume with a radius of *max speed x max flying time* and showing airspace restrictions within the area.



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PART B (print pages 21-22)

PRE-DEPLOYMENT (in preference use app check list <https://arcg.is/0n9frq0>)

NB: Where no is selected, a comment must be provided why the item has not been included as standard deployment. Items marked with an Asterix * are mandatory, where these items are not included specific authorisation from the Accountable Manager must be obtained.

SAFETY

Charged comms kit (Phones/2-way Radio) *	Yes <input type="checkbox"/>	Comment: <input type="text"/>
First aid kit (present, complete & in-date) *	Yes <input type="checkbox"/>	Comment: <input type="text"/>
Fire blanket (present & in- date) *	Yes <input type="checkbox"/>	Comment: <input type="text"/>
PPE (high-viz vests, sleeves, etc.) *	Yes <input type="checkbox"/>	Comment: <input type="text"/>
Anemometer*	Yes <input type="checkbox"/>	Comment: <input type="text"/>
Sunglasses or hats for pilot & observer	Yes <input type="checkbox"/> N/A <input type="checkbox"/>	Comment: <input type="text"/>
Cordon & signage equipment	Yes <input type="checkbox"/> N/A <input type="checkbox"/>	Comment: <input type="text"/>
Landing mat	Yes <input type="checkbox"/> N/A <input type="checkbox"/>	Comment: <input type="text"/>

DOCUMENTATION

Air navigation map (+batt. and charger if electronic)*	Yes <input type="checkbox"/>	Comment: <input type="text"/>
Emergency telephone numbers*	Yes <input type="checkbox"/>	Comment: <input type="text"/>
Permissions*	Yes <input type="checkbox"/>	Comment: <input type="text"/>
Approved risk assessment*	Yes <input type="checkbox"/>	Comment: <input type="text"/>
Approved feasibility study*	Yes <input type="checkbox"/>	Comment: <input type="text"/>
Other forms (site arrival, pre/post flight, incident) *	Yes <input type="checkbox"/>	Comment: <input type="text"/>
Checked log books (airframe, pilot, batteries etc.) *	Yes <input type="checkbox"/>	Comment: <input type="text"/>
Notepad and pens*	Yes <input type="checkbox"/>	Comment: <input type="text"/>

UAS

Check latest firmware (CU&UAS, geoawareness)*	Yes <input type="checkbox"/>	Comment: <input type="text"/>
Check for damage *	Yes <input type="checkbox"/>	Comment: <input type="text"/>
Confirm current Operator ID on aircraft *	Yes <input type="checkbox"/>	Comment: <input type="text"/>
CU charged *	Yes <input type="checkbox"/>	Comment: <input type="text"/>
Battery logs checked (batteries cycled) *	Yes <input type="checkbox"/>	Comment: <input type="text"/>
Check memory card (present and free space)	Yes <input type="checkbox"/> N/A <input type="checkbox"/>	Comment: <input type="text"/>
Offline maps downloaded to CU	Yes <input type="checkbox"/> N/A <input type="checkbox"/>	Comment: <input type="text"/>
Spares	Yes <input type="checkbox"/> No <input type="checkbox"/>	Comment: <input type="text"/>
Routine Maintenance current*	Yes <input type="checkbox"/> RM will be performed on this operation <input type="checkbox"/>	
Transportation safety*	Yes <input type="checkbox"/>	Comment: <input type="text"/>

If needing to complete Routine Maintenance additionally complete pre-deployment in Part E UAS ROUTINE CHECKLIST

RP

Qualifications valid for operation* Yes

Comment:

Currency and Prerequisites* Yes Currency will be gained this op No (cancel ops)

IMSAFE* Yes No (cancel ops)

Comment:

APPROVAL / SIGNOFF (PART B)

NB: By signing below the remote pilot (RP) is certifying that all the above checks have been completed accordingly and the operation meets the Requirements of as set out.

REMOTE PILOTS

RP Signature:

Name :

Date:

PART C (print pages 23-24)

ONSITE SURVEY FORM (in preference use app check list <https://arcg.is/Pvj5L2>)

NB: This assessment is MANDATORY and must be completed prior to undertaking any operation. This assessment becomes invalid if the time from assessment to operation exceeds 4 hours, should this occur, it must be completed again. Any item marked No must be explained in comments. If No is not an option for an entry the operation cannot proceed if not ticked Yes. If any entry is ticked No Go the operation cannot proceed without further risk assessment.

Survey location: Survey date:

Feasibility study completed and approved? **Go** **No Go** NOTAM check complete? **Go** **No Go**

Police 101? Yes N/A Reference: Date notified:

WEATHER

Time of weather forecast: : | Anemometer: m/s | Wind / Gusts within limitation of UAS? **Go** **No Go**

Wind modifiers? **Go** **No Go** | Precipitation within limitation (IP rating)? **Go** **No Go** | Chance of Prec:

Temperature within the limitation of UAS? **Go** **No Go** | Visibility 3+miles? **Go** **No Go** | Kp index: **Go** **No Go**

Weather comments:

GENERAL SAFETY

IMSAFE Completed	Go <input type="checkbox"/> No Go <input type="checkbox"/>	Comment: <input type="text"/>
Permissions obtained (NSF, filming permit, etc.)	Go <input type="checkbox"/> No Go <input type="checkbox"/>	Comment: <input type="text"/>
Brief Client / Customer	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>	Comment: <input type="text"/>
Brief Landowner/Occupier	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>	Comment: <input type="text"/>
Check in with ATC	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>	Comment: <input type="text"/>
Phone Reception Signal	Go <input type="checkbox"/> No Go <input type="checkbox"/>	Comment: <input type="text"/>
Air hazards (AIAA, operating volume clear)	Go <input type="checkbox"/> No Go <input type="checkbox"/>	Comment: <input type="text"/>
Ground hazards (industrial, natural, livestock)	Go <input type="checkbox"/> No Go <input type="checkbox"/>	Comment: <input type="text"/>
Wildlife (raptors, schedule 1 birds)	Go <input type="checkbox"/> No Go <input type="checkbox"/>	Comment: <input type="text"/>
Terrain (slips, trips and falls)	Go <input type="checkbox"/> No Go <input type="checkbox"/>	Comment: <input type="text"/>
Inspect take-off & landing sites and alternatives	Go <input type="checkbox"/> No Go <input type="checkbox"/>	Comment: <input type="text"/>
Obstructions (masts, wires, trees, buildings)	Go <input type="checkbox"/> No Go <input type="checkbox"/>	Comment: <input type="text"/>
View imitations (anything that obstructs LOS)	Go <input type="checkbox"/> No Go <input type="checkbox"/>	Comment: <input type="text"/>
Uninvolved people	Go <input type="checkbox"/> No Go <input type="checkbox"/>	Comment: <input type="text"/>
Public access / Incursion locations	Go <input type="checkbox"/> No Go <input type="checkbox"/>	Comment: <input type="text"/>
Distance requirements e.g. distance from buildings etc.	Go <input type="checkbox"/> No Go <input type="checkbox"/>	Comment: <input type="text"/>
Decide RTH height setting: <input type="text"/> meters	Go <input type="checkbox"/> No Go <input type="checkbox"/>	Comment: <input type="text"/>

EQUIPMENT

Make fire blanket accessible	Yes <input type="checkbox"/>	Comment: <input type="text"/>
Make First Aid Kit easily accessible	Yes <input type="checkbox"/>	Comment: <input type="text"/>
Check airframe for damage in transit	Go <input type="checkbox"/> No Go <input type="checkbox"/>	Comment: <input type="text"/>

CREW SAFETY

IMSAFE Completed **Go** **No Go** Comment:

Site/mission details conveyed **Yes** **No**

Comment:

Crew responsibilities explained **Yes** **No**

Comment:

Issue PPE as required **Yes** **No**

Comment:

Setup cordon, signs and safety tape (if required) **Yes** **No** **N/A**

Comment:

RISK ASSESSMENT UPDATES

Unanticipated hazards **Go** **No Go**

Note any deviations from or updates to the risk assessment

APPROVAL / SIGNOFF (PART C)

NB: By signing below the remote pilot (RP) is certifying that all the above checks have been completed accordingly and the operation meets the requirements of as set out.

Final assessment: Go **No Go**

REMOTE PILOTS

RP 1 Signature:

Name:

Date:

RP 2 Signature:

Name:

Date:

PART D (print pages 25-28)

FLIGHT PROTOCOL (in preference use app check list <https://arcg.is/0qWXfj>)

Where the remote pilot is operating alone applicable checks must ONLY be recorded once the UAS has been powered down as to not distract the remote pilot.

Use a tick for Yes/Go, x for No/No Go and – (dash) for n/a.

Survey location:

Survey date:

UAS:

Payload (if not integrated):

PRE-TAKE-OFF

	Flight 1	Flight 2	Flight 3	Flight 4	Flight 5
Pilot for flight	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
UAS assemble (rotor arms locked, tail secured)	<input type="checkbox"/>	Previous flight post-flight completed			
UAS visual check (damage, wear and tear)?	<input type="checkbox"/>				
Collision avoidance sensors/tail rangefinder (WingtraOne) are clean?	<input type="checkbox"/>				
Check motors, free from damage, dirt or grinding?	<input type="checkbox"/>				
Propellers secure/undamaged?	<input type="checkbox"/>				
Install payload and check mounting?	<input type="checkbox"/>				
SD card installed and capacity checked?	<input type="checkbox"/>				
Power up CU. Unfold antenna. Check CU battery level?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Weather conditions for flight duration (wind, sun, clouds, fronts)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Battery Identification No:	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Battery: visual check, install and mounting checked?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
UAS POWER UP (AT TAKE-OFF LOCATION)					
Verbal warning UAS is being powered up and power up (PROPS CLEAR)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Confirm telemetry/video?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Confirm GPS & home lock (LED/App/position on map)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Confirm Payload settings and working (incl. gimbal)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Out of control/lost CU action set to RTH	<input type="checkbox"/>	Previous flight post-flight completed			
Check RTH height settings?	<input type="checkbox"/>				
Check low battery warnings/RTH?	<input type="checkbox"/>				
Confirm flight volume limitation (Geobarrier)?	<input type="checkbox"/>				
Confirm Remote ID is switched on (if available)?	<input type="checkbox"/>				
Confirm switching flight modes ok, last switch to GPS (if outdoors)?	<input type="checkbox"/>				
Confirm Flight Crew briefed and ready for take-off?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Arm using CU. Check disarm (if applicable)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

TAKE-OFF

Battery Charge (%) (Enough power for operation plus contingency):

Battery Voltage:

Cells balanced?

Confirm site/airspace clear and safe?

Take-off Go/No Go decision, issue verbal warning (LIFTING)?

Note take-off time?

 : : : : :

Arm using CU, take-off procedure as per manufacturer?

Multi-rotor only – Hover at 3m and check stability?

 Previous flight post-flight completed

Multi-rotor only - check authority on all axis?

Multi-rotor only - Go/NoGo on starting mission??

IN-FLIGHT MONITOR AND MAINTAIN

Crew communication	Airspace	Batteries
Uninvolved people / assemblies of people	Weather	Telemetry
Cordon security	GNSS	LEDs

LANDING (PICK ONE OF A-C)

A) MANUAL LANDING

Confirm airspace/TOLA clear?

Communicate intention to land (LANDING)?

Check UA orientation, current flight mode and land and disarm?

Communicate SOD (Safely On Deck)

B) RTH ACTIVATION - Manual

Confirm airspace/RTH route/TOLA clear?

GNSS (GPS) Lock?

Communicate intention to RTH?

Check if UA will 1) Land in-situ or 2) RTH?

DJI 1) if < 5m from RTH / Wingtra only 2)

RTH and monitor RTH behaviour (altitude, direction, hover above TOLA)?

Optional: Adjust RTH manually as required?

Optional: Interrupt RTH and move to A)

Auto-land and disarm?

Communicate SOD (Safely On Deck)

C) RTH ACTIVATION - AUTOMATIC

Communicate RTH has initiated?

Confirm airspace/RTH route/TOLA clear?

RTH and monitor RTH behaviour (altitude, direction, hover above TOLA)?

Optional: Adjust RTH manually as required?

Optional: Interrupt RTH and move to A)

Auto-land and disarm?

Communicate SOD (Safely On Deck)

POST FLIGHT

Note flying time on RC Transmitter/App or landing time?	<input type="text" value=":"/>	<input type="text" value=":"/>	<input type="text" value=":"/>	<input type="text" value=":"/>	<input type="text" value=":"/>
Battery Charge (%):	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Battery Voltage:	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Confirm UAS Safe or UAS Hot?	S <input type="checkbox"/> H <input type="checkbox"/>	S <input type="checkbox"/> H <input type="checkbox"/>	S <input type="checkbox"/> H <input type="checkbox"/>	S <input type="checkbox"/> H <input type="checkbox"/>	S <input type="checkbox"/> H <input type="checkbox"/>
Check battery, visual check & temperature (unless AIRCRAFT HOT)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Check motors for high heat/uneven temp across motors, grinding?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Check propellers?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Check airframe?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Collision avoidance sensors/tail rangefinder (WingtraOne) are clean?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Check payload mounting?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Put batteries into transit case or in charge area (unless AIRCRAFT HOT)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hot debrief (Any occurrences? Why did they occur? Reports to be filed?)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>After last flight</u>					
Notify landowner and relevant 3rd parties that operations have concluded?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ensure site clear (equipment/rubbish/leave no trace/secure)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

CREW DEBRIEF FORM

Weather issues? Yes No Comment:

UAS/C2 System issues? Yes No Comment:

Objectives achieved? Yes No Comment:

Reportable Occurrences? Yes No Comment:

Other occurrences? Yes No Comment:

What worked?

Improvement suggestions?

Crew questions?

Additional notes

SIGNOFF (PART D)

NB: By signing below the remote pilot (RP) is certifying that all the above checks have been completed accordingly and the operation meets the Requirements of as set out.

REMOTE PILOTS

RP 1 Signature: Name : Date:

RP 2 Signature: Name : Date:

Part E (print pages 29-34)

UAS ROUTINE MAINTENANCE CHECKLIST (in preference use app check list

<https://arcg.is/0qWXfj>)

Routine maintenance is conducted on first flight, after major firmware updates, after hard landings and every 3 months or 20h, whichever is sooner. This checklist replaces the flight protocol (section E). If continuing to fly after this checklist this flight replaces flight 1 in part E. All other sections still apply. Routine maintenance needs to be recorded on Hornbill when logging the flight. Use a tick for Yes/Go, x for No/No Go and – (dash) for n/a.

PREREQUISITES

Feasibility study completed and approved? Yes Risk assessment completed and approved? Yes

DETAILS

Date: RP leading / completing check:

UAS: Serial:

PRE-DEPLOYMENT

CU and UAS SW updates (FW, geoawareness)?	Yes <input type="checkbox"/> No <input type="checkbox"/>	Comment: <input type="text"/>
Clean CU, UAS and payloads?	Yes <input type="checkbox"/> No <input type="checkbox"/>	Comment: <input type="text"/>
Check visible solders (corrosion, fraying)?	Yes <input type="checkbox"/> No <input type="checkbox"/>	Comment: <input type="text"/>
Check visible wires (corrosion, fraying)?	Yes <input type="checkbox"/> No <input type="checkbox"/>	Comment: <input type="text"/>
CU visual check (cracks, seals, buttons or fractures)?	Yes <input type="checkbox"/> No <input type="checkbox"/>	Comment: <input type="text"/>
UAV visual check (cracks or fractures)?	Yes <input type="checkbox"/> No <input type="checkbox"/>	Comment: <input type="text"/>
Propellers (cracks, chips, fractures incl. spares)?	Yes <input type="checkbox"/> No <input type="checkbox"/>	Comment: <input type="text"/>
Motors undamaged/no signs of scorching?	Yes <input type="checkbox"/> No <input type="checkbox"/>	Comment: <input type="text"/>
Payload mounting undamaged (if applicable)?	Yes <input type="checkbox"/> No <input type="checkbox"/>	Comment: <input type="text"/>
Perform any required calibration? (IMU, compass, sticks)	Yes <input type="checkbox"/> No <input type="checkbox"/>	Comment: <input type="text"/>
Transport case sufficiently protects the UAS?	Yes <input type="checkbox"/> No <input type="checkbox"/>	Comment: <input type="text"/>

Pre-deployment comments:

PRE-FLIGHT (AFTER ONSITE SURVEY FORM)

UAS assemble (rotor arms locked, tail secured)?	Yes <input type="checkbox"/> No <input type="checkbox"/>
UAS visual check (damage, wear and tear)?	Yes <input type="checkbox"/> No <input type="checkbox"/>
Collision avoidance sensors/tail rangefinder (WingtraOne) are clean?	Yes <input type="checkbox"/> No <input type="checkbox"/>
Propellers secure/undamaged?	Yes <input type="checkbox"/> No <input type="checkbox"/>
Install payload and check mounting?	Yes <input type="checkbox"/> No <input type="checkbox"/>
SD card installed and capacity checked?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
Power up CU. Unfold antenna. Check CU battery level	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
Weather conditions for flight duration (wind, sun, clouds, fronts)	Yes <input type="checkbox"/> No <input type="checkbox"/>

BATTERIES

Battery ID:

Battery: visual check, install and mounting checked? Yes No

Pre-flight comments:

UAS POWER UP (At Take Off Location)

Verbal warning UAS is being powered up (PROPS CLEAR)? Yes No

Confirm telemetry/video? Yes No

Confirm GPS & home lock (LED/App/position on map)? Yes No

Confirm Payload settings and working (incl. gimbal)? Yes No

Out of control/lost C2 action set to RTH? Yes No

Check RTH height settings? Yes No

Check low battery warnings/RTH? Yes No

Confirm flight volume limitation (Geobarrier)? Yes No

Confirm Remote ID is switched on (if available)? Yes No N/A

Confirm switching flight modes ok, last switch to GPS (if outdoors)? Yes No

Confirm Flight Crew briefed and ready for take-off? Yes No

Arm using CU. Check disarm (if applicable)? Yes No N/A

UAS Power Up comments:

TAKEOFF AND FLIGHT

Battery charge: % V Balanced?

Confirm site/airspace clear and safe? Yes No

Take-off Go/No Go decision, issue verbal warning (LIFTING)? **Go** **No Go**

Note take-off time? **Time:** :

Arm using CU, take-off procedure as per manufacturer? Yes No

UA CHECKS BY TYPE: A) MULTI-ROTOR or B) FIXED-WING

A) MULTI-ROTOR ONLY

- Hover at 3m and check stability Yes No N/A
- Check control authority on all axis (GPS mode)? Yes No N/A
- Test in Stabilize/Manual/Sport mode (if applicable)? Yes No N/A
- Test in AltHold/Atti mode/Cine/Tripod mode (if applicable)? Yes No N/A
- Confirm airspace/RTH route/TOLA clear? Yes No N/A
- Communicate intention to RTH? Yes No N/A
- GNSS (GPS) Lock? Yes No N/A
- UA more than 5m from TOLA? Yes No N/A
- RTH test on CU? Yes No N/A
- Monitor RTH behaviour (altitude, direction, hover above TOLA)? Yes No N/A
- Retake control once RTH confirmed working? Yes No N/A

B) FIXED-WING ONLY

- Pause mission Yes No N/A
- Test decrease height, increase height Yes No N/A
- Test available pause flight manoeuvres Yes No N/A
- Resume mission Yes No N/A

Take-off comments:

PAYLOAD FLIGHT TEST

Payload functionality in flight, e.g. camera recording, video, gimbal etc. Yes No N/A

Payload comments:

IN-FLIGHT MONITOR AND MAINTAIN

Crew communication	Airspace	Batteries
Uninvolved people and assemblies of people	Weather	Telemetry
Cordon security	GNSS	LEDs

Monitored and maintained

Flight comments:

LANDING

Confirm airspace/site clear?	Yes <input type="checkbox"/> No <input type="checkbox"/>
Communicate to Flight Team intention to land (LANDING)?	Yes <input type="checkbox"/> No <input type="checkbox"/>
GNSS (GPS) Lock?	Yes <input type="checkbox"/> No <input type="checkbox"/>
<i>A) Multi-rotor only:</i>	
DJI UA more than 5m from TOLA?	Yes <input type="checkbox"/> No <input type="checkbox"/>
Confirm airspace/RTH route/TOLA clear?	Yes <input type="checkbox"/> No <input type="checkbox"/>
Communicate intention to turn off receiver?	Yes <input type="checkbox"/> No <input type="checkbox"/>
Test Failsafe by switching off transmitter?	Yes <input type="checkbox"/> No <input type="checkbox"/>
Reconnect once RTH initiated, but let auto-land?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
<i>Optional: Adjust RTH manually as required?</i>	
<i>Optional: Interrupt RTH and move to A)</i>	
Auto-land and disarm?	Yes <input type="checkbox"/> No <input type="checkbox"/>
Communicate SOD (Safely On Deck)	Yes <input type="checkbox"/> No <input type="checkbox"/>
<i>B) Fixed-wing only:</i>	
Confirm airspace/RTH route/TOLA clear?	Yes <input type="checkbox"/> No <input type="checkbox"/>
GNSS (GPS) Lock?	Yes <input type="checkbox"/> No <input type="checkbox"/>
Communicate intention to RTH?	Yes <input type="checkbox"/> No <input type="checkbox"/>
RTH and monitor RTH behaviour (altitude , direction, hover above TOLA)?	Yes <input type="checkbox"/> No <input type="checkbox"/>
Pause landing + check control authority on all axis?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
Land and disarm?	Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>
Communicate SOD (Safely On Deck)	Yes <input type="checkbox"/> No <input type="checkbox"/>

Landing comments:

POST LANDING

Note flying time on RC Transmitter/App or landing time?

Duration: :

Battery charge: % V

Power down UAS (AIRCRAFT SAFE)?

Yes

Check battery, visual check & temperature?

Yes No N/A

Check motors for high heat/uneven temp across motors, grinding?

Yes No N/A

Check propellers?

Yes No N/A

Check airframe?

Yes No N/A

Check collision avoidance/tail rangefinder (WingtraOne) are clean?

Yes No N/A

Check payload mounting?

Yes No N/A

Put batteries into transit case or in charge area?

Yes No N/A

Hot debrief (Any occurrences? Why did they occur? Reports to be filed?)

Yes No

OCCURRENCES, AIRPROX, OBSERVATIONS AND ISSUES:

MAINTENANCE COMMENTS / RECOMMENDATIONS

APPROVAL / SIGNOFF (ROUTINE MAINTENANCE)

NB: By signing below the remote pilot (RP) is certifying that all the above checks have been completed accordingly and the UAS meets the Requirements of as set out.

REMOTE PILOTS

RP Signature:

Name :

Date:

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PART F (print pages 35-36)

INSURANCE

Standard protocol for UAS operations and flights requires that our pilots are insured appropriately from liability. Please attach evidence of insurance to your plan.



Insurance | Risk Management | Consulting

Station Square
One Gloucester Street
Swindon
SN1 1GW
Tel: 020 7560 3000
Fax: 01 793 468838
www.ajg.com/uk

TO WHOM IT MAY CONCERN

11th August 2025

Dear Sirs

We are the Risk and Insurance Managers for the client below and have pleasure in confirming details of their insurance arrangements as follows:-

Insured Details:

Name(s) **University of Portsmouth Higher Education Corporation and/or subsidiary companies and/or UOPM Sdn Bhd**

Postal Address **University House, Winston Churchill Avenue, Portsmouth, Hampshire, PO1 2UP, United Kingdom**

Our Ref **5068774**

Business Description **Institute of Higher Education**

Public / Products Liability

Insurer	:	HDI Global SE
Policy No.	:	110-01157346-30026
Expiry Date	:	31 st July 2026

DRONES Extension Endorsement

It is noted that the cover provided by this Extension meets the requirements of EC Directive 785/2004.

It is hereby noted and agreed that the following amendment is made to the Policy:

The liability of the Insurer under this extension shall not exceed £5,000,000 in the aggregate in respect of all Occurrences of Property Damage or Bodily Injury in any one Period of Insurance

Territorial Limit: Worldwide

Excess: £500 in respect of Third Party Property Damage

Notwithstanding Exclusion 1 a) this Policy is extended to provide cover for Property Damage or Bodily Injury resulting from Unmanned Aerial Aircraft (Drones).

Arthur J. Gallagher Insurance Brokers Limited is authorised and regulated by the Financial Conduct Authority.
Registered Office: Spectrum Building, 55, Blythswood Street, Glasgow, G2 7AT. Registered in Scotland. Company Number: SC108909.

The following restrictions apply in relation to Drones

- a) Used and operated at daylight and minimum visibility of 3 miles
- b) Used and operated with full compliance to the legal requirements and regulations (including but not limited to e.g. licensing of drone and operator, air traffic regulations and restrictions, privacy and data protection)
- c) Drones will have a weight less than 25kg
- d) Drones will be operated below 400ft above the ground level
- e) Drones must yield right-of-way to other aircraft, manned or unmanned
- f) Drones remain close enough to the operator for the operator to be capable of seeing the aircraft with vision unaided by any device other than corrective lenses

The Insurer shall not be liable for

- a) Property Damage to the Insureds property or Bodily Injury to any Person Employed by the Insured
- b) Drones that serve any military purpose
- c) Hull insurance for the drone or its system components
- d) Marine insurance for goods loaded
- e) fines and penalties of any kind
- f) where indemnity is provided by any other policy

It is a requirement of this Extension that the Insured maintain a list of the individual Drones which can be supplied to Insurers upon request

Nothing contained in this extension shall increase the liability of the Insurer under this Policy beyond the Limits of Indemnity

All other terms and conditions remain unaltered

Cover is subject to the full terms, conditions and exclusions of the policy.

This document is issued to you as a matter of information only and the issuance of this document does not: -

- i) create any contractual relationship between Arthur J. Gallagher Insurance Brokers Limited and the recipient
- ii) make the person or organisation to whom it has been issued an additional assured, nor does it modify in any manner the contract of Insurance between the Assured and the Underwriters.

Any amendments, change or extension of such contract can only be effected by specific endorsement attached thereto with the consent of the Assured and the Underwriters.

We accept no responsibility whatsoever for any inadvertent or negligent act, error or omission on our part in preparing this information or for any loss, damage, expense hereby occasioned to the recipient of this letter

Should the insurance cover be cancelled assigned or changed in any way during the period of insurance neither we nor insurers accept any obligation to notify any recipient.

Yours sincerely,



Timothy Phillips

Email: lupc@ajg.com

PART G (print pages 37-38)

OPERATIONAL AUTHORISATION

Unmanned aircraft, operational authorisation – Specific Category – UKPDRA-01. N/A if operating in the Open Category. Only applicable to remote pilots with the appropriate qualifications and currency that are named in the Operations Manual.



UNMANNED AIRCRAFT - OPERATIONAL AUTHORISATION	
SPECIFIC CATEGORY – UKPDRA01	
1.	AUTHORITY RELEASING THE AUTHORISATION
1.1. State	United Kingdom
1.2. Issuing Authority	United Kingdom Civil Aviation Authority
1.3. Authorising Signatory Point of Contact	SSC Technical Services 0330 022 1908 uav enquiries@caa.co.uk
2.	UAS OPERATOR INFORMATION
2.1. Operator Registration No. CAA Reference.	GBR-OP-R482VGGRWJZY UAS 5059
2.2. UAS Operator Name	University of Portsmouth
2.3. Operational Point of Contact/ Accountable Manager	Name Mr Brent Schwarz Telephone 02392843440 E-MAIL brent.schwarz@port.ac.uk
2.4. Authorisation Number	8
2.5. Operations manual	7.1 10/11/2023
3.	UAS INFORMATION
3.1. Manufacturer	N/A
3.2. Model	Any fixed wing and/or rotary wing Unmanned Aircraft with an MTOM /flying weight of less than 25kg

Operational authorisation 20231113 University of Portsmouth UAS5059

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4. LIMITATIONS AND CONDITIONS FOR THE UAS OPERATION	
4.1. Type of operation	a) VLOS as per the definition given in UK Regulation (EU) No. 2019/947, Article 2(7). b) Flights within 150m of Residential, Commercial, Industrial or Recreational Areas.
4.2. Operating times/periods	24 hrs. Night operations must be carried out in accordance with the procedures in the OM at section 2.5.
4.3. Location(s) of operation	Any location within the United Kingdom subject to the airspace restrictions detailed in 4.4.
4.4. Airspace	a) Flights must not be conducted within the Flight Restriction Zone (FRZ) (See note 1) of a protected aerodrome, or within any Restricted, Prohibited, or Danger Area, unless the appropriate clearance or permission to enter has been obtained. b) Remote Pilots must ensure ANSP notification is completed in accordance with the procedures in the OM at section 2.5.
4.5. Operating heights/altitudes/levels	a) The unmanned aircraft must be maintained within 120 metres (400ft) from the closest point of the surface of the earth. b) Obstacles taller than 105m may be overflown by a maximum of 15m under the following conditions: i. The person in charge of the obstacle must have requested this, and, ii. The unmanned aircraft must not be flown more than 50m horizontally from the obstruction.
4.6. Maximum operating range	a) Flights must be conducted within VLOS as per the definition given in UK Regulation (EU) No. 2019/947, Article 2(7) and must not exceed 500m from the Remote Pilot. b) When operating within VLOS as per the definition given in UK Regulation (EU) No. 2019/947, Article 2(7), the Remote Pilot may be assisted by a competent observer who must be co-located with the Remote Pilot and able to communicate with them clearly and effectively. If present, the observer must maintain VLOS as per the definition given in UK Regulation (EU) No 2019/947, Article 2(7) at all times.

Operational authorisation 20231113 University of Portsmouth UAS5059

Page 2 of 6

4.7. Separation from uninvolved persons	<ul style="list-style-type: none"> a) Flights must not be carried out within 50m of uninvolved persons, except during take-off and landing, where this separation may be reduced to 30m b) Any overflight of uninvolved people must be kept to a minimum (See note 12). c) Flights must not be carried out within 50m horizontal separation of assemblies of people. Any overflight of assemblies of people must not be conducted. <ul style="list-style-type: none"> i. Lone Remote Pilots (See note 4) must have an appropriately set maximum allowed distance from launch/pilot and an appropriately set minimum Return To Home (RTH) battery level. d) Horizontal separation between the Unmanned Aircraft and assemblies of people must not be less than the height of the Unmanned Aircraft (i.e. the 1:1 rule).
4.8. Security of loads/equipment	<ul style="list-style-type: none"> a) The remote pilot must ensure that any load carried by, or equipment on, the unmanned aircraft is properly secured and that the aircraft is in a safe condition for the specific flight. b) Articles must not be dropped. c) Dangerous Goods must not be carried.
4.9. Remote Pilot requirements	<ul style="list-style-type: none"> a) Remote Pilots must: <ul style="list-style-type: none"> i. be employed or contracted by the UAS Operator. ii. hold a valid UK Flyer ID. iii. hold a valid GVC or, until the 1st of January 2024, hold an NGE (full recommendation) obtained prior to the 31st of December 2020. iv. follow the requirements of UK Reg (EU) 2019/947 point UAS SPEC 050. v. be qualified as per the requirements of the OM at section 2.5.
4.10. UAS operator requirements	<ul style="list-style-type: none"> a) The UAS operator must: <ul style="list-style-type: none"> i. comply with the responsibilities set out in UK Regulation (EU) No. 2019/947, point UAS SPEC 050. ii. maintain records of each flight made under this authorisation. iii. make such records available to the Civil Aviation Authority on request as per UK Regulation (EU) No. 2019/947, point UAS SPEC 090.

4.11. Occurrence reporting Requirements	<ul style="list-style-type: none"> a) Any occurrences that take place while operating under this authorisation must be reported in accordance with UK Regulation (EU) No 376/2014 and the requirements set out in CAP 722 section 2.7. b) Any accidents that take place while operating under this authorisation must be reported in accordance with UK Regulation (EU) No. 996/2010 to the UK AAIIB.
4.12. Insurance	Insurance cover meeting the requirements of regulation (EC) 785/2004 must be held.
4.13. Relevant/Other Comments	<ul style="list-style-type: none"> a) The Unmanned Aircraft must be equipped with a mechanism that will cause it to land in the event of a disruption to, or a failure of, any of its control systems, including the C2 Link. b) The Remote Pilot must ensure that this mechanism is in working order before any flight is commenced. c) The UAS Operator must ensure that the radio spectrum used for the C2 Link and for any payload communications complies with the relevant Ofcom requirements and that any licences required for its operation have been obtained. d) The UAS Operator must ensure high energy devices are appropriately stored and transported. e) The UAS Operator ID listed at section 2.1 must be displayed on every aircraft flown under this Operational Authorisation. f) Flights may be conducted within 150m of any Residential, Commercial, Industrial, and/or Recreational Areas. g) The Remote Pilot must not be operating a moving vehicle whilst operating the Unmanned Aircraft. If the Remote Pilot operates the Unmanned Aircraft from a moving vehicle as a passenger, the speed and stability of the vehicle must be sufficient for the Remote Pilot to maintain VLOS and control of the Unmanned Aircraft at all times.
5. VALIDITY	
5.1. Duration of the Authorisation	<p>This operational authorisation is valid:</p> <p>From: 13/11/2023</p> <p>To: 19/11/2024</p> <p>Unless otherwise suspended or revoked.</p>

5.2. Regulation references	This operational authorisation is: Issued under: Article 5 of Regulation (EU) No. 2019/947 as retained (and amended in UK domestic law) under the European Union (Withdrawal) Act 2018.
6. AUTHORISATION SIGNATURE	
6.1. Signature / Stamp	
6.2. Date	13/11/2023

Note 8: Any reference to UK Reg (EU) No. 2019/947 should be taken to refer to Regulation (EU) No. 2019/947 as retained (and amended in UK domestic law) under the European Union (Withdrawal) Act 2018.

Note 9: Any reference to UK Regulation (EU) No. 376/2014 should be taken to refer to Regulation (EU) No. 376/2014 as retained (and amended in UK domestic law) under the European Union (Withdrawal) Act 2018.

Note 10: Any reference to UK Regulation (EU) No. 996/2010 should be taken to refer to Regulation (EU) No. 996/2010 as retained (and amended in UK domestic law) under the European Union (Withdrawal) Act 2018.

Note 11: Any reference to UK Regulation (EU) No. 785/2004 should be taken to refer to Regulation (EC) No. 785/2004 as retained (and amended in UK domestic law) under the European Union (Withdrawal) Act 2018.

Note 12: The guidance in CAP 722 (section 2.1.5.1) must be followed, within the volume 1 operational procedures.

Note 1: The "Flight Restriction Zone" of a protected aerodrome can be determined by reference to the table contained within ANO 2016 Article 94A, Paragraph 7 and is described in CAP 722.

Note 2: UAS operators and remote pilots should be aware that the collection of images of identifiable individuals, even inadvertently, when using surveillance cameras mounted on an unmanned aircraft may be subject to the General Data Protection Regulation and 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.com.uk/for-the-public/otrp/>

Note 3: UAS 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. They must ensure that they observe the relevant trespass laws and do not unwittingly commit a trespass whilst conducting a flight.

Note 4: A lone Remote Pilot is when a remote pilot does not have any support crew (Observer/ Payload Operator) positioned alongside the remote pilot for the duration of the flight.

Note 5: UAS operators must ensure that the appropriate aircraft radio licence has been obtained for any transmitting radio equipment that is installed or carried on the aircraft, or that is used in connection with the conduct of the flight and that operates in an aeronautical band.

Note 6: 'Night' means the time from half an hour after sunset until half an hour before sunrise (both times inclusive), sunset and sunrise being determined at surface level.

Note 7: The following editorial practices are used throughout the authorisation above:
MUST or **SHALL** denotes a mandatory requirement.
SHOULD implies a strong obligation. If the Operator does not follow such an obligation, the Authority would expect a clear justification.
MAY indicates a discretionary practice.

Part H

AMENDMENT RECORD

Version	Date	Amendments	Author
1.0	September 2023	Complete rewrite of Ops Planning documents, superseding all check lists	Brent Schwarz / Martin Schaefer / Toby Meredith
1.2	27 October 2023	Converted to fillable form in Word	Martin Schaefer
1.2.1	23 February 2024	Added Emergency services location to Planning. Updated OA. Tweaked headings for clarity. Tweaked some text for clarity. Added option of second Pilot on same planning document.	Martin Schaefer
1.2.2	18 March 2024	To avoid page reordering added larger spaces for text entry boxes that require multiple lines. Amended order of some elements.	Martin Schaefer
1.2.3	26/04/2024	Added offline maps and routine maintenance to pre-deployment checklist	Martin Schaefer
1.2.4	08/09/2024	Clarified RM checklist questions	Martin Schaefer
1.2.5	16/05/2024	Amended to align with CAP2606A Added info to UAS section Added Kp-index check Added data protection statement Minor tweaks and order of questions changed	

1.2.6	26/06/2024	Added 'Hot debrief' to post-flight	Martin Schaefer
1.2.7	03/10/2024	Added section for all contact details of managed airspace in flyaway zone. Added in-flight checklist Formatting Updated Insurance Document	Martin Schaefer
1.3	24/10/2023	Added debrief form to flight protocol	Martin Schaefer
1.3.1	29/01/2025	Clarified flight planning map requirements Simplified notifications Changed crew acknowledgement from tickbox to initial to align better with Docusign.	Martin Schaefer
2.0.0	17/10/2025	Redesign to align with CA OM templates. Major redesign following user feedback. All RP need to engage with the new version.	Martin Schaefer
2.0.1	14/11/2025	Added screen tips for RAMS, currency, airspace classification and NOTAM. Amended airspace classification to be a drop-down. Placed isolated buildings on a new line.	Martin Schaefer
2.1	06/01/2026	Directed users to the app versions of the check-lists. Minor changes to the order of questions	Martin Schaefer
2.2	06/05/2026	Removed droneprep from	

		<p>preplanning as no longer operational.</p> <p>Replaced dronesafetymap with thedronemap due to AltitudeAngel going into administration.</p>	
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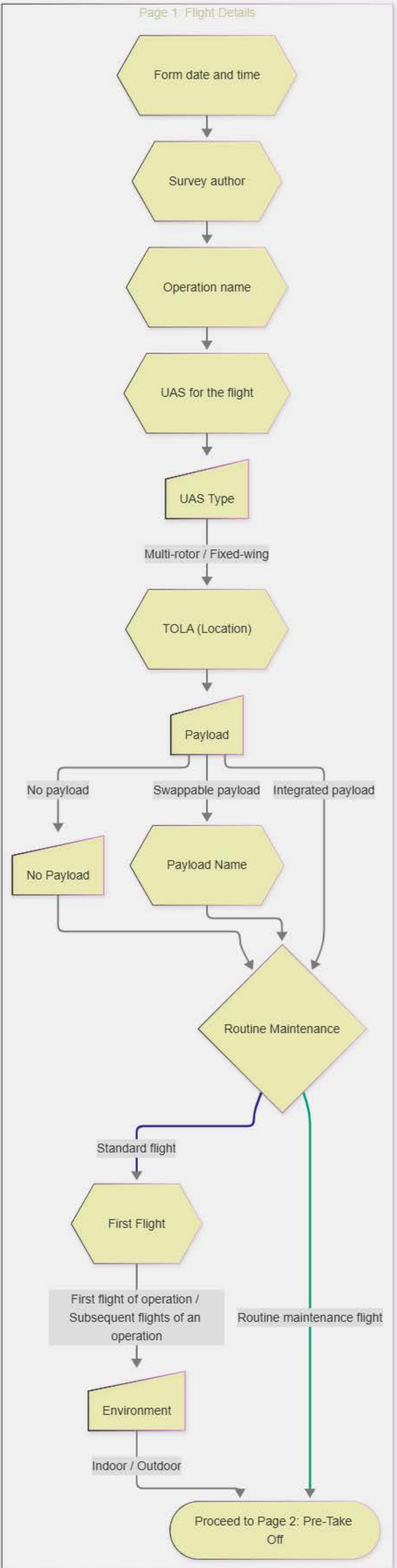
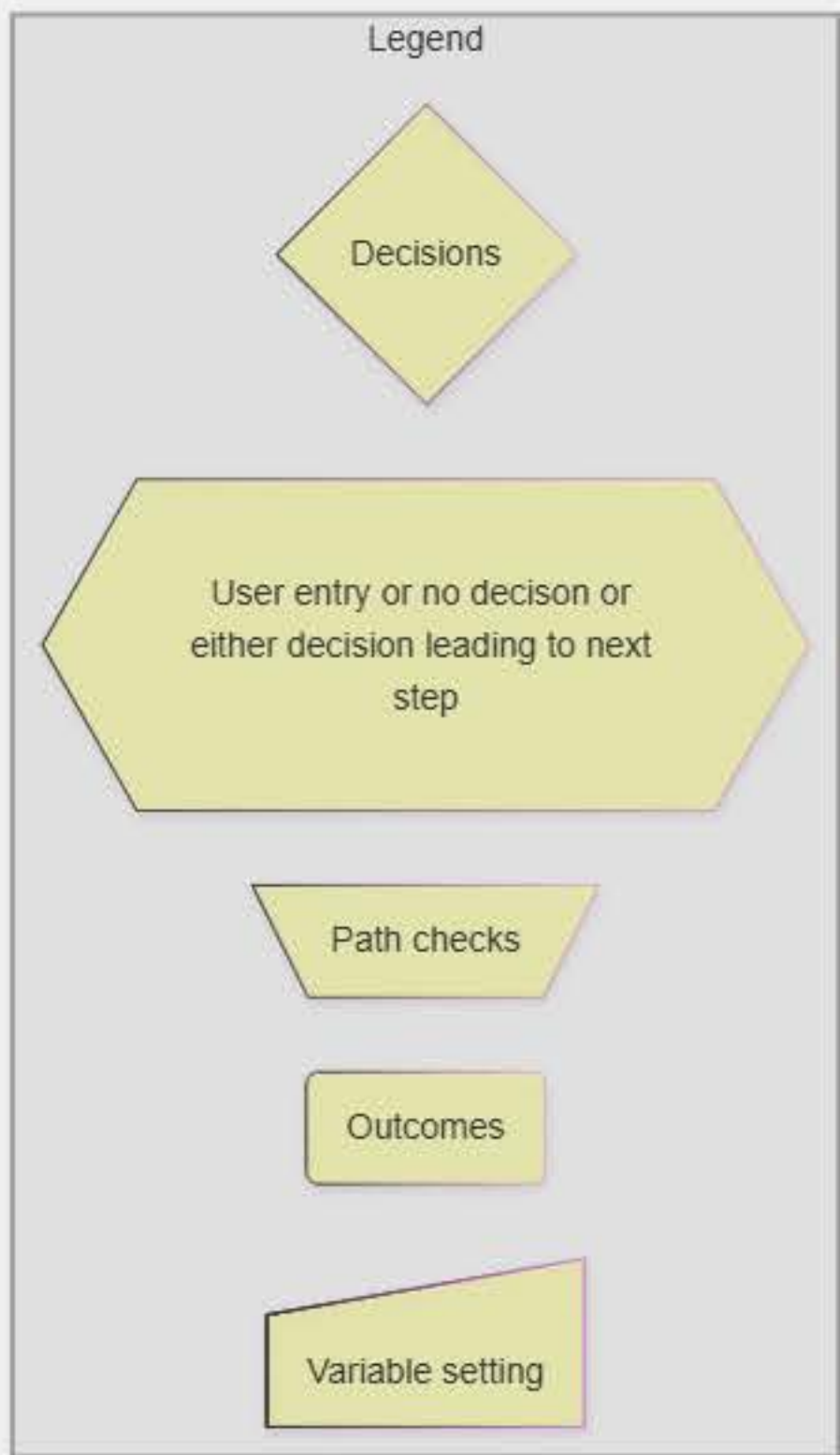
NOTES

FOI - The University is bound by the Freedom of Information Act 2000 which means that if we receive a request for information that we hold about an organisation, we may be required to disclose the requested information. We would only do so after having discussed the request with the necessary organisation, partner, subsidiary or individuals.

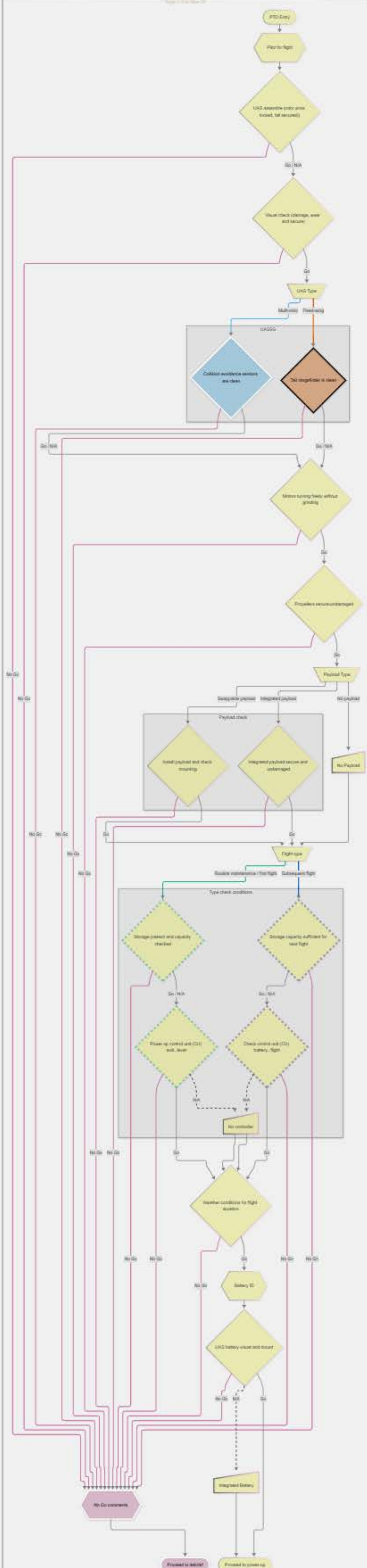
GDPR – The personal data collected in this form will be held securely and only used to contact the individuals named if there are queries about the information requested and / or to update the information. Any queries about the use of this personal data should be made to hsservicedesk@port.ac.uk or to the University’s Data Protection Officer at data-protection@port.ac.uk .

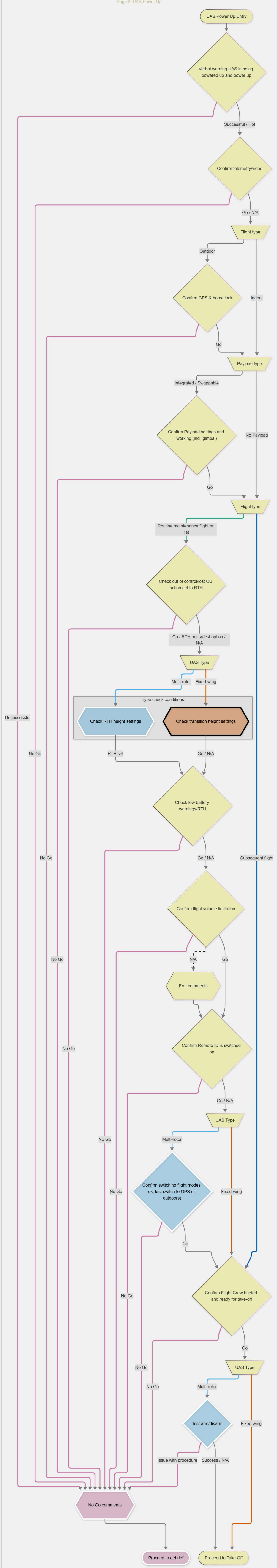
Information Retention – It is our policy to retain information for a period of 3 years. If information relates to an investigation following an incident or accident, the retention period may be extended depending on the nature of the investigation.

Annex 2 – Onsite survey decision tree

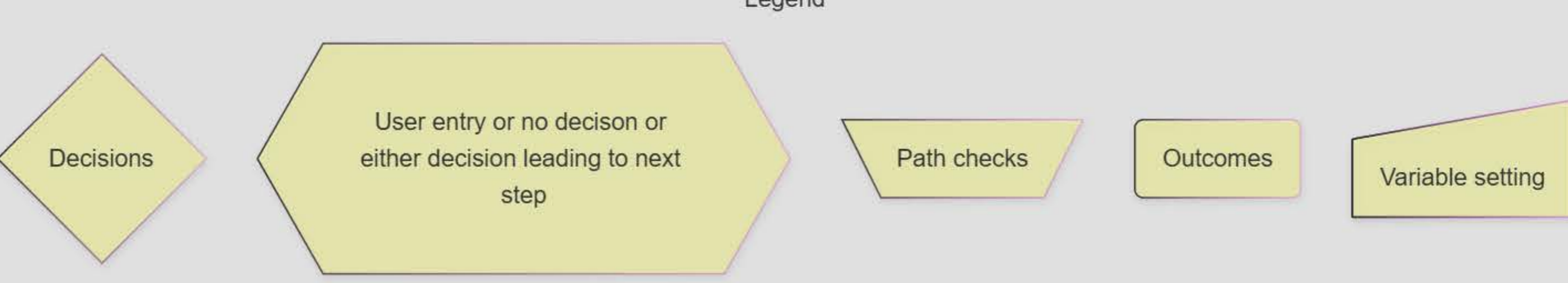


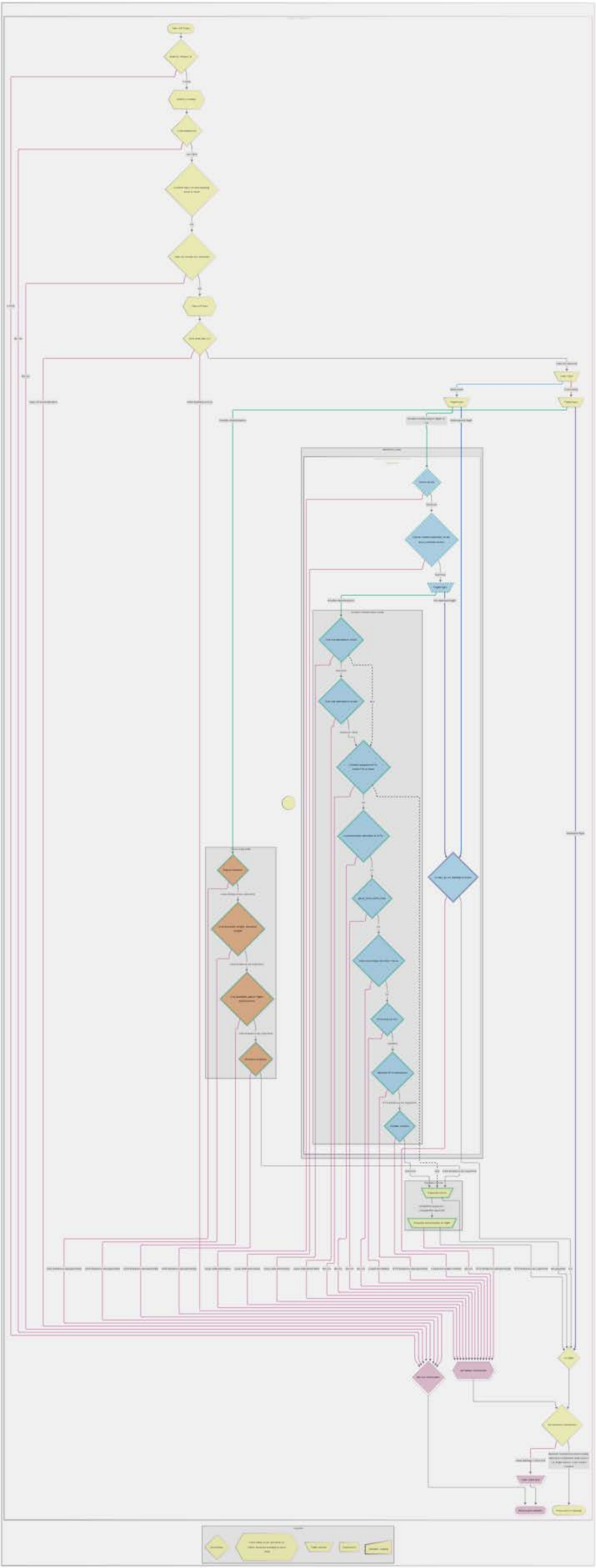
Annex 3 – Flight decision trees

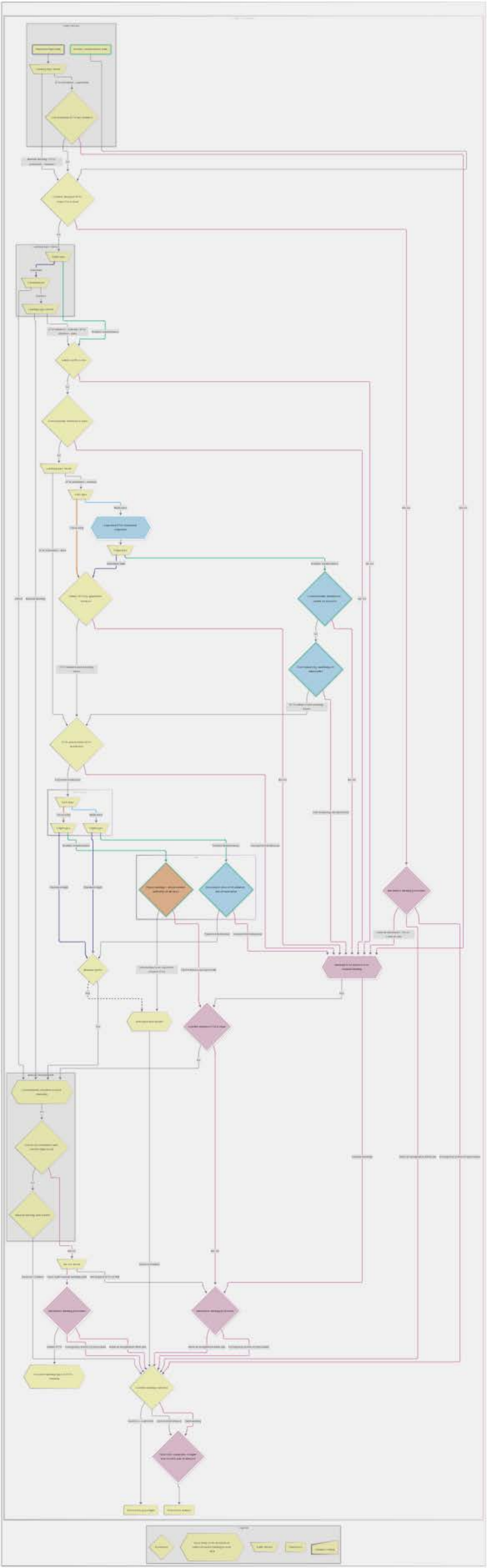


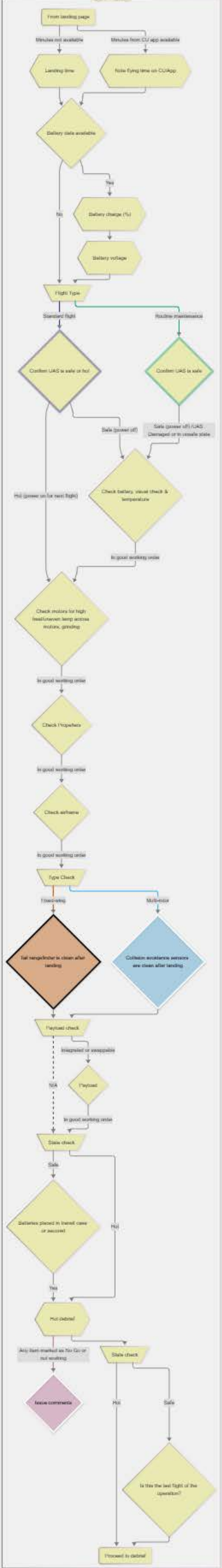


Legend



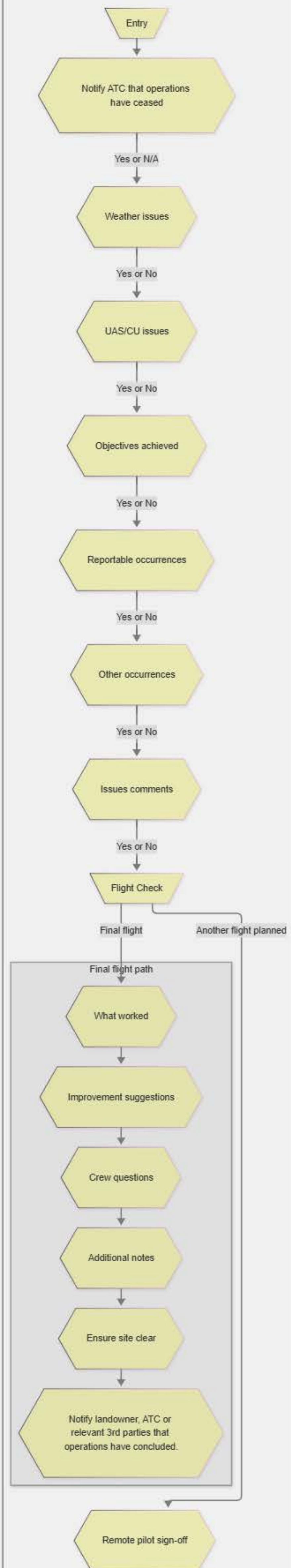
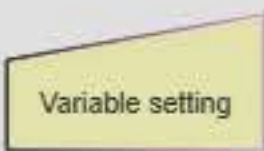
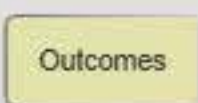
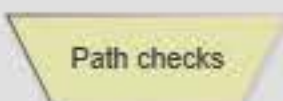
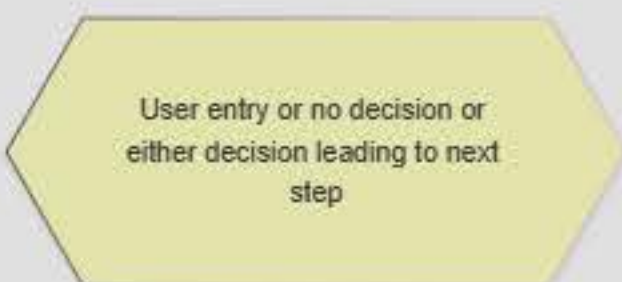






Annex 4 - Debriefing decision tree

Legend



Annex 5 - Occurrence and airprox reporting form

Occurrence form			
Reference			
Date		Time	
what3words		Airspace class	
NOTAMs		Airspace type	
Incident type	Occurrence - Incident	Occurrence - Accident	Airprox
Causal factor	Technical failure	Human factor	Other
UA category		UA type	
UA serial number		MTOM	
Remote pilot			
Flight crew			
Wind direction		Wind strength	
Gusts		Precipitation	
Cloud cover		Visibility	
Air temperature		Kp-Index	
Details of occurrence/airprox			
Witness details			
Photos/video	Have photos or video be taken to aid any investigation?		
General notes			

Diagram of occurrence/airprox

After an occurrence the remote pilot **must** complete the following:

- Follow the emergency response plan in the UAS operators operations manual
- Report to the UAS operator as soon as possible
- [Complete HS1 form](#)

Incidents and accidents

- File a mandatory occurrence report within 72 hours on ECCAIRS2
<https://e2.aviationreporting.eu/reporting>

Report an accident or serious incident

- Air Accidents Investigation Branch
- <https://www.gov.uk/government/organisations/air-accidents-investigation-branch>
- Telephone - 24 hours reporting 01252 512299
- enquiries@aaib.gov.uk
- General enquiries: 01252 510300

Airprox

- File an airprox within 7 days
<https://www.airproxboard.org.uk/report-an-airprox/>

Annex 6 - Other documents

PDRA01 Operational Authorisation



Authorisation details

Key details

Operator (you)	University of Portsmouth
Operator ID	GBR-OP-R482VGGRWJ2Y
Authorisation number	PDRA01-24199
Issued on	12 November 2025
Expires on	25 November 2026 unless otherwise suspended or revoked

Contact and operations manual details

You must tell us if any of these details change.


Accountable Manager	Name: Laura Sayers Phone: 02392 845536 Email: laura.sayers@port.ac.uk
Operations Manual	Date: 11 November 2025 Version: 9.1

What you're authorised to do

Authorisation We authorise you to fly Unmanned Aircraft below 25kg within 150m of residential, commercial, industrial, or recreational areas. You must only fly within visual line of sight (VLOS).

You must carry out operations in accordance with the authorisation conditions and limits; Annex IX to Assimilated Regulation (EU) 2018/1139 and its implementing rules; relevant aspects of the Standardised European Rules of the Air, as described in AMC1 Article 7(2) to Assimilated Regulation (EU) 2019/947; and your operations manual.

Issued by UK Civil Aviation Authority (CAA) ('we', 'us'), under Article 5 of Assimilated Regulation (EU) 2019/947.

CAA signatory 
Kevin Woolsey, Head of RPAS, CAA

Conditions and limits

What you can fly

1 Model of unmanned aircraft	1.1 Any (rotary wing and/or fixed wing) Unmanned Aircraft with a MTOM/flying weight of less than 25kg.
-------------------------------------	--

Where and when you can fly

2 Areas	2.1 Flights may be conducted within 150m of any residential, commercial, industrial, and/or recreational area.
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3 Location	3.1 Any location in the UK, subject to the airspace restrictions set out in this authorisation.
-------------------	---

4 Operating times	4.1 24 hours a day. Night operations must be carried out in accordance with the procedures in the operating manual.
--------------------------	---

5 Airspace	5.1 Flights must not be conducted within any applicable airspace restriction unless the appropriate permission to enter has been obtained. This includes: Flight Restriction Zones (FRZs) around protected aerodromes and space sites; restricted, prohibited and danger areas (including temporary restrictions); and any other applicable restrictions.
-------------------	---

6 Altitude, heights and levels	6.1 The Unmanned Aircraft must be maintained within 120 metres (400ft) from the closest point of the surface of the earth.
	6.2 Obstacles taller than 105m may be overflown by a maximum of 15m under the following conditions: <ul style="list-style-type: none"> – the person in charge of the obstacle must have requested this; and – the Unmanned Aircraft must not be flown more than 50m horizontally from the obstruction.

7 Maximum operating range	7.1 Flights must be conducted within VLOS as per the definition given in UK Reg (EU) 2019/947, Article 2(7) and must not exceed 500m from the Remote Pilot.
	7.2 When operating within VLOS as defined in UK Reg (EU) 2019/947, Article 2(7), the Remote Pilot may be assisted by a competent observer who must be co-located with the Remote Pilot and able to communicate with them clearly and effectively. If present, the observer must maintain VLOS as per the definition given in UK Reg (EU) 2019/947, Article 2(7) at all times.
	7.3 In order to remain within VLOS, as defined in UK Reg (EU) 2019/947, Article 2(7), the Remote Pilot may only change location during the flight, if still able to maintain control of the UAS at all times, and maintain situational awareness and orientation, as set out in the VLOS definition. This must be described within the operations manual procedures, if required.

Conditions and limits continued

Distances from people

- | | |
|---|---|
| 8 Separation from uninvolved persons | <p>8.1 Flights must not be carried out within 50m of uninvolved persons, except during take-off and landing, where this separation may be reduced to 30m.</p> <p>8.2 Any overflight of uninvolved people must be kept to a minimum.</p> <p>8.3 Flights must not be carried out within 50m horizontal separation of assemblies of people. Any overflight of assemblies of people must not be conducted.</p> <ul style="list-style-type: none"> – Lone Remote Pilots must have an appropriately set maximum allowed distance from launch/pilot and an appropriately set minimum return to home (RTH) battery level. (A lone remote pilot is a remote pilot who does not have any support crew next to them during the flight.) <p>8.5 Horizontal separation between the unmanned aircraft and assemblies of people must not be less than the height of the unmanned aircraft (i.e., the 1:1 rule).</p> |
|---|---|
-

Loads and equipment

- | | |
|--|--|
| 9 Security of loads and equipment | <p>9.1 The Remote Pilot must ensure that any load carried by, or equipment on, the Unmanned Aircraft is properly secured, and that the aircraft is in a safe condition for the specific flight.</p> <p>9.2 Articles must not be dropped.</p> <p>9.3 Dangerous goods must not be carried.</p> |
|--|--|
-

Remote pilots and operators

- | | |
|-------------------------------------|--|
| 10 Remote pilot requirements | <p>10.1 Remote pilots must:</p> <ul style="list-style-type: none"> – be employed or contracted by the UAS Operator, – hold a valid UK Flyer ID, – hold a valid GVC or RPC-L1, – follow the requirements of UK Reg (EU) 2019/947, point UAS.SPEC.060, and – be qualified as per the requirements of the Operations Manual. |
| 11 Operator requirements | <p>11.1 The UAS Operator must:</p> <ul style="list-style-type: none"> – comply with the responsibilities set out in UK Reg (EU) 2019/947, point UAS.SPEC.050, – maintain records of each flight made under the Operational Authorisation, and – make such records available to the Civil Aviation Authority on request as per UK Reg (EU) 2019/947, point UAS.SPEC.090. |
-

Conditions and limits continued

Other conditions

12 Occurrence reporting	<p>12.1 Any occurrences that take place while operating under this authorisation must be reported in accordance with UK Reg (EU) 376/2014 and the requirements set out in CAP 722 section 2.7.</p> <p>12.2 Any accidents that take place while operating under this authorisation must be reported in accordance with UK Reg (EU) 996/2010 to the UK AAIB.</p>
13 Insurance	<p>13.1 Insurance cover meeting the requirements of UK Reg (EU) 785/2004 must be held.</p>
14 Control system failure	<p>14.1 The Unmanned Aircraft must be equipped with a mechanism that will cause it to land in the event of a disruption to, or a failure of, any of its control systems, including the C2 Link.</p> <p>14.2 The Remote Pilot must ensure that this mechanism is in working order before any flight is commenced.</p>
15 Radio spectrum	<p>15.1 The UAS Operator must ensure that the radio spectrum used for the C2 Link and for any payload communications complies with the relevant Ofcom requirements and that any licences required for its operation have been obtained.</p>
16 High energy devices	<p>16.1 The UAS Operator must ensure high energy devices are appropriately stored and transported.</p>
17 Operator ID	<p>17.1 The operator ID must be displayed on every aircraft flown under this operational authorisation.</p>
18 Remote ID (RID)	<p>18.1 In accordance with UK Reg (EU) 947/2019 from 1st January 2026, operators will be required to comply with Direct Remote ID in respect of UK1, UK2, UK3, UK5 and UK6 UAS.</p> <p>18.2 From 1st January 2028, operators will be required to comply with Direct Remote ID in respect of UK0 UAS weighing 100g or more with a camera, model aircraft unless exempted, privately built UAS weighing 100g or more with a camera, and legacy UAS weighing 100g or more with a camera (including C class UAS).</p>
19 Operating from moving vehicles	<p>19.1 The Remote Pilot must not operate the UAS while operating any moving vehicle, or while in an aircraft.</p> <p>19.2 The Remote Pilot may operate the unmanned aircraft from a moving vehicle as a passenger (excluding in an aircraft) as long as the vehicle's speed and stability is such that they are able to maintain VLOS and control of the Unmanned Aircraft at all times.</p>

Conditions and limits continued

20 Lighting

- 20.1 In accordance with UK Reg (EU) 947/2019 from 1st January 2026, the operator must ensure that each unmanned aircraft is installed with at least one green flashing light for the purpose of visibility for operations at night.
- 20.2 This operational authorisation disappplies the requirement for operations conducted during the day.
- 20.3 If your aircraft does not have a built-in flashing light, you must securely fit a specialist drone flashing light.
- 20.4 The weight of the flashing light module will be included in the overall weight of the aircraft.
-

Supporting information

Images

- Taking and storing images of identifiable individuals from UAS, even inadvertently, may be subject to the General Data Protection Regulation and Data Protection Act 2018.

More information is available from the Information Commissioner's Office: <https://ico.org.uk/for-organisations/uk-gdpr-guidance-and-resources/cctv-and-video-surveillance/guidance-on-video-surveillance-including-cctv/additional-considerations-for-technologies-other-than-cctv/#uas>

Operating from private land

- You must get any applicable permission before flying from privately owned sites. You must not trespass.
-

Supporting information continued

Regulations

- UK Reg (EU) 2019/947 means Assimilated Regulation (EU) 2019/947.
 - UK Reg (EU) 376/2014 means Assimilated Regulation (EU) 376/2014.
 - UK Reg (EU) 996/2010 means Assimilated Regulation (EU) 996/2010.
 - UK Reg (EU) 785/2004 means Assimilated Regulation (EU) 785/2004.
-

Oversight and enforcement

Contact and operations manual details You must tell us if any of your contact details or operations manual details change.

Oversight and enforcement You may be selected for an audit at any time.
We may ask to see your Operations Manual and supporting records, such as aircraft technical logs and flight logs at any time. You must provide any relevant documents at our request, within the period we specify.
If you fail to meet this or any other requirement, we may revoke your authorisation or suspend it until you provide the information we require.

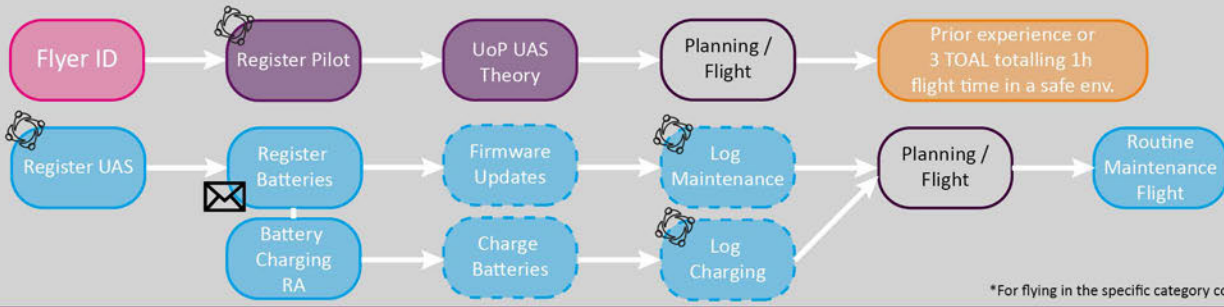
Contacting CAA about this authorisation

Phone 0330 022 1908
Monday to Friday, 8:30am to 4:30pm

Email uavenquiries@caa.co.uk

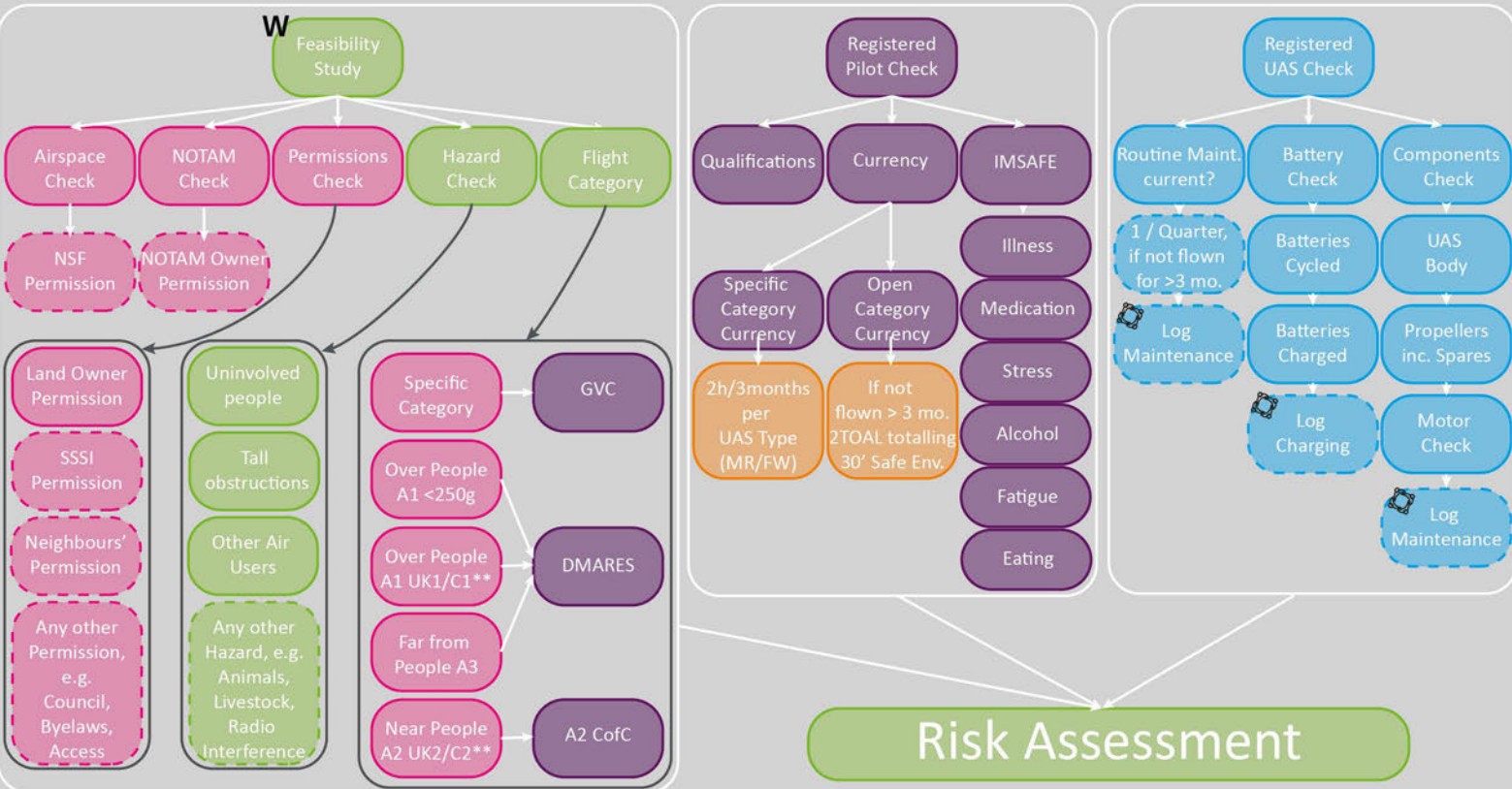
UoP Staff UAS Procedure

Getting started (Open Category)*



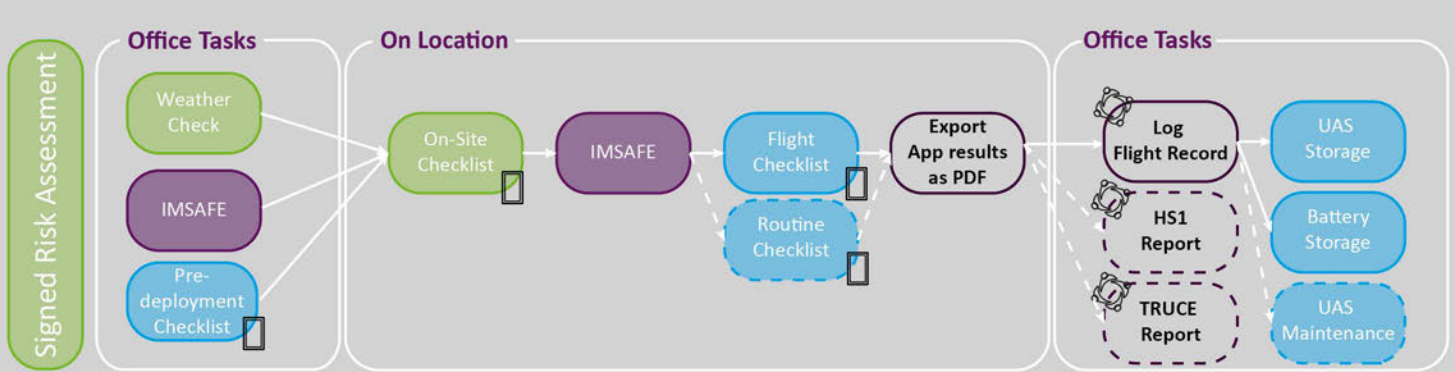
*For flying in the specific category consult UAS SO and Operations Manual

Planning operations



** Until 1 January 2028

Flying operations



Key

- Pilot
- Site
- Training Requirement/Prerequisite
- E-Mail drone@port.ac.uk
- UAS
- CAA/External
- If required
- Survey123 mobile app
- Service Delivery Manager
- Word document

UNITED KINGDOM

Unmanned Aircraft Systems

Remote Pilot Certificate of Competence



Flyer ID

[GBR-RP-4VZMP22PVXS4]

First name: [MARTIN KARL]

Last name: [SCHAEFER]

Expiry date: [20-10-2027]



SETTING INDUSTRY STANDARDS

RAE: [5607]



register-drones.caa.co.uk

GVC - General VLOS Certificate

The holder is competent to act as a remote pilot in the Specific Category in accordance with the limitations specified in the associated Operational Authorisation



This can be revoked, amended or suspended by the CAA at any time.

This is to certify that

Martin Schaefer

Has achieved the following qualification:

**TQUK Level 5 Award for Commercial
Drone Chief Pilots (RQF)**

Qualification Number: 603/3890/8

Awarded On: 18/09/2020

Certificate Number: 230-00004275-68169-20200918

Training Provider: Martek Drones Ltd T/A Coptrz



Andrew Walker
Responsible Officer of TQUK

Dunham House, Cross Street, Sale, M33 7HH
t. 03333 583 344 | e. account.managers@tquk.org | www.tquk.org

WingtraOne Basic Operator Training CERTIFICATE

This is to certify that

Martin Schaefer

Has enrolled in a certified training course by Wingtra and completed successfully
the course

WingtraOne Basic Operator Course

This certificate proves that the certificate owner possesses all required knowledge related to the WingtraOne
hardware and operating modes, planning and safely executing flights.



Issued: 2021-09-05

Expires: 2024-09-04

Certificate ID: lvkgosbzzx

WingtraOne Advanced Operator Training CERTIFICATE

This is to certify that

Martin Schaefer

Has enrolled in a certified training course by Wingtra and completed successfully
the course

WingtraOne Advanced Operator Course

This certificate proves that the certificate owner possesses all required knowledge related to the WingtraOne hardware and operating modes, planning and safely executing flights, knowing how to geotag and postprocess images, automatic maintenance checks and how to do replacements.



Issued: 2022-05-11

Expires: 2025-05-10

Certificate ID: ykec9ndmqj