Unmanned Aircraft Systems (UAS)

OPERATIONS MANUAL

Operator ID: GBR-OP-7696H4LRP8R7

This Operations Manual covers the following aircrafts:

DJI Phantom 3 Pro

DJI Phantom 4 Pro

DJI Inspire 2

DJI Spark

DJI Mini 2

DJI Mini 3 Pro

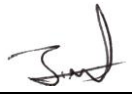
DJI Mavic 3 Enterprise

This document is a combined Safety and Operations Manual. It covers all of the appropriate aspects of Bournemouth University Higher Education Corporation's UAS operations and satisfies the requirements for the Civil Aviation Authority's (CAA) Operational Authorisation UKPDRA01.

ISSUE NUMBER:	Issue 1.11 – 02/04/2025
DOCUMENT AUTHOR:	Dr Andy Harrison
ACCOUNTABLE MANAGER:	Professor Keith Thomas Phalp

Amendment record

ISSUE NUMBER	DATE	AMENDMENTS INCORPORATED	AMENDMENT AUTHOR	APPROVED BY ACCOUNTABLE MANAGER
Issue 0.1	27/01/2017	1st Draft for internal review.		
Issue 0.2	31/01/2017	2nd Draft for internal review.		
Issue 1.0	13/02/2017	First Edition of Bournemouth University SUAS Operations Manual.		
Issue 1.1	01/12/2017	Addition of new drone – change DJI Phantom 4 to DJI Inspire 2: *Part A Sections 2.1, 3, 9; Appendices 4, 6* Update Insurance Certificates: *Appendix 2.*		
Issue 1.2	25/06/2018	Amendment of *Part A Section 16.1* to clarify training requirements for non-commercial operations.		
Issue 1.3	28/02/2019	Update to Referenced Documents to include 'Air Navigation (Amendment) Orders 2018 and 2019': *Part A Section 3.* Update ANO to include amendments as per 'Air Navigation (Amendment) Orders 2018 and 2019': *Part A Section 11.* Remove reference to 'Person in Charge': *Part A Section 11.6.* Remove reference to 'PFAW': *Part A Section 11.9.*		
Issue 1.4	18/02/2020	Updates to referenced documents. Addition of 'Non-commercial operations' Appendix 5. References to 'Non-commercial operations' appendix throughout document, where relevant. Addition of Pilots-In-Command to *Part A Section 6.* Addition of statement stipulating only working during daylight hours: *Part A Section 2.1.* Minor amendments to reflect latest ANO terminology, where necessary.		

ISSUE NUMBER	DATE	AMENDMENTS INCORPORATED	AMENDMENT AUTHOR	APPROVED BY ACCOUNTABLE MANAGER
Issue 1.5	19/02/2021	Name on cover page changed to 'Bournemouth University Higher Education Corporation'. Changed all references of 'Permission for Commercial Operations' to 'Operational Authorisation PDRA01' Updates to referenced documents: *Part A Section 3.* Changed all references to Accountable Manager name from 'Jim' to 'James' Andrews, to match Operator ID. Changed all references of 'SUAS' or 'Small Unmanned Aircraft Systems' to 'UAS' or 'Unmanned Aircraft. Added paragraph to *Part A Section 7* defining 'Remote Pilot', in accordance with CAP 722. Changed all references of 'Pilot-In-Command' to 'Remote pilot'. Updated *Part A Section 11* to reflect recent legislative changes and implementation of the UAS Implementing Regulation 2019/947; UK consolidated text (CAP 1789A).		
Issue 1.6	10/03/2022	Removed Shaun Osborne from 'Nominated Personnel': *Part A Section 6.* Updated Referenced Documents: *Part A Section 3.* Update Insurance Certificates: *Appendix 2.*		
Issue 1.7	31/03/2022	Changed Operator ID from OP-HW5DV4S to GBR-OP-WKH76PN4CHTN. Removed CAP 393 from referenced documents: *Part A Section 3.* Reference to 'small unmanned aircraft' changed to 'UAS': *Part A Section 11.2.* Changed 20kg to 25kg in relation to UAS max take-off mass: *Appendix 5 Section 4.* Added section on GDPR: *Part A Section 18.*		
Issue 1.8	24/02/2023	Operator ID updated *Part A Section 2.1*: Updated Outline of Operations to remove reference to commercial and non-commercial work. *Part A Section 3*: Updated Referenced Documents. *Part A Section 6*: Updated nominated personnel *Part A Section 11*: Reformatted and updated to reflect latest CAP 722 guidance. *Appendix 5*: New appendix added – PDRA01 Technical Characteristics of the System *Appendix 6*: Previously Appendix 5 (Open Category operations).		

ISSUE NUMBER	DATE	AMENDMENTS INCORPORATED	AMENDMENT AUTHOR	APPROVED BY ACCOUNTABLE MANAGER
Issue 1.9	08/04/2024	Updated Operational Authorisation: *Appendix 1.* Updated Insurance Certificates: *Appendix 2.*		
Issue 1.10	08/10/2024	Updated Accountable Manager details throughout.		
Issue 1.11	02/04/2025	*Part A Section 3*: Updated Referenced Documents. *Part A Section 9*: Updated UAS list. Updated Operational Authorisation: *Appendix 1.* *Appendix 2:* Updated Insurance Certificates. *Appendix 3:* Updated Health and Safety Policy Statement. *Appendix 5:* Updated PDRA01 Technical Characteristics of the System.		

Commitment of Accountable Manager

Safety is our priority and takes precedence over any other consideration; our mission is to operate to the highest standards and comply with all regulations and obligations stipulated by the CAA and this Operations Manual.

All operations will be carried out in accordance with the issued Operational Authorisation PDRA01 and abide by the requirements of The Air Navigation Order 2016 – SI 2016 No 765 as amended by The Air Navigation (Amendment) Order 2022 – SI 2022 No 321, and the UAS Regulation – Consolidated Regulation, Acceptable Means of Compliance, Guidance Material and Certification Specifications to UK Regulation (EU) 2019/947 (as amended).

No drone operation will be undertaken without valid insurance.

Our commitment to safety is evidenced by using the following procedures:

- Qualified personnel
- Ongoing specific training
- Currency requirements
- Maintenance
- Risk management

This Operations Manual describes the organisation, aircraft systems, personnel, flight operations and procedures by which Bournemouth University Higher Education Corporation (hereafter referred to as Bournemouth University) carries out its Unmanned Aircraft System (UAS) operations.

It is accepted that the content of this document does not override the necessity of reviewing and complying appropriately with any new or amended regulation as published from time to time by the Civil Aviation Authority.

Signed…… Date: 02/04/2025

Accountable Manager: Professor Keith Thomas Phalp

Pro Vice Chancellor – Education and Quality

For and on behalf of Bournemouth University.

Contact details

Enquiries regarding the content of this document should be addressed to:

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PART A – ORGANISATION AND OPERATIONAL CONTROL

INTRODUCTION

1. CONTENTS

The Contents Table on Page v outlines the structure and content of the Operations Manual.

2. INTRODUCTORY STATEMENT, INCLUDING OUTLINE OF OPERATIONS

This document is a combined Safety and Operations Manual. It covers all of the appropriate aspects of Bournemouth University's UAS operations and satisfies the requirements for the Civil Aviation Authority's (CAA) Operational Authorisation PDRA01.

This Operations Manual describes the organisation, aircraft systems, personnel, flight operations and procedures by which Bournemouth University carries out its UAS operations. All such operations will be conducted in compliance with any Operational Authorisation granted by the CAA and all Bournemouth University personnel involved in any such operations must fully adhere to all operational instructions contained within this manual.

OPEN CATEGORY OPERATIONS

The primary aim of this document is to satisfy the requirements for the CAA's Operational Authorisation PDRA01 to allow nominated remote pilots to operate within the Specific Category, and the document should be read as such. However, Bournemouth University personnel also undertake UAS operations that fall outside the requirement of an Operational Authorisation; in particular, in relation to student projects and other research activities.

Accordingly, Bournemouth University personnel involved in such operations are directed to Appendix 6, which outlines the operational requirements relating to Open category UAS operations, with references to specific sections of this main document, where relevant.

2.1 Outline of operations

The table below summarises the types of UAS operations undertaken by Bournemouth University personnel and the aircraft used for each type of operation. See Section 9 for a brief technical description of each UAS.

Operation type	Aircraft utilised	Payload fitted
General videography and photography	All	Integrated HD camera
Photogrammetry	All	Integrated HD camera
River corridor surveys Geospatial mapping, Orthomosaic, DEM	All	Integrated HD camera / multispectral sensors

Operation type	Aircraft utilised	Payload fitted
Vegetation surveys Geospatial mapping, Orthomosaic, DEM	All	Integrated HD camera / multispectral sensors
General operations under Open Category Student projects, academic research	Various – as per Open Category UAS Product Requirements	Various

3. DEFINITIONS, ABBREVIATIONS AND REFERENCED DOCUMENTS

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

Abbreviation	Full title
UAS	Unmanned Aircraft System
CAA	Civil Aviation Authority
ATC	Air Traffic Control

Below is a list of referenced documents.

Reference	Full title	Version and Date
ANO 2016/765	The Air Navigation Order 2016 – SI 2016 No 765	Last amended 13th April 2022
ANO 2022/321	The Air Navigation (Amendment) Order 2022 – SI 2022 No 321	13th April 2022
CAP2013	Air Navigation Order 2020 Amendment – Guidance for unmanned aircraft system users	Version 1, 17th December 2020
UK Reg (EU) 2019/947	UAS Regulation – Consolidated Regulation, Acceptable Means of Compliance, Guidance Material and Certification Specifications to UK Regulation (EU) 2019/947 (as amended)	First edition, Amendment 2, February 2025
CAP722	Unmanned Aircraft System Operations in UK Airspace - Guidance	Version 9.2, 16th April 2024
CAP722H	Specific Category Operations: Pre-defined Risk Assessment Requirements, Guidance & Policy	Version 3, 9th April 2024
CAP2012	Drone Rules: Requirements for flying in the Open category	Version 3, 3rd July 2023
DMAC	The Drone and Model Aircraft Code	Last updated March 2024
DJI	Inspire 2 User Manual	V1.4, July 2017
DJI	Phantom 3 Professional User Manual	V1.8, March 2016
DJI	Phantom 4 Professional User Manual	V1.4, October 2017
DJI	Mavic 2 User Manual	V2.0, April 2019
DJI	Spark User Manual	V1.6, October 2017
DJI	Mini 2 User Manual	V1.4, June 2021
DJI	Mini 3 Pro User Manual	V1.4, October 2022
DJI	Mavic 3 Enterprise User Manual	V1.0, September 2022
DroneDeploy	DroneDeploy Documentation (Online)	Live resource

4. DOCUMENT CONTROL AND AMENDMENT PROCESS

All amendments to this Operations Manual are to be made by Andy Harrison and must be recorded in the amendment record table found at the front of this document. Each amendment is identified with an Issue Number, Date, Amendments Incorporated and Amendment Author header. The Accountable Manager will sign off all amendments to this document.

The CAA will be informed of all major updates, such as new aircraft or pilots. All Bournemouth University personnel involved in UAS operations will be informed of any changes to this Operations Manual and they must maintain a current up-to-date version either in electronic or paper format.

ORGANISATION

5. STRUCTURE OF ORGANISATION AND MANAGEMENT LINES

Bournemouth University is a Higher Education Corporation, established in 1992, with its main campus located in neighbouring Poole. The university currently has more than 18,000 students and almost 2,000 staff employed throughout academic, admin and professional services.

Along with a comprehensive education and research programme, Bournemouth University supports numerous professional consultancies engaging in a range of specialist field survey operations; including Bournemouth University Global Environmental Solutions (BUG) and Bournemouth University Archaeology (BUARC).

Organisation Name: Bournemouth University

Organisation Type: Higher Education Corporation

Organisation Registration Number: N/A

Country of Registration: United Kingdom

Bournemouth University has the following insurance policies (see Appendix 2 for certificates):

Employers Liability: £50,000,000 (expires 31/07/2025) – QBE Insurance (Europe) Limited

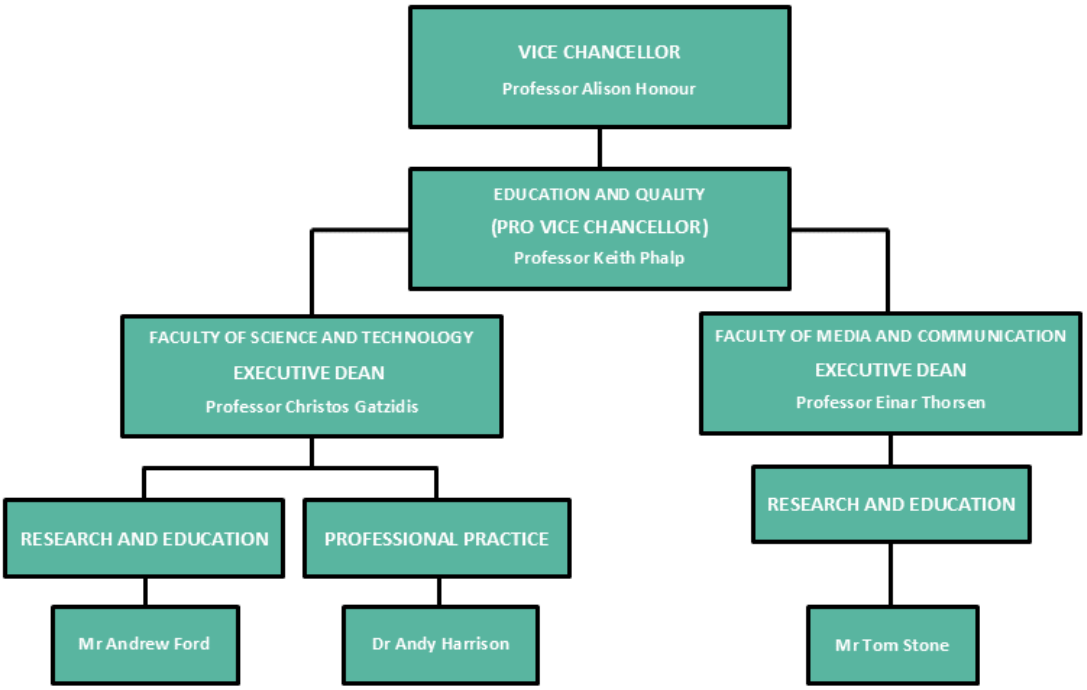
Public and Products Liability: £50,000,000 (expires 31/07/2025) – U.M. Association Limited

- Includes cover for Unmanned Aerial Vehicles (see Appendix 2)

Professional Indemnity: £10,000,000 (expires 31/07/2025) – U.M. Association Limited

5.1 Management lines

The Vice Chancellor has overall responsibility for all Health and Safety at Bournemouth University. However, in practice, many specific areas are delegated to the Chief Operating Officer. With specific regard to UAS operations outlined within this Operations Manual, the 'Accountable Manager' is the Pro Vice Chancellor – Education and Quality, Professor Keith Phalp. An organogram showing the organisational structure of the personnel highlighted in Section 6 is provided below.



6. NOMINATED PERSONNEL

The following key personnel are listed for the safe operation, maintenance and administration of all commercial UAS operations within Bournemouth University. The remote pilot on any one flight will be dependent on the job specification and work stream. When not acting as remote pilot for a particular flight, those listed below as remote pilot may act as support personnel (Observers).

	Accountable Manager	Professor Keith Thomas Phalp
	Qualification	N/A
	Flyer ID	N/A
	Telephone Number	+44 (0)1202 965571
	Email Address	kphalp@bournemouth.ac.uk

	**Remote Pilot / Chief Pilot**	Dr Andy Harrison
	Qualification	CAA approved Remote Pilot Authorisation (3iC)
	Flyer ID	GBR-RP-BVPY49PYT5JF
	Telephone Number	+44 (0)1202 968261
	Email Address	andyharrison@bournemouth.ac.uk

	**Remote Pilot**	Mr Andrew Ford
	Qualification	CAA approved Remote Pilot Authorisation (3iC)
	Flyer ID	GBR-RP-9X842BZRMDHZ
	Telephone Number	+44 (0)1202 961104
	Email Address	aford@bournemouth.ac.uk

	**Remote Pilot**	Mr Tom Stone
	Qualification	CAA approved Remote Pilot Authorisation (3iC)
	Flyer ID	GBR-RP-8ZW6Y6NZL9YJ
	Telephone Number	+44 (0)1202 524111
	Email Address	stonet@bournemouth.ac.uk

7. RESPONSIBILITIES OF THE REMOTE PILOT

The guidance document CAP 722 defines a remote pilot as '*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*'.

Below is an outline of the responsibilities associated with the role of remote pilot. All Bournemouth University personnel acting as remote pilot must be fully aware of their role and responsibilities as highlighted below:

- Overall responsibility for a safe operation.
- Before take-off, take all reasonable steps so as to be satisfied that the flight can be safely made, taking into consideration the flight route, weather forecasts, and any obstacles or hazards identified.
- Supervision of support personnel (Observers) and the operation of the UAS.

- Provision of a briefing to ensure all support personnel (Observers) are aware of their responsibilities.
- Ensure all required paperwork is completed, including Flight, Maintenance, Battery and Incident Logs (Appendix 4).
- Ensure the Pre-Survey and On-site Survey (Appendix 4) are completed correctly.
- Ensure the aircraft is only operated within the stated limitations for that particular aircraft.
- Ensure all operations are completed within the limitations stated in the Operational Authorisation PDRA01.
- Ensure that the aircraft used is airworthy by completing the Pre-flight Checklist (Appendix 4).
- Ensure the welfare of themselves or others is not compromised by any planned operations.

8. RESPONSIBILITIES OF SUPPORT PERSONNEL (OBSERVERS)

Below is an outline of the responsibilities associated with the role of support personnel (Observers), where used and fully briefed. All crew members acting as support personnel (Observers) must be fully aware of their role and responsibilities as highlighted below:

- Ensuring operational safety.
- Ensure the position of the UAS is known at all times.
- Ensure the remote pilot is aware of all relevant developing situations.
- Maintain constant visual look out for public and aircraft encroachments.
- Ensure members of the public do not encroach on operational area.

9. UAS TECHNICAL SPECIFICATIONS AND ROLES

Bournemouth University operates a total of 9x DJI quadcopters (UAS1 – UAS9). See the table below for details on the payload associated with each UAS. Each of these aircraft may be utilised for all of the operations outlined in Section 3.

UAS	Make / Model	Payload	Role / Use (Section 2.1)
UAS1	DJI Phantom 3 Professional	Integral gimbal + HD camera	All
UAS2	DJI Phantom 3 Professional	Integral gimbal + HD camera	All
UAS3	DJI Phantom 3 Professional	Integral gimbal + HD camera	All
UAS4	DJI Phantom 3 Professional	Integral gimbal + HD camera	All
UAS5	DJI Inspire 2	Integral gimbal + HD camera, NIR sensor	All
UAS6	DJI Phantom 4	Integral gimbal + HD camera	All

UAS	Make / Model	Payload	Role / Use (Section 2.1)
UAS7	DJI Spark	Integral gimbal + HD camera	All
UAS8	DJI Mini 2	Integral gimbal + HD camera	All
UAS9	DJI Mini 3 Pro	Integral gimbal + HD camera	All
UAS10	DJI Mavic 3 Enterprise M	Integral gimbal + Multispectral camera	All
UAS11	DJI Mini 3 Pro	Integral gimbal + HD camera	All

Full technical specifications to satisfy the requirements of 'PDRA01 – Technical Characteristics of the System' are provide for each UAS in Appendix 5.

10. AREA OF OPERATION

Bournemouth University UAS operations will take place throughout the UK; subject to the operating limitations and conditions outlined within the Air Navigation Order and Operational Authorisation PDRA01 (see Section 11 below).

Work areas may include (or may encompass), but not be limited to:

- Open countryside
- River corridors
- Archaeological sites
- Roads / Railway lines
- Building sites
- Mining operations
- Forested areas
- Coastal regions
- Conservation areas

OPERATIONAL RESTRICTIONS

11. OPERATING LIMITATIONS AND CONDITIONS

All operations will be carried out in accordance with the issued Operational Authorisation PDRA01 and abide by the requirements of The Air Navigation Order 2016 – SI 2016 No 765 as amended by The Air Navigation (Amendment) Order 2022 – SI 2022 No 321, and UAS Regulation – Consolidated Regulation, Acceptable Means of Compliance, Guidance Material and Certification Specifications to UK Regulation (EU) 2019/947 (as amended).

The guidance document produced by the CAA 'Unmanned Aircraft System Operations in UK Airspace – Guidance' (CAP 722) consolidates and summarises the requirements outlined within the relevant legislation.

CAP 722 is an exhaustive document and should be referred to alongside this document for full details in advance of undertaking Bournemouth University UAS operations. However, several of the key points are summarised below. Text in italics represents excerpts from the relevant chapter of the CAP 722 guidance document.

UAS operations are regulated in a manner that is proportionate to the level of risk that the individual operation presents. This 'risk and operation centric' approach means that each operation will fall into one of three Operating Categories [Open, Section 11.5; Specific, Section 11.6; Certified, Section 11.7].

11.1 Visual Line of Sight (VLOS)

[Relevant section of CAP722: Section 2.1.1]

All Bournemouth University UAS operations will be undertaken within 'Visual line of sight' (VLOS) unless specifically authorised otherwise by the CAA within an Operational Authorisation to undertake 'Beyond visual line of sight' (BVLOS) or 'Extended visual line of sight' (EVLOS) operations.

When operating within VLOS, the remote pilot must be able to see the UA at all times during the flight, sufficiently well to be able to maintain control of it. The maximum distance from the remote pilot at which this can be safely achieved depends on a number of factors and may change from flight to flight.

When operating within the Open Category, or when set out within the terms of an Operational Authorisation for the specific category, the UA must be operated within visual line of sight of the remote pilot (VLOS).

A VLOS Operation is defined within UK Regulation (EU) 2019/947 as:

> *'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.'*

Maintaining VLOS ensures the remote pilot can monitor the aircraft's position, orientation, and the surrounding airspace at all times. This is important in order to ensure the UA can be manoeuvred clear of anything that might pose a collision hazard.

While corrective lenses may be used, the use of binoculars, telescopes, or any other forms of image enhancing devices are not permitted.

Note: *Provision is made within UK Regulation (EU) 2019/947 for the use of FPV equipment within the Open Category, providing an observer is used.*

The maximum VLOS distance varies for every operation, and will include such considerations as:

- *The size of the aircraft (and its 'visual conspicuity')*
- *Any lighting onboard the UA to aid in orientation and navigation*
- *The weather conditions (fog, sun glare etc.)*
- *The remote pilot's eyesight*
- *Terrain and obstacles that may obscure the view between the RP and the UA*

It is for the RP to satisfy themselves, after careful consideration of the above guidance, the maximum horizontal distance that can be safely achieved whilst still maintaining unaided visual contact with the UA.

Note*: It is important to consider additional technical factors which may limit the safe operating distance from the RP and the UA during VLOS operations. For example, the C2 link capability of the UAS.*

11.2 VLOS Operating Heights

[Relevant section of CAP722: Section 2.1.1.1]

Open Category operations are limited to a maximum distance of 400 feet (120 metres) from the closest point of the surface of the earth.

Note: *This is not a 'vertical height', but a distance between the UA and the closest point on the surface of the earth.*

UK Regulation (EU) 2019/947 UAS.OPEN.010 gives two additional height provisions:

- *For UA to be flown up to 15m higher than the height of an 'artificial obstacle', when that obstacle is taller than 105m, and the UA is kept within 50m of it.*
- *For unmanned sailplanes (with an MTOM less than 10Kg) to be flown at a height greater than 120m above the surface of the earth, provided that it is not flown higher than 120m above the remote pilot.*

This height limitation is intended to reduce the risk of collision with a manned aircraft. Although other aircraft may fly below this height, the vast majority fly at higher levels.

11.3 Protection of third parties

[Relevant section of CAP722: Section 2.1.4]

While the primary focus of the UAS Regulations is on the protection of persons, UAS operators and remote pilots must also bear in mind their responsibilities towards vehicles, vessels and structures while flying, even if they are unoccupied.

Under ANO 2016 article 241, 'no person may recklessly or negligently cause or permit an aircraft to endanger any person or property'. This article applies to the endangerment of manned aircraft with an unmanned aircraft.

Similarly, ANO 2016 article 240 requires that 'a person must not recklessly or negligently act in a manner likely to endanger an aircraft, or any person in an aircraft'. Although this article does not apply to 'unmanned aircraft that are not subject to certification' (see the exception in article 23 – i.e., the unmanned aircraft itself cannot be 'endangered'), its requirements still apply to UAS operators and remote pilots, in relation to the endangerment of other aircraft with a UA.

Key points to note when considering the safety of third parties:

- *Fly cautiously and with the expectation that control of the UA could be lost without notice*
- *Reduce the harmful characteristics of the unmanned aircraft to people*
  - *Minimise the UA's mass wherever possible or use a smaller/lighter UA*
  - *Use a UA with design features that reduce harm*
  - *Do not fly at excessive speeds when close to people*
- *Check that the UA is in a safe condition to fly*
- *Consider the environmental factors that may aggravate the potential for loss of control or loss of propulsion*
- *Consider the use of additional operating personnel to warn uninvolved people immediately following any loss of control or propulsion*
- *Make use of any available technology or safety features which may reduce the risk of harm if control is lost*

11.3.1 Uninvolved persons

[Relevant section of CAP722: Section 2.1.5]

The primary focus for UAS operations is the protection of people that are not a part of the operation (i.e., third parties). Within the UAS regulations, they are referred to as 'uninvolved persons'.

The regulation sets out that 'uninvolved persons' means an individual, or group of individuals, who either:

- *are not, in any way, participating in the UAS Operation; or*
- *have not received clear instructions and safety precautions from the RP, the UAS Operator or a person nominated by the UAS Operator, to follow throughout the operation and in the event the UAS exhibits any unplanned behaviour.*

A person is considered to be 'participating' in the operation, if they are the UAS Operator, or acting on behalf of the UAS Operator, for example, the remote pilot, or another member of the flight or supporting ground crew.

11.3.2 Overflight of uninvolved persons

[Relevant section of CAP722: Section 2.1.4]

The overflight of uninvolved people is possible in some circumstances within the Open and Specific category of operation.

The overflight of uninvolved people should always be minimised where possible, to reduce the risk of a collision with them, following a loss of control, to as low as reasonably practicable.

*This risk can be reduced by lowering the **likelihood** of such a collision occurring, and the **severity** of the collision.*

*Factors that a UAS Operator and remote pilot should take to reduce the **likelihood**, include:*

- *Only flying directly over people when absolutely necessary to achieve the aim of the flight (and when legal to do so) and minimise the time doing so.*
- *Consider remote pilot experience and fatigue level.*
- *When flying over uninvolved people remote pilots should, whenever reasonably possible, maintain some horizontal separation between their aircraft and those uninvolved people. The extent of this horizontal distance is for the remote pilot to judge based on any relevant factors such as the prevailing weather conditions and the flight characteristics of the UA and its flight, for example;*
    - *Wind direction- avoid flying 'upwind' of uninvolved people, a strong wind may blow the aircraft towards them as it falls.*
    - *Think before flying towards people, especially at higher speeds as the aircraft's trajectory while falling may present a danger to people on the ground.*
- *Consider the nature and temperament of uninvolved people being overflown and how they may react to the presence of an unmanned aircraft.*
- *Keep the UA maintained in accordance with the manufacturer's guidance.*
- *Maintain an appropriate margin of confidence in the flying time that can be provided by the existing battery power/charge to carry out the intended operation and cope with unexpected issues.*
- *Consider environmental factors that may increase the chance of a loss of control, including;*
    - *Flight in precipitation – which may suddenly prevent the UA from operating*
    - *Sources of interference with the Command and Control link*

- *Wind speed and turbulence – which could affect the remote pilot's ability to control the aircraft precisely and increase its power consumption.*
- *Colder outside air temperatures - which could reduce battery performance.*

*Factors that a UAS Operator and remote pilot should take to reduce the **severity**, include:*

- *Minimise the mass of the aircraft while flying, in order to reduce the kinetic energy that may be transferred in a collision;*
  - *If possible, use a lighter UA.*
  - *The UA should only carry loads that are necessary.*
- *Use UA with design features that reduce harm following collision with a person.*
- *Do not fly at excessive speeds when close to people.*

11.3.3 The 1:1 rule

[Relevant section of CAP722: Section 2.1.4]

The '1:1 rule' is a principle which can be used to identify when the minimum separation distance from uninvolved people may need to be increased, and by how much. It is based on the relationship between the UA's height and its distance from the uninvolved person (the 1:1 line).

The horizontal separation between the UA and uninvolved people should not be less than the height of the aircraft. *The higher the aircraft, the further it will travel should it suffer a catastrophic failure, and therefore the higher the likelihood of it colliding with uninvolved people, and so the separation distance must be increased (or the height reduced). This is so that, in the event of a propulsion failure, the UA is not likely to fall in an area with uninvolved people present.*

11.3.4 Assemblies of people

[Relevant section of CAP722: Section 2.1.5.2]

Assemblies of people are defined as: gatherings where persons are unable to move away due to the density of the people present.

There are no strict numbers defined above which a 'group of people' would turn into an 'assembly' of people as different situations would result in different conclusions. An assembly must be evaluated qualitatively, based on the ability of people within that group to 'escape' from any risk posed by the UAS operation.

Examples of assemblies of people may include the following, (this is not an exhaustive list):

- *sporting, cultural, religious or political events;*

- *music festivals and concerts;*
- *marches and rallies;*
- *parties, carnivals and fêtes.*

11.3.5 Vehicles, vessels and structures

[Relevant section of CAP722: Section 2.1.7]

Although there are no specific separation distances from vessels, vehicles and structures within the regulations, in many cases these will still have persons inside them who need to be protected. For example, the 'endangerment' regulation in the Air Navigation Order (article 241) - it is an offence to 'endanger' such property with an unmanned aircraft.

Additionally, the overall security and privacy situation must also be considered. There may be buildings in the area where it would be inadvisable, from a security or privacy standpoint, to be flying close to without first obtaining permission to do so.

11.3.6 Congested areas

[Relevant section of CAP722: Section 2.1.8]

As part of the aim to protect uninvolved persons, flights within areas that are used for residential, commercial, industrial or recreational purposes (i.e. areas that are densely populated or likely to be occupied by large numbers of persons) have additional operational limitations placed on them.

UAS flights within these 'congested' areas may only be undertaken:

- *by UA that are deemed to be small enough to not present a hazard;*
- *by UA that have been built to specific product safety standards;*

  ***Note:** in both of the cases above, additional remote pilot competency requirements may also be required.*

  or,

- *if authorised by the CAA.*

Further details on UAS product requirements and areas of operation can be found in Sections 11.5 (Open Category) and 11.6 (Specific Category).

11.4 Flight Restriction Zones

[Relevant section of CAP722: Section 2.3.4]

Flight Restriction Zones (FRZs) are established around aerodromes, and space sites.

Aerodrome Flight Restriction Zones (FRZ) are implemented at the majority of UK aerodromes (a complete list can be found in the AIP, and on the DroneSafe Website). Their purpose is to enhance safety for other airspace users within the vicinity of an aerodrome.

Aerodrome FRZs are always active.

In order to operate within an Aerodrome FRZ, permission must be sought from the appropriate authority, either the Air Traffic Service unit (ATSU) or the Aerodrome Operator. This may be obtained through an online platform, or directly from the aerodrome. The procedure is normally outlined on the aerodrome website, otherwise the ATSU may be contacted directly, contact details can be found within the AIP.

An approval in principle may be issued in advance, which must normally be followed by an 'on the day' approval from the appropriate air traffic service unit, or aerodrome operator. In some cases, a standing agreement may be appropriate, and agreed by both parties, which grants permission on a standing basis for a specific operation.

Aerodrome FRZs are defined in article 94A of the ANO and comprise three sections:

- *A cylinder, with the same dimensions as the Aerodrome Traffic Zone (ATZ);*
- *Runway Protection Zones (RPZs);*
- *Additional Boundary Zones.*

The ATZ is an existing airspace structure, which applies to manned aircraft, and is a 2.0 or 2.5 NM radius cylinder which extends to 2000 ft above aerodrome level, centred around the centre point of the longest runway.

The RPZs are rectangular blocks, starting at the runway threshold and extending out 5 km along the extended runway centreline, which are 1 km wide and extend to 2000 ft above aerodrome level.

The Additional boundary zones exist where a line drawn that is 1km beyond the airfield boundary, extends outside of the ATZ. This additional volume is called the 'additional boundary zone'. This also extends to 2000 ft above aerodrome level.

For illustrative purposes, the FRZ for Bournemouth Airport is shown in Figure 11.1 below.

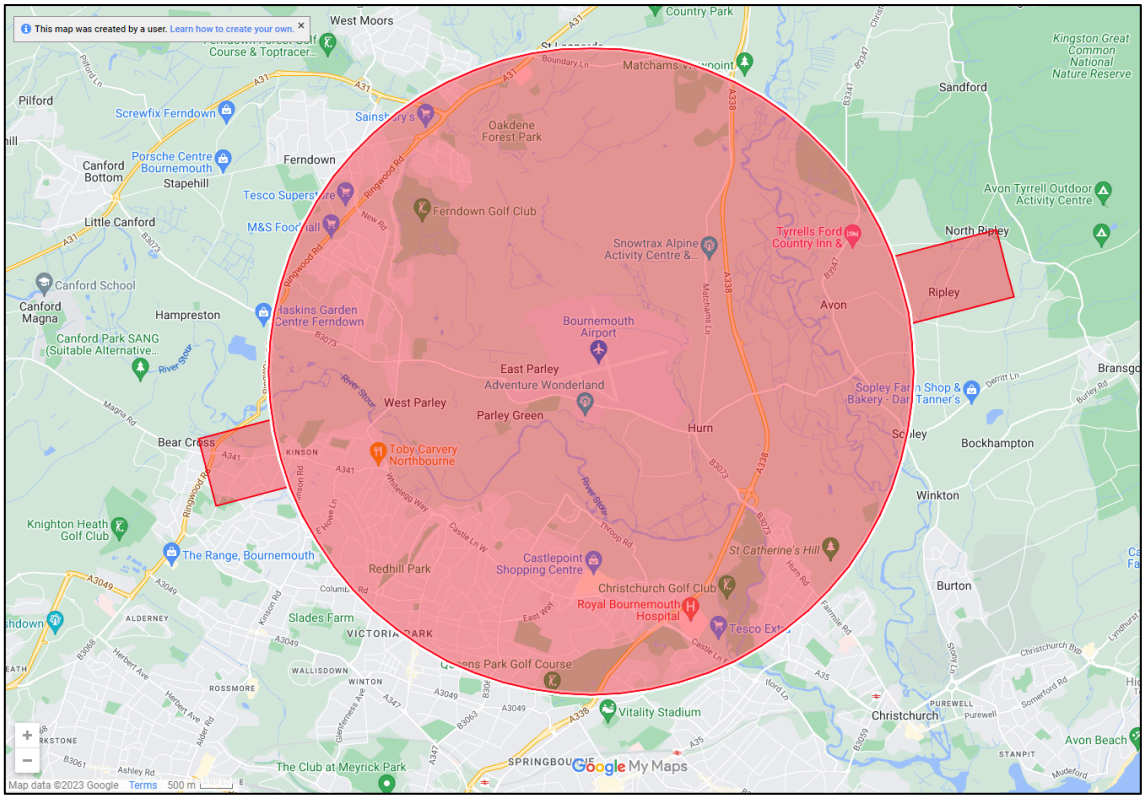


Figure 11.1. Flight Restriction Zone (FRZ) at Bournemouth Airport (correct at time of publication – presented for illustration purposes only).

Full details of Flight Restriction Zones, including an interactive map, can be found on the NATS Aeronautical Information Service website.

UAS Operators intending to operate above 400ft (120m) within an FRZ must obtain an Operational Authorisation from the CAA to do so. The air traffic control unit, flight information service unit or aerodrome operator may issue a permission for access to the FRZ (at any level), but may not authorise operations in the Specific category (e.g. above 400ft).

11.5 Open Category

[Relevant section of CAP722: Section 2.2.1]

Any remote pilot may fly within the Open Category.

The Open category covers operations that present a low risk to third parties. Operations within this category are conducted within a set of basic and pre-defined limitations and do not require any further authorisation by the CAA. The Open category is sub-divided into three further sub-categories.

Restrictions on operations within the Open Category are primarily based on 1) the type (size) of UAS being flown and 2) the proximity of the UAS to uninvolved persons. Sections 11.5.1 to 11.5.4 describe in detail the Open Category operational limitations. However, **a tabulated summary of Open Category operational limitations, product requirements and personnel requirements is provided in Table 11.1**.

11.5.1 Operational boundaries

[Relevant section of CAP722: Section 2.2.1.1]

Open category operations are bounded by a number of factors, all of which must be met:

- *the maximum take-off mass/flying weight of the unmanned aircraft must be less than 25kg; and*
- *the unmanned aircraft must be operated within VLOS (unless operating in accordance with the procedure described in GM1 Article 4(1)(d) of UK Regulation (EU) 2019/947); and*
- *the unmanned aircraft must not be flown further than 400 feet (120 metres) from the closest point of the surface of the earth (unless operating in accordance with the procedure described in UK Regulation (EU) 2019/947 UAS.OPEN.010 (3); and*
- *only one UA may be operated at any one time.*
- *The UA must not drop any material during the flight. See AMC1 Article 4(1)(f) of UK Regulation (EU) 2019/947 for further information.*

11.5.2 Open Category subcategories

[Relevant section of CAP722: Section 2.2.1.2]

The Open Category is then further divided down into three operational 'subcategories', primarily based on the proximity of the unmanned aircraft to uninvolved persons while in flight, as follows:

- ***A1 (fly 'over' people)** – Operations in subcategory A1 can be conducted within 'congested' areas* [see Section 11.3.6] *and may be carried out over uninvolved people (other than A1 transitional UAS* [see Section 11.5.3 for UAS product requirements]*), but not assemblies of people. Any overflight of people should be avoided if possible and kept to a minimum. Operations must be conducted with a:*
    - *UAS less than 250g, that is privately built or placed on the market before 1 Jan 2026 (under the 'Legacy' provisions* [see Section 11.5.3 for UAS product requirements]*); or*
    - *A1 Transitional UAS* [see Section 11.5.3 for UAS product requirements] *with a mass less than 500g, provided the remote pilot holds an A2 CofC certificate* [see Section 11.5.4 for personnel requirements]*, and does not overfly uninvolved people – only until 01 January 2026.*

- ***A2 (Fly 'close to' people)*** *(under the transitional provisions* [see Section 11.5.3 for UAS product requirements]*) – Operations in subcategory A2 can be conducted 'near' people with a minimum horizontal distance of 50 metres from uninvolved persons. The remote pilot must have successfully completed an additional competency examination (the A2 CofC), and the UAS must be a transitional UAS* [see Section 11.5.3 for UAS product requirements]*, with a mass less than 2Kg - only until 01 January 2026.*

- ***A3 (Fly 'far from' people)*** *– This category covers the more general types of unmanned aircraft operations. The unmanned aircraft may only be flown in areas where no uninvolved person may be endangered by the unmanned aircraft, and may not be flown within 150 metres horizontally of areas that are used for residential, commercial, industrial or recreational purposes.*

11.5.3 Open Category product requirements

[Relevant section of CAP722: Section 2.2.1.3]

A set of product requirements has been introduced within UK Regulation (EU) 2019/945. Currently, it is not possible for manufacturers to comply with these requirements in the UK, due to the lack of designated standards, or Conformity Assessment Bodies, established under this regulation. As such, there are currently no UAS in the UK which are class marked in accordance with this regulation. For this reason, the CAA has removed class marking guidance from this document, for simplicity and readability.

This is subject to a regulatory review to be conducted by the DfT and the CAA in due course.

UAS which are marked with a class mark, in accordance with the European version of this regulation, are not recognised in the UK as being class marked, and must be flown under the other open category provisions (i.e. transition, legacy or non-class marked).

Legacy UAS

UAS products (which are not privately built) which do not conform to the class markings, but which are placed on the market before 01 January 2026 may continue to be used in the Open Category in the A1 and A3 subcategory - providing that the unmanned aircraft has a MTOM less than 250g (for the A1 subcategory) or 25Kg (for the A3 subcategory).

New UAS products (which are not privately built) and which are placed on the market on or after 1 January 2026 and which do not conform to the class markings described above, may not be used in the Open category.

Transitional Arrangements

In order to manage the transition to the new product standard rules, UK Regulation (EU) 2019/947 Article 22 sets out transitional provisions that allow certain UAS that don't meet the class marking requirements to continue to be operated in the Open category until 01 Jan 2026. These are:

- *A1 sub-category: UA less than 500g, and remote pilot must hold an A2 CofC certificate. No overflight of uninvolved people.*
- *A2 sub-category: UA less than 2Kg, no closer than 50m horizontally from uninvolved persons, remote pilot must hold an A2 CofC certificate.*

11.5.4 Open Category personnel requirements

Subcategory A1

- UAS Operator must be registered (unless UA is a toy / unable to capture personal data)
- Remote pilot competence
    - < 250 g:
        - DMARES online learning and obtain Flyer ID
    - A1 Transitional:
        - DMARES online learning and obtain Flyer ID
        - A2 CofC (Certificate of Competence)

Subcategory A2

- UAS Operator must be registered
- Remote pilot competence
    - DMARES online learning and obtain Flyer ID
    - A2 CofC (Certificate of Competence)

Subcategory A3

- UAS Operator must be registered
- Remote pilot competence
    - DMARES online learning and obtain Flyer ID

Table 11.1. Summary of Open Category operational limitations, product requirements and personnel requirements.

Subcategory	Operating area	Drone class	Mass	DJI drone type	Registration (UAS Operator)	Competency (Remote Pilot)
A1 Fly 'over' people	Fly over uninvolved people, but not over crowds.	Privately built or placed on the market before 01/01/2026	< 250 g	Mavic Mini, Mini 2, Mini 3 Pro	Only if camera equipped (but not toys)	Read user manual
	No intentional flight over uninvolved persons.	A1 Transitional (not after 01/01/2026)	< 500 g	Mavic Air, Spark	Yes	Read user manual DMARES online learning and obtain Flyer ID A2 CofC
A2 Fly 'close to' people	No closer than 50 m horizontally from uninvolved persons.	A2 Transitional (not after 01/01/2026)	< 2 kg	Mavic Pro, Mavic 2 series, Mavic 3 series, Mavic 3 Enterprise series, Mavic Air 2, Mavic Air 2S, Phantom 4 series, Phantom 3 series	Yes	Read user manual DMARES online learning and obtain Flyer ID A2 CofC theoretical test
A3 Fly 'far from' people	No uninvolved people present within the area of flight. Maintain 50 m separation from any uninvolved people. No flight within 150 m horizontally of residential, commercial, industrial or recreational areas.	Privately built or placed on the market before 01/01/2026	< 25 kg	Inspire series, Matrice series, M30 series	Yes	Read user manual DMARES online learning and obtain Flyer ID

11.6 Specific Category

[Relevant section of CAP722: Section 2.2.2]

Only remote pilots listed within this Operations Manual are permitted to fly within the Specific Category.

The Specific Category covers operations that present a greater risk than that of the Open Category, or where one or more elements of the operation fall outside the boundaries of the Open Category.

The key element of the Specific Category is that the UAS operator is required to hold an Operational Authorisation, which has been issued by the CAA.

This Operational Authorisation will be based on the CAA's evaluation of a safety risk assessment that has been produced by the UAS operator or, in some circumstances, has been 'pre-defined' and published by the CAA as a pre-defined risk assessment (PDRA).

A PDRA is a shortened set of prescriptive conditions that must be complied with by a UAS operator in order to conduct a pre-determined type of operation. In these cases, the CAA conducts a risk assessment for the operation, to generate a list of mitigations. These mitigations are then published as a series of requirements and limitations. The Operator must demonstrate compliance with these mitigations within the operations manual, as part of a 'shortened' application for an operational authorisation. Individual PDRAs that are available for use within the UK are listed in CAP 722H.

This operations manual satisfies the CAA requirement for an Operational Authorisation UKPDRA01, which uses the Pre-Defined Risk Assessment UKPDRA01 – Operations within 150 metres of any Residential, Commercial, Industrial or Recreational Areas for UAS with a Maximum Take-Off Mass of less than 25kg.

The operating limitations of UKPDRA01 are summarised below:

Summary

This PDRA is designed to enable VLOS operations with UAS in the areas that are likely to be more 'congested' than the areas where [Open Category] subcategory A3 operations are permitted.

Operational Conditions and Limitations

UKPDRA01 is subject to the following operational conditions:

- *VLOS only, as defied in UK Regulation (EU) 2019/947 Article 2(7), and GM1 Article 2(7), within the Acceptable Means of Compliance and Guidance Material to this regulation. The use of a UA observer situated next to the remote pilot, is permitted.*
- *Maximum height not to exceed 400 feet above the surface. Structures/obstacles taller than 105m may be overflown by a maximum of 15m providing the UA remains within 50m of the structure or obstacle.*
- *Flight permitted within 150 metres of any Residential, Commercial, Industrial or Recreational Area for UAS.*
- *Flight may take place during the hours of daylight or at night.*
- *No flight within 50 metres of any uninvolved person, except that during take-off and landing this distance may be reduced to 30 metres. Any overflight of uninvolved people must be kept to a minimum.*
- *No flights within restricted airspace (Restricted Areas, Danger Areas, FRZs) without relevant permission for access to that airspace.*
- *Any overflight of assemblies of people is prohibited.*
- *Flight within 50 metres horizontally of assemblies of people is prohibited.*
    - *The height of the UA must not exceed the horizontal distance from any assembly of people. (i.e. the 1:1 'rule').*
- *Remote pilots operating alone must enable a technical means (e.g. containment system such as geo awareness) to prevent their aircraft exiting the operational volume.*
- *No dropping of Articles*
- *No carriage of dangerous goods*

Technical Limitations

- UAS mass of less than 25kg (fixed wing or rotary wing).
- UAS equipped with a mechanism that makes it land in the event of loss or disruption of C2 Link.
- Suitable lighting to assist with visual conspicuity, maintain situational awareness, and orientation of the UA.

Additional Requirements

- *UAS Operators must produce an Operations Manual which details organisational information, how flights are performed and associated safety procedures' (i.e. how maintenance activities are performed). CAP 722A contains further details (only the preliminary information/Ops*

manual Volume 1 element of the operations manual, including technical details as set out in Chapter 3 is required for this PDRA).

- *Complete and submit the table in Section 3.1 with the application.*
- *All remote pilots involved in the operation must be in possession of a valid General VLOS Certificate (GVC).*
    - *Unless renewing an existing PDRA01 Operational authorisation, in which case an NQE Recommendation will be accepted until 01st January 2024.*
- *All remote pilots involved in the operation must have had a minimum of 2 hours logged flying time in the previous 3 months on unmanned aircraft of a similar type.*
- *Insurance cover to meet insurance regulatory requirements (EU 785/2004).*
- *Report occurrences in accordance with (EU 376/2014).*
- *Report accidents in accordance with (EU 996/2010) to the UK AAIB.*

11.7 Certified Category

[Relevant section of CAP722: Section 2.2.3]

NOT RELEVANT TO BOURNEMOUTH UNIVERSITY UAS OPERATIONS.

11.8 Other restrictions

The following paragraph is taken from the CAA guidance for drone operators):

"Drone operators need to consider any other restrictions and legitimate interests of statutory bodies such as Local Authorities, many of which have established local byelaws. These byelaws often restrict the take-off/landing of drones from council land. Such a restriction, on its own, is not an airspace restriction, and therefore is not always reflected in drone specific alerts and advice.

It is important to distinguish between the permission required to operate from council land and the permission required to operate in certain portions of airspace. Should a drone operator be given permission by a council to operate on their land this does not necessarily mean that they have overall permission to fly. A permission from a Local Authority in accordance with a Byelaw may be just one of many permissions needed, such as a permission to fly within an Airfield restricted zone, or an authorisation from the CAA to fly within the Specific category.

We cannot provide advice on what is, or is not, a legitimate interest or whether restrictions or fees are being lawfully imposed by other authorities. However, any authority or regulatory body should be able to identify the specific laws, regulations or bye-laws that empower it to regulate the use of drones, or more usually, the land from which they are operated."

In accordance with the above, Bournemouth University remote pilots must ensure that all relevant stakeholders have been contacted with regard to any proposed UAS flight operations and, where

necessary, appropriate permissions (e.g. landowner) have been obtained. This should be recorded within the Job File (see Part B Section 1 below).

OPERATIONAL CONTROL

12. SUPERVISION OF UAS OPERATIONS

When in-flight, the Bournemouth University remote pilot on the day is wholly responsible for supervising the operation of the Bournemouth University UAS. In addition; the Bournemouth University Chief Pilot and/or Accountable Manager may monitor flight operations ad-hoc to ensure all remote pilots adhere to the procedures outlined within this Operations Manual.

13. ACCIDENT PREVENTION AND FLIGHT SAFETY PROGRAMME

It is the goal of Bournemouth University to operate its aircraft without harm, injury or damage to any persons or property. The Bournemouth University remote pilot will comply with all of the safety requirements and limitations of the Operational Authorisation PDRA01, as issued by the CAA. All members of Bournemouth University involved in UAS operations will comply with the policies and procedures as set out within this document.

13.1 Safety policy

Bournemouth University adopts best industry practice to ensure that all of its flight operations using UAS are carried out as safely as possible. Health and Safety is at the heart of all Bournemouth University operations and is reflected in a comprehensive Health and Safety Policy to which all employees must adhere. A summary Health and Safety Policy Statement is provided in Appendix 3.

Bournemouth University is committed to maintaining the highest standards of flight safety. It aims to minimise harm to any persons or property by undertaking thorough Risk Assessment, site surveys, crew briefings and ensuring aircraft are in operational condition through regular inspection and maintenance regimes. By these processes Bournemouth University assures safety at all times whilst carrying out its flight operations.

13.2 Organisational safety training

All Bournemouth University personnel involved in UAS operations will receive in-house organisational training, relevant to their role in the flight team (Remote pilot or support personnel (Observer)), and must follow the specific procedures set out in this Operations Manual. Training will include a technical overview of the aircraft(s) to be used, limitations to be considered for its operation, organisational procedures and emergency procedures.

Any incidents during UAS operations will be recorded (see Section 13.3 below), analysed, and any findings will be fed back to the relevant personnel in the form of in-house training, as a basis for continual professional development.

13.3 Incident investigation and Mandatory Occurrence reporting

Any Incidents or Occurrences will be dealt with by Bournemouth University as detailed in Sections 13.3.1 to 13.3.4 below.

13.3.1 Incident handling

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

MINOR INCIDENTS

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

MAJOR INCIDENTS

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

13.3.2 Incident logging

All Minor incidents should be logged in the Flight Logbook (Appendix 4, Sheet 9). Upon noting a Minor incident the logbook should be checked for similar occurrences. If a Minor incident occurs three times then an investigation should be initiated to identify the cause and consider implementing steps to reduce the likelihood of this incident occurring again.

All Major incidents require an investigation as outlined in the investigation procedure (see Section 13.3.3 below) and the Incident Logbook (Appendix 4, Sheet 12) should be completed.

13.3.3 Investigation procedure

In order to preserve evidence and gather crucial details from persons present, it is important that the investigation procedure begins as soon as possible. NOTE: Medical issues or actions to move away from a dangerous situation should be completed first.

At the start of the investigation, any equipment used should be quarantined i.e. not used again until the investigation is complete. Any investigations undertaken by Bournemouth University will result in a report structured as shown below.

INTRODUCTION

The introduction contains the context of the UAS operations, and outlines the major facts pertaining to the incident.

DESCRIPTION OF EVENTS

This is a factual account of all events relevant to the incident, including the lead up and aftermath. Its aim is to provide an agreed basis upon which the analysis is carried out. Facts should include:

- Timing of events.
- Personnel roles at the time of the incident.
- Mission / Operations.
- Location (both of flight crew and incident).

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

ANALYSIS

The analysis of events sets out to find explanations for what is described in the description of events. The analysis should set the scene for any conclusions and provide traceability from the facts to the conclusions in a logical and auditable way.

CONCLUSIONS

The conclusions are derived from the analysis, which themselves are based upon the facts in the description of events. A strong conclusion is one where traceability is good and the incident investigation procedure can stand up to scrutiny.

RECOMMENDATIONS

The aim of the recommendations is to provide the organisations and/or personnel involved with the required information to ensure that the incident is not repeated and future flight operations can proceed safely.

13.3.4 Mandatory Occurrence reporting

Mandatory Occurrence Reporting will be completed, where necessary, as stipulated by the Air Navigation Order. This states that *"Any incident which endangers or which, if not corrected, would endanger an aircraft, its occupants or any other person"* is a reportable occurrence.

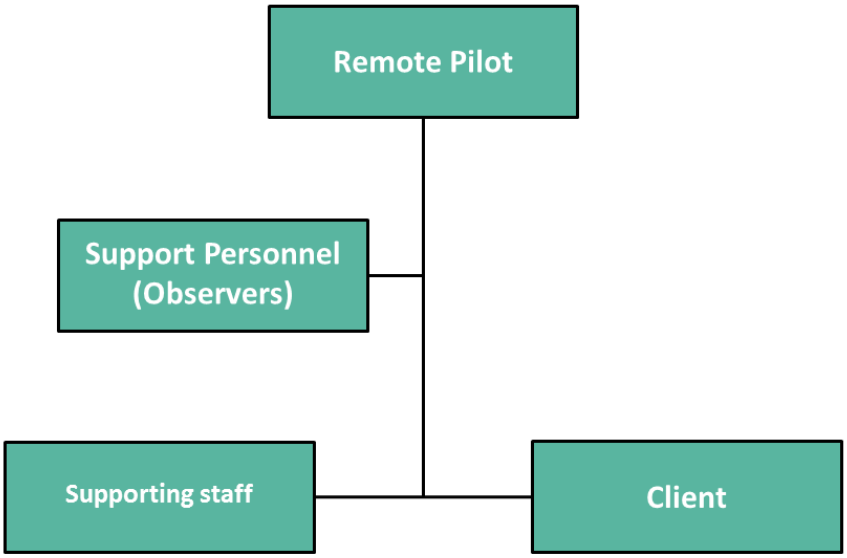
The Mandatory Occurrence Reporting Scheme will be the compliance document, and reporting will be carried out utilising the Aviation Reporting Portal (ECCAIRS).

14. FLIGHT TEAM COMPOSITION

Bournemouth University UAS operation flight teams comprise a minimum of two personnel. The remote pilot has overall responsibility for all flight operations, supported by one or more support

personnel (Observers), who support the remote pilot in ensuring operational safety. See Sections 7 and 8 for full details of the responsibilities involved with both roles.

Depending on the type of operation, other supporting staff and/or the client may also be present on-site during flight operations (see organogram below).



15. OPERATION OF MULTIPLE TYPES OF UAS

All personnel operating as remote pilot for Bournemouth University commercial UAS operations are suitably qualified to operate any of the UAS detailed in Section 9.

16. QUALIFICATION REQUIREMENTS AND CURRENCY

All personnel operating as remote pilot for Bournemouth University UAS operations under the Operational Authorisation PDRA01 must be at least eighteen years of age and have undertaken or hold the following:

- General Visual Line of Sight Certificate (GVC)

  NOTE: During a transitional period until 31st December 2023, remote pilots may operate under the BU Operational Authorisation PDRA01 if they hold an existing National Qualified Entity (NQE) Remote Pilot Authorisation certification. From 1st January 2024 onwards, all remote pilots must hold a GVC.
- Manufacturers Operational Training Course, where required.
- Bournemouth University in-house Operational Training Course, where required.

Bournemouth University remote pilots operating under the Operational Authorisation PDRA01 are required to maintain operational currency standards by ensuring that they operate an aircraft for at least two hours flight time every three calendar months. This may be completed with training flights or, in extreme circumstances (such as periods of adverse weather conditions), a flight simulator may be permitted.

17. CREW HEALTH

It is the responsibility of the individual to determine if they are in a physically and mentally fit condition to undertake Bournemouth University UAS operations. Remote pilots or support personnel (Observers) shall not operate if they are under the influence of alcohol. Bournemouth University has a strict no drugs policy. All Bournemouth University personnel undertaking UAS operations who are taking prescription drugs should seek professional guidance. Any Bournemouth University personnel undertaking UAS operations should immediately advise the remote pilot, or support personnel (Observer) if an aircraft is in flight, if they feel unable to continue with their assigned responsibilities.

Eyesight: All remote pilots and support personnel (Observers) must be capable of clearly reading a vehicle registration number plate from twenty metres distance using the same optical correction system (if worn) that will be used during the flight.

All Bournemouth University remote pilots are limited to a maximum of 120 minutes of flight time in any twenty-four hour period.

18. GENERAL DATA PROTECTION REGULATION

In accordance with Data Protection legislation (Data Protection Act 2018) and General Data Protection Regulation (GDPR), consent should be obtained from any individual who is the focus of a video recording in order to process his/her personal data fairly. Where a recording involves individuals other that the main players, then, in some circumstances, the images of other individuals may constitute personal data and GDPR may come into play, particularly where the video conveys information of biographical significance to the individual concerned. However, where filming takes place in a public place, the fact that a passer-by is captured in the film in the background and is able to be identified by individuals who know him/her does not in itself make the image personal data and consent is unlikely to be required to put the video on YouTube or incorporate it in an Open Educational Resource (OER).

If you have any questions or concerns about this policy or about data protection generally, please use the email address dpo@bournemouth.ac.uk. Your query will be picked up by either the Data Protection Officer or BU's Information Office (Legal Services, working with the Data Protection Officer), as appropriate.

For any other information on this please see the following websites for all information on the Data Protection Act (GDPR):

www.legislation.gov.uk/ukpga/2018/12/contents

www.gov.uk/government/publications/guide-to-the-general-data-protection-regulation

19. LOGS AND RECORDS

Bournemouth University will maintain up-to-date information and operational logbooks as detailed below (examples are provided in Appendix 4, Sheets 9 to 12):

- Flight Logbook – all pertinent flight details, including:
  - Remote pilot and Flight Team
  - Aircraft details
  - Battery levels
  - Flight purpose and details
  - Minor incidents
- Maintenance Logbook
- Incident Logbook
- Battery charge Logbook

PART B – OPERATING PROCEDURES

1. FLIGHT PLANNING / PREPARATION

Appendix 4 of this Operations Manual contains an Excel spreadsheet comprising a series of numbered Forms and Checklists as per the list below:

1. Pre-Survey Form
2. Risk Assessment Form
3. Embarkation Checklist
4. Arrival Checklist
5. On-site Survey
6. Pre-Flight Checklist
7. Field Record Sheet
8. Post-Flight Checklist

These are designed to be printed on A4 paper and combined in numerical order into a 'Job File' to be taken on-site during flight operations. These Forms and Checklists take the remote pilot through all the procedures necessary for safe UAS operation; from the initial Pre-Survey, through the Embarkation, Arrival, Pre- and Post-Flight Checklists.

In addition, Appendix 4 also contains the four sheets below, which are designed to be completed electronically, as required:

9. Flight Log
10. Battery Charge Log
11. Maintenance Log
12. Incident Log

The various Forms, Checklists and Logs are referred to throughout this Operations Manual.

1.1 Determination of intended task and feasibility

Initial customer enquiries should be captured using the standard procedures for the Bournemouth University department concerned. Enquiries may take the form of telephone, email or in-person correspondence; however, in each case, the following details should be recorded as a minimum:

- Contact details
- Work required

- Date and time constraints
- Location of work (National Grid Reference, if possible)
- Landowner details
- Other nearby air users (if known)
- Price expectations
- Any other relevant information

An official quotation for the required services should be produced, based upon the information provided above. Upon acceptance of the quotation by the client, a 'Job File' should be created to include the job specification and quotation, along with the relevant Forms and Checklists contained in sheets 1 to 8 of Appendix 4.

This 'Job File' will be taken on-site whilst flight operations are undertaken and will be retained for at least three years for future reference.

1.2 Operating site location and assessment

On determination of the task required from the client, the Pre-Survey Form (Appendix 4, Sheet 1) should be completed with all pertinent site details (e.g. airspace classification, access permissions, obstructions, hazards, etc). Experienced Bournemouth University personnel can complete the form using the following information sources:

First hand resources

- Client Information
- Current relevant aeronautical charts

Online resources

- CAA Drones – Civil Aviation Authority drone website.
- Noflydrones – No fly zones for drones in the UK.
- NotamInfo – Airspace charts and NOTAM info plotted on maps.
- NATS – Aeronautical Information Services – UAS Restriction Zones
- SkyWise – Online latest safety alerts.
- SkyVector – Online aeronautical charts
- Sky Demon – VFR flight planning and navigation software (Subscription service)
- AeroNOTAM – Online and/or mobile app for NOTAM updates

- AeroWeather – Current (METAR) and forecast (TAF) weather. Online and mobile app
- Google Earth – Online maps for site assessment
- Google Maps – Online maps for site assessment

1.3 Risk management

The Risk Assessment process is at the forefront of all Bournemouth University field survey activities; this includes an individual 'Task Risk Assessment' for the activity to be undertaken, along with a 'Dynamic (Site Specific) Risk Assessment' to identify any further risks on-site that were not foreseen at the planning stage (e.g. livestock in fields, temporary hazards, pollution, hostile environment).

All UAS operations will comprise a specific UAS Risk Assessment as part of the survey planning process. A copy of the UAS Risk Assessment form can be found in Appendix 4, Sheet 2. Bournemouth University staff will use this form to record any potential hazards which may affect normal flight operations or pose a risk to people or property. An Initial Risk level is assigned, according to the Severity and Likelihood of the event to occur. Potential mitigating factors should be recorded with a view to reducing the Severity and/or the Likelihood of occurrence. The resulting Controlled Risk is then calculated. The following Risk Matrix outlines the Controlled Risk Levels under which flight operations may proceed.

Risk Level = Severity (S) x Likelihood (L) Controlled Risk Level: 1 – 6 = Low Risk (acceptable); 8 – 12 = Moderate Risk (acceptable, but seek further mitigation); 15 – 25 = High Risk (STOP)			Likelihood (L)				
			1	2	3	4	5
			Very Unlikely	Unlikely	Possible	Likely	Almost Certain
Severity (S)	1	INSIGNIFICANT	1	2	3	4	5
	2	MINOR INJURY, STOPPAGE OR DAMAGE	2	4	6	8	10
	3	MODERATE (REPORTABLE) INJURY OR DAMAGE	3	6	9	12	15
	4	MAJOR (REPORTABLE) INJURY OR DAMAGE	4	8	12	16	20
	5	CATASTROPHIC INJURY (FATALITY) OR DAMAGE	5	10	15	20	25

A Controlled Risk Level of 1 – 6 (Low Risk) is acceptable and flight operations may proceed. A Controlled Risk Level of 8 – 12 (Moderate Risk) is acceptable; however, further mitigation measures should be sought to reduce the risk, if possible. If further mitigation measures are not sufficient to reduce the Controlled Risk to 'Low', agreement from the Accountable Manager should be sought before any flight operations take place. A Controlled Risk Level of 15 – 25 is unacceptable and flight operations should not proceed.

1.4 Communications

Contact telephone numbers for the following must be recorded on the On-Site Survey Form (Appendix 4, Sheet 5) before embarkation to the site. This task is best carried out at the planning stage whilst the Pre-Survey Form is being completed. All Bournemouth University crew members must carry a fully

charged mobile phone and ensure they have all of the relevant contact numbers in case of emergencies.

- Remote pilot contact number
- Support personnel (Observer) contact number(s)
- Client contact number
- Local Police Station contact number
- Ambulance contact number
- Local Air Traffic Control contact numbers

1.5 Pre-notification

Pre-Notification is required if a planned flight operation is to take place within two and a half nautical miles of an aerodrome or within an Aerodrome Traffic Zone. The remote pilot should contact the Local Control Tower in person at least twenty- four hours before the planned flight to advise the controller of the planned flight operation. Contact details for the tower should be recorded on the relevant On-Site Survey Form (Appendix 4, Sheet 5) as part of the Job File.

If the planned flight operation is to take place in an area where there is likely to be members of the public, it is recommended that the local police are informed. The contact number should be recorded on the On-Site Survey Form (Appendix 4, Sheet 5).

If the flight operation is to take place in congested areas, such as housing estates, a leaflet drop must be considered at least seven days in advance to advise members of the public of proposed flight operations. Operations in public areas where public address systems are available require a Bournemouth University employee to announce planned flight operations at least one hour before commencement.

1.6 Site permissions

Bournemouth University will obtain permission from all landowners from whose land flight operations are to be conducted. The permission will either be in the form of a printed email attached to the Pre-Survey Form (Appendix 4, Sheet 1) or as a written signature obtained from the client captured on the On-Site Survey Form (Appendix 4, Sheet 5). No flight operations will commence without permission from the relevant landowners.

1.7 Weather forecasts

In the week leading up to any flight operation the Bournemouth University remote pilot will obtain long-range weather forecasts. Twenty-four hours before the proposed flight operations, a further

weather forecast will be obtained. The information from this weather forecast will either be printed and stapled to, or written in the Pre-Survey Form (Appendix 4, Sheet 1).

The remote pilot will then review the weather forecast and, based on the aircraft limitations (e.g. do not fly in winds exceeding 10 m/s or 22 mph), make a decision about the validity of the planned flight operations. Weather forecasts will be obtained using the following resources:

- Met Office
- BBC Weather
- MetCheck
- AeroWeather app

1.8 Preparation and serviceability of equipment and UAS

Bournemouth University will ensure that all aircraft are kept in a serviceable condition through routine maintenance and by using the following checklists, which can be found in Appendix 4:

- Embarkation Checklist (Sheet 3)
- Arrival Checklist (Sheet 4)
- Pre-Flight Checklist (Sheet 6)
- Post-Flight Checklist (Sheet 8)

The Bournemouth University remote pilot on the day is responsible for ensuring that all checklists are completed correctly. The Bournemouth University remote pilot must check the Maintenance Logbook (Appendix 4, Sheet 11) for any issues and ensure that all required flight batteries are fully charged and ready to use before arriving at the operations site location.

1.8.1 Maintenance principles and regime

Only suitably qualified Bournemouth University staff or appointed service engineers can carry out maintenance to Bournemouth University aircraft. In all cases the Maintenance Logbook (Appendix 4, Sheet 11) must be filled in to reflect any work completed and a flight test which tests all functions must be carried out by a qualified Bournemouth University pilot.

ROUTINE MAINTENANCE

The Pre-Flight and Post-Flight checklists (Appendix 4, Sheets 6 and 8) must be carried out by a Bournemouth University pilot every time a Bournemouth University aircraft is operated.

Either every six months or every fifty hours of flight time, whichever comes first, the following inspection should be carried out by a Bournemouth University qualified pilot:

- Inspect the airframe for any damage, unusual marks and security of attachments.

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

The inspection should be recorded in the Maintenance Logbook (Appendix 4, Sheet 11). If minor problems (damaged propeller, faulty battery pack, etc.) are identified and remedied and the remote pilot believes the aircraft is suitable to return to operational status then the work completed should be noted in the Maintenance Logbook (Appendix 4, Sheet 11).

Where any major issues are identified (e.g. unserviceable motor, damaged airframe, etc.) then the aircraft must undergo a full flight test regime, as shown below, once the identified fault has been remedied.

FULL FLIGHT TEST

The system must have all functions thoroughly tested with a minimum of fifteen minutes flight time by a qualified Bournemouth University pilot. Any abnormalities are to be recorded in the Flight Logbook (Appendix 4, Sheet 9). If the remote pilot deems the aircraft safe to fly, then this should be recorded in the Maintenance Logbook (Appendix 4, Sheet 11) as fit for operational use.

1.8.2 Software and Firmware update policy

Software and firmware updates will be applied as per the manufacturer's instructions, with a view to ensuring that all aircraft and ground stations have the most recent and fully operational software and firmware available. Automatic prompts are provided when new software or firmware updates are available for the following items:

- Aircraft
- Intelligent Flight Battery
- Remote Controller
- DJI GO mobile / tablet app
- DroneDeploy mobile / tablet app
- Operating system update for mobile / tablet

In all circumstances, the upgrade should only be performed by qualified Bournemouth University personnel or appointed service providers. All upgrade information, such as version numbers and new functions must be recorded in the Maintenance Logbook (Appendix 4, Sheet 11).

Any upgraded system must have all functions thoroughly tested with a minimum of fifteen minutes flight time by a qualified Bournemouth University pilot, recording any abnormalities in the Flight Logbook (Appendix 4, Sheet 9). If the remote pilot deems the aircraft safe to fly, then this should be recorded in the Maintenance Logbook (Appendix 4, Sheet 11) as fit for operational use.

If any doubts exist as to the new upgrade, the aircraft should be downgraded to the previous firmware and the flight test procedure repeated. Systems with identified issues to firmware or software should be grounded until the problem can be rectified.

2. ON-SITE PROCEDURES AND PRE-FLIGHT CHECKS

2.1 On-site Survey

Upon arrival at the operating site location, the Bournemouth University remote pilot and Observer will carry out an On-Site Survey to familiarise themselves with the local geography of the site. This is completed by physically walking around the site to assess any hazards marked on the Pre-Survey Form. In addition, salient features should also be recorded for future reference and/or reporting purposes. All findings should be recorded using the On-Site Survey Form (Appendix 4, Sheet 5).

If the remote pilot feels confident that the proposed flight operations can be safely carried out, then the operation can progress to the next stage.

2.2 Selection of operating areas and alternate

The Bournemouth University remote pilot should select a take-off and/or landing area based on the following criteria:

- Full visual coverage of the operating site.
- Position in relation to the sun to avoid visual impairment.
- Physical obstacles such as overhanging trees, rocks, buildings, power lines, etc.
- Terrain topography; avoid steep slopes or uneven ground.
- Consider effects such as wind shear from nearby trees, buildings, etc.
- During the take-off and landing phases, the aircraft is not to be flown within 30 metres of any buildings or persons not under the control of the remote pilot.

An alternative or emergency landing zone should also be discussed with the support personnel (Observer) and selected. This area should be kept clear and available for a landing if the first location becomes inaccessible.

2.3 Flight team briefing

The Bournemouth University remote pilot will deliver the flight team briefing on-site. This briefing must be carried out before any flight operations take place. If possible, a pre-operation flight team briefing should also be given on the day before a flight operation is to take place so that all flight team members can be prepared on the day.

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

- Check that all relevant and required crew members are present.
- Issue identification badges and hi-vis vests, if required.
- Advise flight team of take-off, landing, emergency and other operating areas.
- Confirm flight plan with the flight team.
- Advise the flight team on timescales (expected flight times, durations and quantities).
- Ensure all flight team members are aware of their individual responsibilities.
- Ensure flight team are familiar with the emergency procedures and have emergency contact numbers.
- Ensure support personnel (Observer) is familiar with the failsafe functions.
- Check that the flight team are happy to proceed and in good health.
- Issue two-way radios, if required, and state channel to use (see Section 2.5.1).
- Check mobile phones have adequate signal for emergency use and batteries are charged.

2.4 Cordon procedure

The Pre-Survey (Appendix 4, Sheet 1) should have identified if a cordon is required; however, the Bournemouth University remote pilot will confirm if a cordon is required during the On-site Survey (Appendix 4, Sheet 5).

If large numbers of the public are expected, then a cordon should ideally be established fifty metres around the planned flight path and take-off / landing area. This cordon should be set out using cones and safety tape. Signs should be placed advising members of the public that UAS flight operations are in progress.

Extra personnel or 'Spotters' may be required to be positioned at gates or on public footpaths to advise members of the public about the dangers of entering the area. Gates may be closed and access may be restricted; however Spotters may not detain any members of the public or prevent them from accessing public rights of way. The Spotters are there to advise on the dangers of entering restricted areas and to advise the Observer about public encroachments.

2.5 Communications

Once the remote pilot has decided that it is safe to proceed with flight operations, any necessary communications with other stakeholders should be conducted; in particular, local Air Traffic Control should be notified that flight operations are due to commence, if required. It is recognised that small airfields may not have air traffic control. In this case efforts should be taken to obtain the contact details of a suitable individual or operator within the site.

2.5.1 Flight Crew communications

Consideration must be given to the operating location in relation to crew communication. Where crew members are likely to be separated beyond normal vocal communication range and/or if the operating location is likely to be busy or noisy, then two-way radios should be issued.

2.6 Weather checks

The Bournemouth University remote pilot for the operation must assess the local weather conditions. Wind speed in knots/mph and outside air temperature in degrees Celsius will be obtained by using a hand held anemometer. The wind direction can be obtained using the compass feature of a suitable mobile app. The on-site weather information should be recorded on the On-site Survey Form (Appendix 4, Sheet 5).

2.7 Charging and fitting of batteries

The Bournemouth University remote pilot is responsible for charging and fitting flight batteries to the aircraft. All batteries are identified by a unique identification number applied to the battery pack and should be charged and checked as part of the Embarkation Checklist (Appendix 4, Sheet 3).

All battery charging information will be recorded in the Battery Charge Logbook (Appendix 4, Sheet 10). Pre- and post-flight battery charge will be recorded in the Flight Logbook (Appendix 4, Sheet 9).

The DJI series Intelligent Flight Batteries should be charged and stored as per the instructions outlined in the Intelligent Flight Battery Safety Guidelines (see Section 3).

Under no circumstances will damaged batteries be re-charged.

2.8 Loading of equipment

The Bournemouth University remote pilot is responsible for ensuring that the payload is ready to use. Drones should only be operated with correctly fitted payloads. The condition and security of the gimbal and camera should be checked as part of the Pre-Flight Checklist (Appendix 4, Sheet 6).

2.9 Preparation and correct assembly of UAS

The UAS should be prepared and assembled as per the manufacturer's instructions. To facilitate this process, the Bournemouth University remote pilot must complete the following checklists (Appendix 4) before and on arrival to site:

- Embarkation Checklist (Sheet 3) – This must be completed before / as the equipment is loaded and brought to site.
- Arrival Checklist (Sheet 4) – This must be completed as soon as the remote pilot reaches the intended flight operation location.

2.10 Pre-flight and post-flight checklists

A pre-flight checks routine should be followed before each UAS flight, adhering to all guidance contained within the UAS technical manuals. To facilitate this process, the Bournemouth University remote pilot must complete the following checklist:

- Pre-Flight Checklist (Appendix 4, Sheet 6) – This must be completed immediately prior to any flight operation.

At the end of each flight, the following checklist should be used to ensure safe and efficient shut down and termination of operations:

- Post-Flight Checklist (Appendix 4, Sheet 8) – This must be completed immediately after each flight operation.

3. FLIGHT PROCEDURES

The following procedures are basic guidelines for Bournemouth University flight crew. As far as practically possible these procedures must be complied with. The Bournemouth University remote pilot on the day is responsible for supervising the operation whilst the aircraft is in flight.

3.1 Start-up procedure

The start-up procedure is outlined in the Pre-Flight Checklist (Appendix 4, Sheet 6).

3.2 Take-off procedure

The take-off procedure is outlined in the Pre-Flight Checklist (Appendix 4, Sheet 6).

3.3 In-flight procedure

The following in-flight procedure is to be followed by the remote pilot and Observer:

- Remote pilot to keep aircraft within Visual Line of Sight (VLOS) – 500 metre horizontal distance and 400 feet (120 m) high.
- Remote pilot to maintain primary focus on the aircraft and immediate surroundings.
- Remote pilot to monitor telemetry, imagery, flight battery level, satellite status, etc. from aircraft when safe and appropriate.
- Remote pilot to maintain communications with the support personnel (Observer) at all times.
- Support personnel (Observer) to maintain visual lookout for public encroachments and airspace incursions.

3.4 Landing procedure

The following landing procedure is to be followed by the remote pilot and Observer:

- Remote pilot to advise Observer of intention to land.
- Observer to visually check landing area to ensure it is safe to land.
- Remote pilot to fly to landing site and hover at approximately 2 m, facing into wind.
- Remote pilot to ensure camera is orientated upwards for landing.
- Remote pilot to take a final look below the aircraft and call “Landing”.
- Remote pilot to reduce power and land the aircraft (Be aware of ground effect).

3.5 Shutdown procedure

The shutdown procedure is outlined in the Post-Flight Checklist (Appendix 4, Sheet 8).

4. EMERGENCY PROCEDURES

4.1 Emergency procedures for Bournemouth University UAS

Below is a list of emergency procedures for various scenarios that could potentially occur while using the UAS operated by Bournemouth University; these procedures should be adhered to by the Bournemouth University remote pilot, Observer(s) and Spotter(s).

Depending on site conditions, two-way radios may be necessary to ensure that all crew members can maintain contact during flight operations. Any emergency situation should be recorded in the Incident Logbook (Appendix 4, Sheet 12); refer to PART A Section 13.3 for incident handling procedures.

FAILSAFE PROCEDURE*:* If the Home Point was successfully recorded and the compass is functioning normally, the Return-To-Home (RTH) function can be used to automatically bring the aircraft back to its Home Point. There are three different RTH procedures, outlined below (please refer to the User Manuals for full operating instructions – see Section 0):

- Smart RTH – At any stage during flight operations, the Smart RTH procedure can be initiated by pressing and holding the RTH button on the remote controller for two seconds. The aircraft will automatically ascend to a pre-determined RTH altitude, before flying in a straight line back to its Home Point. The remote controller can be used to control the aircraft's position during Smart RTH. The Smart RTH procedure can be cancelled at any time by pressing the RTH button on the remote controller.
- Low Battery RTH – The DJI GO app will display a notice when a low battery warning is triggered. If no action is taken after a 10 second countdown, the aircraft will automatically ascend to a pre-determined RTH altitude, before flying in a straight line back to its Home Point. The user can cancel the RTH procedure by pressing the RTH button on the remote controller. Thresholds for these warnings are determined automatically by the aircraft's current altitude and distance from the Home Point.
- Failsafe RTH – If the remote controller signal is lost for more than three seconds, the Failsafe RTH procedure will automatically be activated. The Return-To-Home process may be interrupted by pressing the RTH button on the remote controller and the operator may regain control of the aircraft if the remote controller signal is re-established.

NOTE: The aircraft cannot avoid obstructions during the Failsafe RTH procedure; therefore, it is important to always ensure that a suitable Return-To-Home altitude is set in advance of each flight operation. Launch the DJI GO app and select 'Mode' > 'Advanced Settings' > 'Failsafe Mode' to set the Failsafe RTH altitude.

Emergency scenario	Action required	Responsibility
Transmitter failure Frequency interference	Call "**Failsafe**" so that the crew understand the situation and observe the aircrafts flight path. Upon transmitter failure or frequency interference the aircraft will enter the failsafe 'Return to Home' mode.	Remote pilot
	Upon hearing the call "**Failsafe**", ensure that the take-off site is clear of all persons / obstructions, as the aircraft will be returning to its initial 'power up' coordinates.	Observer / Spotters
Loss of propulsion Motor or propeller failure Aircraft battery failure	Call "**Dead Stick**" and assess if the aircraft is controllable. If sufficient control is maintained, head directly to either the landing site or alternate landing site; whichever is closest. If control is compromised try to execute a controlled descent.	Remote pilot
	Upon hearing the call "**Dead Stick**", identify the closest safe landing position to the aircraft and advise the remote pilot.	Observer
	Upon hearing the call "**Dead Stick**", immediately clear any persons directly underneath or in the path of the aircraft to either the landing site or alternate landing site; whichever is closest. Maintain visual contact with the aircraft once the area is clear.	Observer / Spotters
Ground control station failure	Call "**Landing**" and carry out the standard landing procedure. The aircraft is not in immediate danger but the ground station monitors crucial systems and therefore it is not advisable to fly without telemetry information.	Remote pilot
Loss of GPS / GLONASS signal	Call "**Dead Stick**" and toggle the 'Flight Mode' switch to manual or 'Attitude' control. Head directly to either the landing site or alternate landing site; whichever is closest. If control is compromised try to execute a controlled descent.	Remote pilot
	Upon hearing the call "**Dead Stick**", identify the closest safe landing position to the aircraft and advise the remote pilot.	Observer
	Upon hearing the call "**Dead Stick**", immediately clear any persons directly underneath or in the path of the aircraft to either the landing site or alternate landing site; whichever is closest. Maintain visual contact with the aircraft once the area is clear.	Observer / Spotters

Emergency scenario	Action required	Responsibility
Flyaway	Call "**Fly Away**" so that the crew understand the situation. Activate the Return-to-Home failsafe function in case communication is re-established and maintain direct visual contact with the aircraft for as long as possible. If visual contact is lost make a note of estimated altitude, speed, remaining battery endurance and heading estimated from the compass rose on the calibration platform. Once the Observer confirms actual information, contact the local Air Traffic Control and local police using the contact numbers found on the On-site Survey Form (Appendix 4) to advise them of the situation. If the aircraft is seen to make contact with the ground or a structure, execute the shutdown procedure and walk over to the crash site taking a fire extinguisher and camera. Take photographs at the crash site, contact details and statements from anyone present and recover the aircraft. Leave contact details if any property is damaged as a result.	Remote pilot
	Upon hearing "**Fly Away**", immediately make a note of the aircraft's heading, speed and altitude. Advise the remote pilot of all necessary information so that the local Air Traffic Control can be advised by the remote pilot.	Observer
	Upon hearing "**Fly Away**", maintain direct visual contact with the aircraft for as long as possible and advise the remote pilot of an estimated heading.	Spotter
Public encroachment	Call "**Public**" and approach the member of the public asking them to follow you to safety, as they are currently in a dangerous situation.	Spotter
	Upon identifying an encroachment from a member of the public, or hearing the call "**Public**", advise the remote pilot by using the relevant phrase ("**Public Below**", "**Public Left**" or "**Public Right**"). Identify the nearest available landing site away from the encroachment and advise the remote pilot. Once the remote pilot confirms they understand; if there is no Observer present dealing with the situation, approach the member of the public asking them to follow you to safety as they are currently in a dangerous situation.	Observer
	Upon being advised by the Observer of a public encroachment, immediately hold position and wait for further instruction. The Observer will advise which the safest area to land is and confirmation should be given that the instruction has been understood. Immediately proceed to the advised landing site.	Remote pilot
Aircraft incursion	Upon identifying an imminent aircraft incursion within the 400ft, 500 metre bubble, call the relevant phrase ("**Aircraft Ahead**", "**Aircraft Behind**", "**Aircraft Left**" or "**Aircraft Right**") and maintain visual contact with the approaching aircraft.	Spotter

Emergency scenario	Action required	Responsibility
	Upon identifying an imminent aircraft incursion within the 400ft, 500 metre bubble or hearing the call "**Aircraft…**", identify the location of the approaching aircraft. Advise the remote pilot to take avoiding action by using the phrase "**Aircraft, Descend**". Once the aircraft has passed by then advise the remote pilot by using the phrase "**Aircraft Clear**".	Observer
	Upon being advised by the Observer of an aircraft incursion, immediately hold position and look beneath the aircraft to identify hazards. Descend the aircraft to around 10 ft above the ground or any structure. Once the Observer advises the incursion no longer exists, the planned operation may resume.	Remote pilot
Pilot incapacitation	Upon feeling as though incapacitation is imminent, try to activate the failsafe Return-To-Home function and call "**Failsafe**".	Remote pilot
	Upon noticing the remote pilot has become incapacitated, activate the failsafe Return-To-Home function and call "**Failsafe**". Ensure that the remote pilot is not in any imminent danger from a returning aircraft and then ensure that the take-off site is clear of all persons, as the aircraft will be returning to its initial home location. Call for the emergency services if required. Once the aircraft lands and shuts down, disconnect the flight battery.	Observer

4.2 Fire

The table below outlines the procedures to be followed upon discovery of a fire in either the ground equipment or the aircraft in flight.

Emergency scenario	Action required	Responsibility
Fire (Ground equipment)	Upon noticing fire, call "**Fire**". If the fire is a Lithium Polymer battery fire do not try to extinguish; allow the battery to burn out and then extinguish any additional fires. If the fire cannot easily be extinguished and increases in size, call the emergency services.	All crew
Fire (Aircraft in flight)	Upon noticing an aircraft fire call "**Aircraft Fire**" and wait for instruction from the Observer. Upon hearing "**Aircraft Fire**", proceed directly as instructed by the Observer to the safest available landing point. Upon landing, shut down the motors.	Remote pilot
	Upon identifying an aircraft fire call "**Aircraft Fire**". Upon hearing "**Aircraft Fire**", immediately identify the nearest safe landing point and advise the remote pilot. Approach the aircraft with a fire extinguisher and continue as per the Fire (Ground equipment) procedure	Observer

Emergency scenario	Action required	Responsibility
	Upon identifying an aircraft fire call "**Aircraft Fire**". Upon hearing "**Aircraft Fire**", wait for the aircraft to land and then treat the emergency as per the Fire (Ground equipment) procedure.	Spotter / All crew

4.3 Accidents

All accidents or incidents should be dealt with according to the incident handling procedures outlined in PART A Section 13.3.

PART C – TRAINING

1. DETAILS OF OPERATOR TRAINING PROGRAMME

All Bournemouth University remote pilots will hold the relevant current qualification, as stated in the qualification requirements section for operating under BU's Operational Authorisation PDRA01 (Section 16) or Appendix 6 for Open Category operations. Crew performance will be monitored, assessed and refresher and new equipment training may be given where required.

PART D – APPENDICES

APPENDIX 1 – OPERATIONAL AUTHORISATION PDRA01

UAS Specific category

PDRA01 Operational Authorisation

UK Civil Aviation Authority

Authorisation details

Key details

Operator (you)	**Bournemouth University**
Operator ID	**GBR-OP-7696H4LRP8R7**
Authorisation number	**PDRA01-22166**
Issued on	**3 April 2025**
Expires on	**3 April 2026** unless otherwise suspended or revoked

Contact and operations manual details

You must tell us if any of these details change.

Accountable Manager	Name: **Professor Keith Thomas Phalp** Phone: **07864 246211** Email: **coo@bournemouth.ac.uk**
Operations Manual	Date: **2 April 2025** Version: **1.11**

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

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PDRA01 authorisation **PDRA01-22166** | Operator **Bournemouth University**

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.
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: – 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.

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Conditions and limits continued

Distances from people

8 Separation from uninvolved persons	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.
	8.2 Any overflight of uninvolved people must be kept to a minimum.
	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. – 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.)
	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).

Loads and equipment

9 Security of loads and equipment	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.
	9.2 Articles must not be dropped.
	9.3 Dangerous goods must not be carried.

Remote pilots and operators

10 Remote pilot requirements	10.1 Remote pilots must: – be employed or contracted by the UAS Operator, – hold a valid UK Flyer ID, – hold a valid GVC, – 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	11.1 The UAS Operator must: – 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	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. 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.
13 Insurance	13.1 Insurance cover meeting the requirements of UK Reg (EU) 785/2004 must be held.
14 Control system failure	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. 14.2 The Remote Pilot must ensure that this mechanism is in working order before any flight is commenced.
15 Radio spectrum	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.
16 High energy devices	16.1 The UAS Operator must ensure high energy devices are appropriately stored and transported.
17 Operator ID	17.1 The operator ID must be displayed on every aircraft flown under this operational authorisation.
18 Operating from moving vehicles	18.1 The Remote Pilot must not operate the UAS while operating any moving vehicle, or while in an aircraft. 18.2 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.

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

APPENDIX 2 – INSURANCE

TO WHOM IT MAY CONCERN 1st August 2024

Dear Sir/Madam

BOURNEMOUTH UNIVERSITY AND ALL ITS SUBSIDIARY COMPANIES

We confirm that the above Institution is a Member of U.M. Association Limited and that the following covers are currently in place:

EMPLOYERS' LIABILITY

Certificate No.	Y016458QBE0124A/044
Period of Indemnity	1st August 2024 to 31st July 2025
Limits of Indemnity	£10,000,000 Primary Limit any one event unlimited in the aggregate
	£40,000,000 Excess Limit
Includes	Indemnity to Principal
Covers provided by	QBE UK Limited (Primary Limit) U.M. Association Limited (Excess Limit)

PUBLIC AND PRODUCTS LIABILITY

Certificate of Entry No.	UM044/99
Period of Indemnity	1st August 2024 to 31st July 2025
Includes	Indemnity to Principal
Limit of Indemnity	£50,000,000 any one event and in the aggregate in respect of Products Liability and unlimited in the aggregate in respect of Public Liability
Cover provided by	U.M. Association Limited

If you have any queries in respect of the above details, please do not hesitate to contact us.

Yours faithfully

James Roberts
For U.M. Association Limited

5 St Helen's Place, London EC3A 6AB | T: 020 7847 8670 | www.umal.co.uk

U.M.Association Ltd (registered in England & Wales, no. 2731799) is the Appointed Representative (FCA firm reference no. 417806) of Hasilwood Management Services Ltd (registered in England & Wales, no. 9295343) which is authorised and regulated by the Financial Conduct Authority (FCA firm reference no. 665752). Hasilwood Management Services Ltd is a wholly owned subsidiary of U.M. Association Ltd. The registered address of both companies is 5 St Helen's Place, London, EC3A 6AB. Hasilwood Management Services Ltd VAT Registration Number: 212249835.

ISO 9001 REGISTERED FIRM

TO WHOM IT MAY CONCERN

1st August 2024

Dear Sir/Madam

BOURNEMOUTH UNIVERSITY AND ALL ITS SUBSIDIARY COMPANIES

We confirm that the above Institution is a Member of U.M. Association Limited and that the following covers are currently in place:

PUBLIC AND PRODUCTS LIABILITY (Unmanned Aircraft Systems)

Certificate of Entry No.	UM044/99
Period of Indemnity	1st August 2024 to 31st July 2025
Limit of Indemnity	£50,000,000 any one event and in the aggregate in respect of Products Liability and unlimited in the aggregate in respect of Public Liability
Cover provided by	U.M. Association Limited
UAS Extension	Public and Products Liability is extended to include liability arising out of or from the ownership possession or use by or on behalf of the Member of any Unmanned Aircraft System (UAS, Drone) within the UK. This includes liability incurred in respect of third parties as a result of an act of war, terrorism, hijacking, an act of sabotage, the unlawful seizure of aircraft or civil commotion, upto the relevant minimum level set out in UK Regulation (EU) No.785/2004 or the cover limits whichever is lower provided that a) the Member (and any person acting on the Member's behalf) complies with the Civil Aviation Authority (CAA) regulations for use of such UAS and b) the maximum mass of the UAS does not exceed 25kg including payload and c) the UAS is not a military vehicle, does not carry weapons of any kind and is not being used for military purposes or in any way involving military purposes and d) such use is not above 400 feet/120 metres in height from the surface without CAA permission.

Yours faithfully

James Roberts
For U.M. Association Limited

5 St Helen's Place, London EC3A 6AB | T: 020 7847 8670 | www.umal.co.uk

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ISO 9001 REGISTERED FIRM

TO WHOM IT MAY CONCERN

1st August 2024

Dear Sir/Madam

BOURNEMOUTH UNIVERSITY AND ALL ITS SUBSIDIARY COMPANIES

We confirm that the above Institution is a Member of U.M. Association Limited and that the following cover is currently in place:

PROFESSIONAL INDEMNITY

Certificate of Entry No.	UM044/99
Period of Indemnity	1st August 2024 to 31st July 2025
Limit of Indemnity	£10,000,000 any one claim and in the aggregate except for Pollution where cover is limited to £1,000,000 in the aggregate
Cover provided by	U.M. Association Limited

If you have any queries in respect of the above details, please do not hesitate to contact us.

Yours faithfully

James Roberts
For U.M. Association Limited

5 St Helen's Place, London EC3A 6AB | T: 020 7847 8670 | www.umal.co.uk

APPENDIX 3 – HEALTH AND SAFETY POLICY STATEMENT

Title:	Health and Safety Policy Statement
Keywords:	H&S Policy
Description:	Statement regarding Health, Safety & Wellbeing matters
Publish Date:	4th February 2016
Review Date:	31st January 2025
Policy Owner:	Karen Parker
Audience:	Staff & Students

Health and Safety Policy Statement

1. Scope and Purpose

1.1 This policy statement is for all BU Staff, students, visitors, contractors, and all others who may have cause to visit Bournemouth University for whatever reason.

2. Key responsibilities

2.1 Whilst the Vice-Chancellor of Bournemouth University has the overall responsibility for ensuring the University complies with health and safety law, various specific duties have been delegated (see 'Organisation' Section 5 of the Policy) to achieve this.

2.2 Employees are reminded that they too have duties in law: these are outlined in the Organisation section of the policy. Health, Safety & wellbeing must be one of the primary concerns of all employees and regarded as an integral part of their normal duties. Should any member of staff have any concerns about health and safety matters they must raise it with their manager (or supervisor) and/or to the Health, Safety and Wellbeing Team.

3. Links to other Documents

3.1 Organisation Section

3.2 Arrangements Section

Policy

4. Statement

4.1 We are committed to running Bournemouth University in such a way as to ensure, as far as is reasonably practicable, the health, safety & wellbeing of our staff whilst at work and that persons not in our employment (students, visitors, contractors etc.), are also not exposed to risks to their health and safety.

4.2 Whilst conducting our business presents various hazards and risks, we know from experience that if we properly plan our work with health and safety in mind then none of our activities should harm our staff or others. The central message therefore is;

"We will not tolerate any behaviour or condition which could foreseeably result in a serious injury to anyone as a result of this University's activities".

4.3 In general the University aims to provide and maintain safe working conditions, equipment, and systems of work. Our policy will be made freely accessible to our employees and any other person(s) who may be affected by our operations.

4.4 The University fully endorses guidance produced by UCEA and USHA,

- "*HE sector Health, Safety and Wellbeing Strategic Framework for 2022–25*" published by the Universities & Colleges Employers Association ("UCEA")

1

- "*Leadership and Management of health and safety in Higher Education Institutions*", published by UCEA and University Safety & Health Association ("USHA") (the "2015 Guidance")
- "*Leading Health & Safety at Work: Leadership Actions for Vice Chancellors and Members of University Governing Bodies*" published by UCEA and USHA (the "2008 Guidance").

5. Our Health & Safety Objectives

5.1 To establish and maintain an organisational structure with clearly defined responsibilities for implementing the policy and monitoring its effectiveness.

5.2 To promote a culture of health, safety & wellbeing best practice which will lead to the avoidance of, or reduction in risks and ensure compliance with all relevant health and safety legislation.

5.3 To identify the health, safety & wellbeing hazards within our organisation and eliminate associated risks where reasonably practicable.

5.4 To evaluate the risks that cannot be avoided using the technique of risk assessment and reduce these risks to as low a level as is reasonably practicable using effective controls.

5.5 To actively review and develop our health, safety & wellbeing standards, and revise those when there are changes in legislation, industry best practice or the technology available to us.

6. General

6.1 The University will provide adequate support and resources for achieving these objectives and actively encourage continuous improvement in our health and safety performance.

6.2 We will consult with employees on health, safety & wellbeing issues and ensure that they are given adequate instruction, information, supervision, and training to carry out their jobs/roles safely and without risks to health.

6.3 The University considers that serious or persistent disregard of our health, safety & wellbeing arrangements to be a disciplinary matter and will be treated accordingly.

Professor John Vinney

Vice-Chancellor Bournemouth University **February 2024**

APPENDIX 4 – OPERATIONAL FORMS, CHECKLISTS AND LOGBOOKS

All Forms, Checklists and Logbooks can be found in the accompanying Excel file 'BU_SUAS_App4_Forms+Checklists+Logs'. Worksheets are labelled as follows:

1. Pre-Survey Form
2. Risk Assessment Form
3. Embarkation Checklist
4. Arrival Checklist
5. On-site Survey Form
6. Pre-Flight Checklist
7. Field Record Sheet
8. Post-Flight Checklist
9. Flight Log
10. Battery Charge Log
11. Maintenance Log
12. Incident Log

Survey forms and checklists (Sheets 1 to 8) are designed to be printed onto A4 sheets to be taken into the field as part of the Job File. Logbooks (Sheets 9 to 12) are to be completed directly within the Excel workbook.

For reference, PDFs of each form/checklist are embedded below (double click the image to open the PDF file). **NOTE: For all UAS operations, Sheets 1 to 8 should be printed out directly from the Excel file and included within the Job File.**

1. UAS OPERATIONS: PRE-SURVEY

Bournemouth University

PROJECT DETAILS	SITE DETAILS
PROJECT CODE:	SITE NAME:
PROJECT NAME:	LOCALITY:
CLIENT:	NGR:
DATE REQUIRED:	LATITUDE:
FLIGHT TEAM COMPOSITION	LONGITUDE:
PILOT-IN-COMMAND:	ALTITUTUDE AMSL:
OBSERVER:	DOWLOADED BASEMAP:
SUAS REGISTRATION:	IS THERE VEHICULAR ACCESS:
WORK REQUIRED:	

ITEM	ACTION TO COMPLETE / FINDINGS
AIRSPACE	Airspace Class? (A,C,D,E,F,G) - ATC permission required?
	Resources: UK VFR (Visual Flight Rules) charts, http://notaminfo.com/nationalmap
NOTAMS	Any Notice to Airmen that may effect operations
	Resources: http://www.ais.org.uk, http://notaminfo.com/nationalmap
TERRAIN	What is the terrain? (Flat, mountainous, boggy, etc.)
PROXIMITIES	Other aircraft (aerodromes, heli pads, model sites)
HAZARDS	Live firing, High Intensity Radio Transmissions, gas venting, etc.
RESTRICTIONS	Nuclear power stations, prisons, High Intensity Radio, etc.
SENSITIVITIES	Nature Reserves, recreational areas, bye-laws
PEOPLE	Local habitation (Do we need to letter drop?)
LIVESTOCK	Local farms

2. UAS OPERATIONS: RISK ASSESSMENT

Bournemouth University

PROJECT CODE:	SITE NAME:	PILOT-IN-COMMAND:
PROJECT NAME:	NGR:	OBSERVER:
CLIENT:	SURVEY DATE(s):	AIRCRAFT:

1 - HAZARD	2	3 - LIKELIHOOD INFORMATION	INITIAL RISK			7 - CONTROL MEASURES	CONTROLLED RISK			
What is the hazard and potential injury?	AT RISK	How will it be realised?	4 - SEVERITY	5 - LIKELIHOOD	6 - RISK	Mitigation measures to reduce the risk Severity and/or Probability - update columns 8 - 10. Is final Risk acceptable (see table at bottom)?	8 - SEVERITY	9 - LIKELIHOOD	10 - RISK	ACCEPTABLE?

AUTHORISED BY THE ACCOUNTABLE MANAGER	NAME (Print):	SIGNED:	DATE:

AT RISK (Column 2)		SEVERITY (Column 4 and 8)		LIKELIHOOD (Column 5 and 9)
E - Employees	1	INSIGNIFICANT	1	VERY UNLIKELY
C - Client	2	MINOR INJURY, STOPPAGE OR DAMAGE	2	UNLIKELY
V - Visitors	3	MODERATE (REPORTABLE) INJURY OR DAMAGE	3	POSSIBLE
P - Public	4	MAJOR (REPORTABLE) INJURY OR DAMAGE	4	LIKELY
A - All	5	CATASTROPHIC INJURY (FATALITY) OR DAMAGE	5	ALMOST CERTAIN

RISK RATING (Multiply the Severity x Likelihood		
Severity x Likelihood - 1 to 6	LOW	Acceptable
Severity x Likelihood - 8 TO 12	MOD	Acceptable, but seek further mitigation
Severity x Likelihood - 15 TO 25	HIGH	Unacceptable - STOP

3. UAS OPERATIONS: EMBARKATION CHECKLIST

AIRCRAFT and ANCILLARIES		
ITEM	**ACTION / CHECK**	✓
AIR FRAME	Check condition.	
PROPELLERS (x2 SETS)	Check condition.	
GIMBAL / CAMERA MOUNT	Check condition and functionality.	
SPARE BOLTS FOR GIMBAL / CAMERA MOUNT	Check condition.	
CAMERA	Check condition and functionality.	
CAMERA MEMORY CARD	Check condition and storage space. Fit to aircraft.	
REMOTE CONTROLLER	Check condition and functionality.	
REMOTE CONTROLLER HOOD	Check condition and functionality.	
TABLET / PHONE	Check condition and functionality.	
TABLET / PHONE CONNECTION LEAD	Check condition and functionality.	
BATTERIES and ANCILLARIES		
ITEM	**ACTION / CHECK**	✓
INTELLIGENT FLIGHT BATTERIES	Check condition and charge.	
REMOTE CONTROLLER BATTERY	Check condition and charge.	
DJI MAINS AC BATTERY CHARGER	Check condition and functionality.	
DJI IN-CAR BATTERY CHARGER	Check condition and functionality.	
DJI BATTERY CHARGING HUB	Check condition and functionality.	
POWER BANK PORTABLE CHARGER	Check condition and charge.	
LAPTOP COMPUTER	Check condition and charge.	
TWO-WAY RADIOS	Check condition and charge.	
TABLET / PHONE BATTERY	Check condition and charge.	
TABLET / PHONE MAINS AC BATTERY CHARGER	Check condition and functionality.	
TABLET / PHONE IN-CAR BATTERY CHARGER	Check condition and functionality.	
OPERATIONS and FLIGHT PLANNING		
ITEM	**ACTION / CHECK**	✓
LAPTOP COMPUTER AND LEADS	Check condition and functionality.	
MOBILE PHONE (and emergency numbers)	Check condition and functionality.	
ANEMOMETER	Check condition and functionality.	
UK VFR CHARTS	Check condition.	
CHECKLISTS, MANUALS and LOGBOOKS	Check condition.	
TWO-WAY RADIOS	Check condition and functionality.	
NOTEPAD and PENS	Check condition.	

4. UAS OPERATIONS: ARRIVAL CHECKLIST

ITEM	ACTION / CHECK	✓
PPE (inc HI-VIS VEST)	Issue as required.	
TWO-WAY RADIOS	Issue as required.	
ON-SITE SURVEY	Carry out On-site Survey with observer.	
FLIGHT PLAN BRIEF	Confirm flight plan and brief crew / observer.	
LANDING PAD	Position on level ground, according to site survey*.	
SIGNAGE and CORDON	Position according to site survey (if necessary).	
FIRST AID KIT	Position to be easily accessible and inform all crew.	
FIRE EXTINGUISHER	Position to be easily accessible and inform all crew.	
AIRFRAME	Unload and check for transit damage.	
GIMBAL / CAMERA MOUNT	Unload and check for transit damage.	
PROPELLERS	Unload and check for transit damage.	
GROUND CONTROL POINTS	Position as required (if necessary)	
CREW / HELPERS	Position as required to maintain safe flying zone.	

NOTES

* The landing pad displays a compass rose and should be positioned so that North is aligned correctly. The compass rose can then be consulted in the event of a fly away to ascertain approximate heading quickly.

5. UAS OPERATIONS: ON-SITE SURVEY

Bournemouth University

PROJECT DETAILS	SITE DETAILS
PROJECT CODE:	TEMPERATURE (°C):
PROJECT NAME:	WIND SPEED (KNOTS):
CLIENT:	WIND DIRECTION:
DATE:	
FLIGHT TEAM COMPOSITION	
PILOT-IN-COMMAND:	
OBSERVER:	
UAS REGISTRATION:	

ITEM	ACTION TO COMPLETE / FINDINGS
OBSTRUCTIONS	Masts, power lines, buildings, train tracks, trees, lakes, rivers, canals or industrial hazards
VISUAL LIMITATIONS	Anything that may impair vision? (up to 5 km)
CORDON	Is a cordon required? (Do we need extra staff?)
LIVESTOCK	Any animals or wildlife present or nearby?
TERRAIN	Flat surface, rough, sloped, wet, trees?
PERMISSION	Do we have the land owners permission?
PUBLIC	Public Right of Way, footpaths, gates
AIR TRAFFIC	Do we need and/or have clearance?
COMMUNICATION	Are two-way radios required?
PROXIMITY	Are we far enough away from buildings?
TAKE-OFF AREA	Where is the safest convenient position?
LANDING AREA	Where is the safest convenient position?

6. UAS OPERATIONS: PRE-FLIGHT CHECKLIST

ITEM	ACTION / CHECK	✓
AIRFRAME	Place on Landing Pad.	
AIRFRAME	Check condition and security of airframe and all fittings.	
GIMBAL / CAMERA MOUNT	Remove gimbal clamp and/or protective cover. Attach camera and check security of all fittings.	
CAMERA	Check lens is clean	
PROPELLERS	Attach propellers according to the correct colour coding for clockwise / anti-clockwise rotation.	
REMOTE CONTROLLER	Check position of all switches and cyclic controls. Ensure antennae positions are adjusted correctly. Toggle 'Flight Mode' switch to 'P'. TURN ON	
MOBILE PHONE / TABLET	Check condition and charge level (≥ 80 %). Connect to remote controller with correct lead.	
INTELLIGENT FLIGHT BATTERY	Record battery number in logbook. Check terminals and fit securely into airframe. Call "CLEAR PROPS" and TURN ON.	
SETTINGS AND CHECKS	Launch DJI GO app.	
REMOTE CONTROLLER and WIFI	Check remote controller and WIFI are connected and tablet camera view visible.	
REMOTE CONTROLLER BATTERY	Check battery level is ≥80 %. Record in log book.	
INTELLIGENT FLIGHT BATTERY	Check battery level is ≥90 %. Record in log book.	
COMPASS CALIBRATION	Check compass calibration and calibrate, if necessary. (NOTE: Always calibrate if flying in a new area).	
CAMERA GIMBAL and CAMERA	Confirm correct operation and settings.	
MEMORY CARD	Confirm storage capacity. Format, if necessary.	
GPS POSITION FIX	Monitor satellite capture and ensure status indicator displays 'Safe to Fly (GPS)' and is highlighted green.	
RETURN TO HOME (RTH)	Ensure home location is set and RTH altitude is appropriate for flying zone. Check Failsafe RTH altitude.	
TAKE-OFF AREA	Position aircraft in take-off area on Landing Pad and facing into the wind.	
FLIGHT PLAN (Automated flights only)	Close DJI GO app. Launch Flight Plan / Control app (DroneDeploy). Load flight plan and check correct waypoints.	
CREW, PUBLIC, CLIENT	Ensure everyone is in correct, safe position.	
CLEARANCE (Air Traffic Control)	Clearance from ATC (if required).	
POWER UP	Call "POWER UP" and start motors.	

7. UAS OPERATIONS: FIELD RECORD SHEET

Bournemouth University

Bournemouth University | Bournemouth University Global Environmental Solutions

PROJECT DETAILS			
PROJECT CODE:		CLIENT:	
PROJECT NAME:		DATE:	
FLIGHT LOG DETAILS			
FLIGHT 1	Start time:	End time:	Notes:
Flight battery	Pre flight %:	Post flight %:	
Controller battery	Pre flight %:	Post flight %:	
Tablet battery	Pre flight %:	Post flight %:	
FLIGHT 2	Start time:	End time:	Notes:
Flight battery	Pre flight %:	Post flight %:	
Controller battery	Pre flight %:	Post flight %:	
Tablet battery	Pre flight %:	Post flight %:	
FLIGHT 3	Start time:	End time:	Notes:
Flight battery	Pre flight %:	Post flight %:	
Controller battery	Pre flight %:	Post flight %:	
Tablet battery	Pre flight %:	Post flight %:	
FLIGHT 4	Start time:	End time:	Notes:
Flight battery	Pre flight %:	Post flight %:	
Controller battery	Pre flight %:	Post flight %:	
Tablet battery	Pre flight %:	Post flight %:	
FLIGHT 5	Start time:	End time:	Notes:
Flight battery	Pre flight %:	Post flight %:	
Controller battery	Pre flight %:	Post flight %:	
Tablet battery	Pre flight %:	Post flight %:	
FLIGHT 6	Start time:	End time:	Notes:
Flight battery	Pre flight %:	Post flight %:	
Controller battery	Pre flight %:	Post flight %:	
Tablet battery	Pre flight %:	Post flight %:	
NOTES			

8. UAS OPERATIONS: POST-FLIGHT CHECKLIST

Bournemouth University

ITEM	ACTION / CHECK	✓
TOUCH DOWN	Upon touch down, STOP MOTORS.	
BATTERY LEVEL	Note levels of flight and remote controller batteries.	
POWER DOWN	Turn off aircraft. Call "AIRCRAFT SAFE".	
BATTERY CHANGE (Multi-stop flights only)	Remove used battery / batteries. Insert new battery / batteries.	
MEMORY CARD CHANGE (Multi-stop flights only)	Remove full memory card. Insert empty memory card.	
CONTINUE FLIGHT PLAN (Multi-stop flights only)	Continue flight operations using Pre-Flight Checklist.	
TOUCH DOWN (Multi-stop flights only)	Upon touch down, STOP MOTORS.	
BATTERY LEVEL (Multi-stop flights only)	Note levels of flight and remote controller batteries.	
POWER DOWN (Multi-stop flights only)	Turn off aircraft. Call "AIRCRAFT SAFE".	
REMOVAL	Remove the aircraft from the landing area.	
REMOTE CONTROLLER	Turn off remote controller.	
MOBILE PHONE / TABLET	Exit Flight Plan / Control app (DJI GO / DroneDeploy).	
LOGBOOKS	Record Pilot, Aircraft and Battery details in logbooks.	
AIRFRAME	Check for damage, wear and tightness of fittings.	
GIMBAL / CAMERA MOUNT	Check for damage, wear and tightness of fittings. **Insert gimbal clamp and/or protective cover.**	
PROPELLERS	Remove, check for damage / wear. Store for transit.	
INTELLIGENT FLIGHT BATTERY	Remove flight battery / batteries from aircraft. Check for damage / overheating. Allow to cool, if necessary. Store for transit.	
MEMORY CARD	Remove from camera and backup to laptop.	
REVIEW	Review images and evaluate with crew and/or client.	
PACK and STORE	Securely pack all equipment for transit and/or storage.	

APPENDIX 5 – PDRA01 TECHNICAL CHARACTERISTICS OF THE SYSTEM

DJI Inspire 2

Mass	Empty mass (Kg)	3.44
	Maximum Take-Off Mass	4.00
Dimensions for Fixed-Wing	Wingspan	N/A
	Fuselage Length	N/A
	Fuselage Diameter	N/A
Dimensions for Rotorcraft / Multirotor	Length of aircraft body	605 mm (Diagonal distance, Landing Mode)
	Width of aircraft body	605 mm (Diagonal distance, Landing Mode)
	Height of aircraft body	
	Propellor Dimensions	380 mm x 40 mm
	Propellor Configuration	2x CW, 2x CCW
Centre of Gravity (CG)		N/A

Flight Duration / Endurance	25 min
Maximum Range	3.5 km @ 2.4 GHz (CE); 2.0 km @ 5.8 GHz (CE)
Maximum Operating Height (Service Ceiling)	2,500 mASL (5,000 mASL with special propeller)
Maximum Airspeed	26 m/s (94 kph, 58 mph)
Environmental / Weather Limitations	-20°C to +40°C operating temperature
Any other relevant information	N/A

Fuel Type	Battery
Status Indicators / Alert Messages	Battery Level, Low Battery, Critical Low Battery
Hazardous Substances	N/A
Any other relevant information	N/A

Batteries	Quantity	2
	Type	6S LiPo Intelligent Flight Battery
	Arrangement	Paired
Electrical Loads		4280mAh capacity, 22.8V
Any other relevant information		N/A

Engines	Quantity	4
	Type	Electrical, DJI 3512
	Propellor Type	DJI 1550T

Any other relevant information	N/A

Sensors (Flight sensors, not payload)	Type	Downward Vision System (10 m operating range, 10 m/s velocity range) Forward Vision System (0.7 m – 30 m obstacle sensing range) Upward Infrared Sensing System (0 m – 5 m obstacle sensing range)
	Quantity	3
Backup Means of Navigation and Guidance		Automatic 'Return to Home' function
Automatic Flight Control Functions		Automatic 'Return to Home' function
Geo-awareness Functions		Automatic 'Return to Home' function
Any other relevant information		N/A

C2 Link	Range	3.5 km @ 2.4 GHz (CE); 2.0 km @ 2.4 GHz (CE)
Transceivers / Modems	Power Levels	17 dBm @ 2.4 GHz (CE); 14 dBm @ 5.8 GHz (CE)
Operating Frequencies Used		2.4 GHz, 5.8 GHz
Third Party Link Service Provider		N/A
Data Rates		N/A
Latencies		N/A
Any other relevant information		N/A

DJI Phantom 3 Professional

Mass	Empty mass (Kg)	1.28
	Maximum Take-Off Mass	1.28
Dimensions for Fixed-Wing	Wingspan	N/A
	Fuselage Length	N/A
	Fuselage Diameter	N/A
Dimensions for Rotorcraft / Multirotor	Length of aircraft body	350 mm (Diagonal distance, Props excluded)
	Width of aircraft body	350 mm (Diagonal distance, Props excluded)
	Height of aircraft body	
	Propellor Dimensions	
	Propellor Configuration	2x CW, 2x CCW
Centre of Gravity (CG)		N/A

Flight Duration / Endurance	23 min
Maximum Range	3.5 km @ 2.4 GHz (CE)
Maximum Operating Height (Service Ceiling)	6,000 mASL
Maximum Airspeed	16 m/s (58 kph, 36 mph)
Environmental / Weather Limitations	0°C to +40°C operating temperature
Any other relevant information	N/A

Fuel Type	Battery
Status Indicators / Alert Messages	Battery Level, Low Battery, Critical Low Battery
Hazardous Substances	N/A
Any other relevant information	N/A

Batteries	Quantity	1
	Type	LiPo 4S Intelligent Flight Battery
	Arrangement	Single
Electrical Loads		4480mAh capacity, 15.2V
Any other relevant information		N/A

Engines	Quantity	4
	Type	Electrical
	Propellor Type	
Any other relevant information		N/A

Sensors (Flight sensors, not payload)	Type	Downward Vision System (50 - 300 cm operating range, <8 m/s velocity range
	Quantity	1
Backup Means of Navigation and Guidance		Automatic 'Return to Home' function
Automatic Flight Control Functions		Automatic 'Return to Home' function
Geo-awareness Functions		Automatic 'Return to Home' function
Any other relevant information		N/A

C2 Link	Range	3.5 km @ 2.4 GHz (CE)
Transceivers / Modems	Power Levels	16 dBm @ 2.4 GHz (CE)
Operating Frequencies Used		2.4 GHz
Third Party Link Service Provider		N/A
Data Rates		N/A
Latencies		N/A
Any other relevant information		N/A

DJI Phantom 4

Mass	Empty mass (Kg)	1.380
	Maximum Take-Off Mass	1.380
Dimensions for Fixed-Wing	Wingspan	N/A
	Fuselage Length	N/A
	Fuselage Diameter	N/A
Dimensions for Rotorcraft / Multirotor	Length of aircraft body	350 mm (Diagonal distance, Props excluded)
	Width of aircraft body	350 mm (Diagonal distance, Props excluded)
	Height of aircraft body	
	Propellor Dimensions	
	Propellor Configuration	2x CW, 2x CCW
Centre of Gravity (CG)		N/A

Flight Duration / Endurance	28 min
Maximum Range	3.5 km (CE)
Maximum Operating Height (Service Ceiling)	6,000 mASL
Maximum Airspeed	20 m/s (72 kph, 45 mph)
Environmental / Weather Limitations	0°C to +40°C operating temperature
Any other relevant information	N/A

Fuel Type	Battery
Status Indicators / Alert Messages	Battery Level, Low Battery, Critical Low Battery
Hazardous Substances	N/A
Any other relevant information	N/A

Batteries	Quantity	1
	Type	LiPo 4S Intelligent Flight Battery
	Arrangement	Single
Electrical Loads		5350mAh capacity, 15.2V
Any other relevant information		N/A

Engines	Quantity	4
	Type	Electrical
	Propellor Type	
Any other relevant information		N/A

Sensors (Flight sensors, not payload)	Type	Downward Vision System (0 - 10 m operating range, < 10 m/s velocity range Forward Vision System (0.7 m – 15 m obstacle sensing range)
	Quantity	2
Backup Means of Navigation and Guidance		Automatic 'Return to Home' function
Automatic Flight Control Functions		Automatic 'Return to Home' function
Geo-awareness Functions		Automatic 'Return to Home' function
Any other relevant information		N/A

C2 Link	Range	3.5 km (CE)
Transceivers / Modems	Power Levels	17 dBm (CE)
Operating Frequencies Used		2.4 GHz
Third Party Link Service Provider		N/A
Data Rates		N/A
Latencies		N/A
Any other relevant information		N/A

DJI Spark

Mass	Empty mass (Kg)	0.300
	Maximum Take-Off Mass	0.300
Dimensions for Fixed-Wing	Wingspan	N/A
	Fuselage Length	N/A
	Fuselage Diameter	N/A
Dimensions for Rotorcraft / Multirotor	Length of aircraft body	170 mm (Diagonal distance, Props excluded)
	Width of aircraft body	170 mm (Diagonal distance, Props excluded)
	Height of aircraft body	
	Propellor Dimensions	
	Propellor Configuration	2x CW, 2x CCW
Centre of Gravity (CG)		N/A

Flight Duration / Endurance	16 min
Maximum Range	0.5 km @ 2.4 GHz (CE); 0.3 km @ 5.8 GHz (CE)
Maximum Operating Height (Service Ceiling)	4,000 mASL
Maximum Airspeed	14 m/s (50 kph, 31 mph)
Environmental / Weather Limitations	0°C to +40°C operating temperature
Any other relevant information	N/A

Fuel Type	Battery
Status Indicators / Alert Messages	Battery Level, Low Battery, Critical Low Battery
Hazardous Substances	N/A
Any other relevant information	N/A

Batteries	Quantity	1
	Type	LiPo 3S Intelligent Flight Battery
	Arrangement	Single
Electrical Loads		1480mAh capacity, 11.4V
Any other relevant information		N/A

Engines	Quantity	4
	Type	Electrical
	Propellor Type	
Any other relevant information		N/A

Sensors (Flight sensors, not payload)	Type	Downward 3D Sensing System (0.2 - 5 m sensing range) Forward Vision System (0 – 30 m obstacle sensing range, < 10 m/s)
	Quantity	2
Backup Means of Navigation and Guidance		Automatic 'Return to Home' function
Automatic Flight Control Functions		Automatic 'Return to Home' function
Geo-awareness Functions		Automatic 'Return to Home' function
Any other relevant information		N/A

C2 Link	Range	0.5 km @ 2.4 GHz (CE); 0.3 km @ 5.8 GHz (CE)
Transceivers / Modems	Power Levels	18 dBm @ 2.4 GHz (CE); 14 dBm @ 5.8 GHz (CE)
Operating Frequencies Used		2.4 GHz, 5.8 GHz
Third Party Link Service Provider		N/A
Data Rates		N/A
Latencies		N/A
Any other relevant information		N/A

DJI Mini 2

Mass	Empty mass (Kg)	0.249
	Maximum Take-Off Mass	0.249
Dimensions for Fixed-Wing	Wingspan	N/A
	Fuselage Length	N/A
	Fuselage Diameter	N/A
Dimensions for Rotorcraft / Multirotor	Length of aircraft body	245 mm
	Width of aircraft body	289 mm
	Height of aircraft body	55 mm
	Propellor Dimensions	
	Propellor Configuration	2x CW, 2x CCW
Centre of Gravity (CG)		N/A

Flight Duration / Endurance	31 min
Maximum Range	6.0 km (CE)
Maximum Operating Height (Service Ceiling)	4,000 mASL
Maximum Airspeed	16 m/s (58 kph, 36 mph)
Environmental / Weather Limitations	0°C to +40°C operating temperature
Any other relevant information	N/A

Fuel Type	Battery
Status Indicators / Alert Messages	Battery Level, Low Battery, Critical Low Battery
Hazardous Substances	N/A
Any other relevant information	N/A

Batteries	Quantity	1
	Type	LiPo 2S Intelligent Flight Battery
	Arrangement	Single
Electrical Loads		2250mAh capacity, 7.7V
Any other relevant information		N/A

Engines	Quantity	4
	Type	Electrical
	Propellor Type	
Any other relevant information		N/A

Sensors	Type	Downward 3D Sensing System

(Flight sensors, not payload)		(0.5 - 10 m sensing range) Forward Vision System (0 – 30 m obstacle sensing range, < 10 m/s)
	Quantity	2
Backup Means of Navigation and Guidance		Automatic 'Return to Home' function
Automatic Flight Control Functions		Automatic 'Return to Home' function
Geo-awareness Functions		Automatic 'Return to Home' function
Any other relevant information		N/A

C2 Link	Range	6.0 km (CE)
Transceivers / Modems	Power Levels	20 dBm @ 2.4 GHz (CE); 14 dBm @ 5.8 GHz (CE)
Operating Frequencies Used		2.4 GHz, 5.8 GHz
Third Party Link Service Provider		N/A
Data Rates		N/A
Latencies		N/A
Any other relevant information		N/A

DJI Mini 3 Pro

Mass	Empty mass (Kg)	0.249
	Maximum Take-Off Mass	0.249
Dimensions for Fixed-Wing	Wingspan	N/A
	Fuselage Length	N/A
	Fuselage Diameter	N/A
Dimensions for Rotorcraft / Multirotor	Length of aircraft body	171 mm (exc props)
	Width of aircraft body	245 mm (exc props)
	Height of aircraft body	62 mm
	Propellor Dimensions	
	Propellor Configuration	2x CW, 2x CCW
Centre of Gravity (CG)		N/A

Flight Duration / Endurance	34 min
Maximum Range	8.0 km (CE)
Maximum Operating Height (Service Ceiling)	4,000 mASL
Maximum Airspeed	16 m/s (58 kph, 36 mph)
Environmental / Weather Limitations	-10°C to +40°C operating temperature
Any other relevant information	N/A

Fuel Type	Battery
Status Indicators / Alert Messages	Battery Level, Low Battery, Critical Low Battery
Hazardous Substances	N/A
Any other relevant information	N/A

Batteries	Quantity	1
	Type	Li-ion Intelligent Flight Battery
	Arrangement	Single
Electrical Loads		2453mAh capacity, 7.38V
Any other relevant information		N/A

Engines	Quantity	4
	Type	Electrical
	Propellor Type	
Any other relevant information		N/A

Sensors	Type	Forward Vision System

(Flight sensors, not payload)		(0.39 m – 25 m precis. meas. range, < 10.5m/s) Backward Vision System (0.36 m – 23.4 m precis. meas. range, < 8m/s) Downward Vision System (0.15 m – 9 m precis. meas. range, < 3m/s)
	Quantity	3
Backup Means of Navigation and Guidance		Automatic 'Return to Home' function
Automatic Flight Control Functions		Automatic 'Return to Home' function
Geo-awareness Functions		Automatic 'Return to Home' function
Any other relevant information		N/A

C2 Link	Range	8.0 km (CE)
Transceivers / Modems	Power Levels	20 dBm @ 2.4 GHz (CE); 14 dBm @ 5.8 GHz (CE)
Operating Frequencies Used		2.4 GHz, 5.8 GHz
Third Party Link Service Provider		N/A
Data Rates		N/A
Latencies		N/A
Any other relevant information		N/A

DJI Mavic 3 Enterprise M

Mass	Empty mass (Kg)	0.915
	Maximum Take-Off Mass	1.050
Dimensions for Fixed-Wing	Wingspan	N/A
	Fuselage Length	N/A
	Fuselage Diameter	N/A
Dimensions for Rotorcraft / Multirotor	Length of aircraft body	347.5 mm (exc props)
	Width of aircraft body	283.0 mm (exc props)
	Height of aircraft body	107.7 mm
	Propellor Dimensions	
	Propellor Configuration	2x CW, 2x CCW
Centre of Gravity (CG)		N/A

Flight Duration / Endurance	45 min
Maximum Range	8.0 km (CE)
Maximum Operating Height (Service Ceiling)	6,000 mASL
Maximum Airspeed	21 m/s (76 kph, 47 mph)
Environmental / Weather Limitations	-10°C to +40°C operating temperature
Any other relevant information	N/A

Fuel Type	Battery
Status Indicators / Alert Messages	Battery Level, Low Battery, Critical Low Battery
Hazardous Substances	N/A
Any other relevant information	N/A

Batteries	Quantity	1
	Type	LiPo 4S
	Arrangement	Single
Electrical Loads		5000mAh capacity, 15.4V
Any other relevant information		N/A

Engines	Quantity	4
	Type	Electrical
	Propellor Type	
Any other relevant information		N/A

Sensors	Type	Forward Vision System

(Flight sensors, not payload)		(Measurement range 0.5m – 20.0m, Effective sensing speed ≤15m/s) Backward Vision System (Measurement range 0.5m – 16.0m, Effective sensing speed ≤12m/s) Lateral Vision System (Measurement range 0.5m – 25.0m, Effective sensing speed ≤15m/s) Upward Vision System (Measurement range 0.2m – 10.0m, Effective sensing speed ≤6m/s) Downward Vision System (Measurement range 0.3m – 18.0m, Effective sensing speed ≤6m/s)
	Quantity	5
Backup Means of Navigation and Guidance		Automatic 'Return to Home' function
Automatic Flight Control Functions		Automatic 'Return to Home' function
Geo-awareness Functions		Automatic 'Return to Home' function
Any other relevant information		N/A

C2 Link	Range	8.0 km (CE)
Transceivers / Modems	Power Levels	<20 dBm @ 2.4 GHz (CE); <14 dBm @ 5.8 GHz (CE)
Operating Frequencies Used		2.4 GHz, 5.8 GHz
Third Party Link Service Provider		N/A
Data Rates		15 MB/s
Latencies		200 ms
Any other relevant information		N/A

APPENDIX 6 – OPEN CATEGORY OPERATIONS

The primary aim of this Operations Manual is to satisfy the requirements for the CAA's Operational Authorisation PDRA01, and the main document should be read as such.

ONLY REMOTE PILOTS LISTED WITHIN THIS OPERATIONS MANUAL ARE PERMITTED TO WORK UNDER THE BOURNEMOUTH UNIVERSITY OPERATIONAL AUTHORISATION PDRA01 AND OPERATE WITHIN THE SPECIFIC CATEGORY.

However, Bournemouth University personnel also undertake UAS operations that fall outside the requirement of an Operational Authorisation; in particular, in relation to student projects and research activities.

Accordingly, Bournemouth University personnel involved in such operations should follow the guidelines and procedures below, which outline the operational requirements relating to Open Category UAS operations

References to specific sections of the main document are included, where relevant.

1. DRONES AVAILABLE FOR NON-COMMERCIAL OPERATIONS

Bournemouth University has a fleet of drones designated under its own Operator ID that are used for a variety of activities. Availability of Bournemouth University drones is at the discretion of the drone owner and / or you line manager or supervisor.

Bournemouth University personnel (including staff or students) are permitted to use their own drone for Bournemouth University UAS operations. However, it is the remote pilot's responsibility (and a legal requirement) to ensure that any drone used is adequately maintained and is safe for flight. This must be acknowledged via the Risk Assessment process in advance of any flight being permitted (see Section 4 below).

2. INSURANCE

Bournemouth University has comprehensive Employers Liability and Public & Products Liability insurance, which includes cover for Unmanned Aerial Vehicle operations (see Appendix 2). Bournemouth University personnel operating their own drone for Bournemouth University UAS operations will be insured for third-person and public liability; however, damage or loss of the drone will not be covered under the insurance policy.

It is recommended that remote pilots using their own drone for Bournemouth University UAS operations should ensure that sufficient insurance cover for the drone is in place, if desired.

3. REGISTRATION REQUIREMENTS

It is against the law to fly a drone in the UK without a Flyer ID and without displaying the Operator ID clearly on the drone. The Drone and Model Aircraft Code (last updated January 2023) stipulates the legal requirements and outlines the steps required to obtain a Flyer and/or Operator ID:

https://register-drones.caa.co.uk/drone-code

- **Operator ID**

  The person or organisation that's responsible for the drone (this may not be the remote pilot) must register to get an Operator ID.

- **Flyer ID**

  The person who will operate the drone (remote pilot) must pass the theory test to get a Flyer ID.

If you wish to operate a drone and are also responsible for (or own) the drone in question, then you will need to obtain both a Flyer ID and an Operator ID.

4. QUALIFICATION REQUIREMENTS, LIMITATIONS AND RISK ASSESSMENT

It is the policy of Bournemouth University that all personnel acting as remote pilot for any UAS operations (e.g. research, student assessments) must comply with the following requirements:

- Provide evidence of Flyer ID (and Operator ID, if applicable).
- Provide evidence of A2 CofC certification (if applicable).
- Be assessed as competent by a nominated Faculty representative who is trained to the level as detailed in Part A Section 16.
- Operate a UAS of no more than 25 kg Maximum Take-Off Mass.
- Comply with the operating requirements outlined within this Operations Manual (Part A Section 11).
- Complete a BU UAS Risk Assessment, including signed acknowledgement that;
    - They are registered with a Flyer ID and (where required) an Operator ID.
    - The UAS intended for use has been adequately maintained and is safe for flight.
    - The remote pilot has been assessed as competent by a nominated Faculty representative (counter-signature required by nominated Faculty representative).
    - The remote pilot has read and agreed to adhere to the requirements outlined within this Operations Manual.

5. RESPONSIBILITIES OF FLIGHT TEAM

A flight team for Bournemouth University UAS operations comprises two different roles:

1. Remote pilot – The remote pilot is responsible for operating the UAS and has overall responsibility for a safe operation. See Part A Section 7 for full details of the role of remote pilot.
2. Support personnel (Observers) – Support personnel (Observers) do not operate the UAS, but assist the remote pilot with flight activities and ensure that the UAS is maintained within visual line of sight at all times. See Part A Section 8 for full details of the role of support personnel (Observers).

6. CREW HEALTH

All remote pilots and support personnel (Observers) must satisfy the requirements outlined in Part A Section 17 of this Operations Manual.

7. OPERATING LIMITATIONS AND CONDITIONS

Part A Section 11 of this document outlines the key operating limitations and conditions and should be strictly adhered to for all Bournemouth University UAS operations. Part A Section 11 highlights key sections of the guidance document produced by the CAA 'Unmanned Aircraft System Operations in UK Airspace – Guidance' (CAP 722), the relevant sections (Open Category) of which should be reviewed in advance of undertaking any BU UAS operations.

A tabulated summary of Open Category operational limitations, product requirements and personnel requirements is provided in Table 11.1 of this document.

In addition, in order to ensure that drone users in the UK can easily access the information they need about how to fly their drones safely and legally, without endangering others, the CAA developed a dedicated drone section on the CAA website:

https://www.caa.co.uk/drones

The key resource relating to flying a UAS in the Open Category is the Drone and Model Aircraft Code:

https://register-drones.caa.co.uk/drone-code

The Drone and Model Aircraft Code includes a link to Flight Restriction Zones (around protected aerodromes), presented in an interactive map.

8. OPERATING PROCEDURES

Operating procedures for Open Category Bournemouth University UAS operations should broadly follow those outlined in Part B of the Operations Manual. However, some aspects may not be relevant to Open Category operations and these are highlighted below:

Part B Section 1: Flight planning / preparation

- Section 1 (Flight planning / preparation)

  This section outlines the forms and checklists that are provided in Appendix 4 of the Operations Manual. All forms 1 – 8 should be printed out and completed during UAS operations.

  All completed forms should be kept on file in the event of any accident/incident investigation. The following forms will need to be provided to your line manager or supervisor:

  1. Pre-survey form (before flight operations take place)
  2. Risk Assessment form (before flight operations take place)
  5. On-site survey (after flight operations have finished)

- Section 1.8 (Servicing and Maintenance)

  This section is a requirement for Bournemouth University's Operational Authorisation PDRA01. These procedures are not required for Open Category UAS operations. However, as outlined in Section 4 above, it is the remote pilot's responsibility (and a legal requirement) to ensure that the UAS being used is adequately maintained and safe for any planned flight activities.

Part B Section 2: On-site procedures and pre-flight checks

All sections of Part B Section 2 are relevant for Open Category UAS operations.

Part B Section 3: Flight procedures

All sections of Part B Section 3 are relevant for Open Category UAS operations.

Part B Section 4: Emergency procedures

All sections of Part B Section 4 are relevant for Open Category UAS operations, with the exception of Part B Section 4.3 (Accidents). Accident / Incident logging procedures for Open Category operations are outlined in Section 9 below.

9. INCIDENT LOGGING

Any incidents (Minor or Major) should be recorded and reported to your line manager or supervisor. Notes from any incident should be collated by the remote pilot, with assistance from support personnel (Observers), bystanders or eye witnesses, as necessary and reported to your line manager or supervisor who will continue the investigation, if necessary.

The procedures outlined in Section 13.3 will be followed in any investigation process. Therefore, the remote pilot and support personnel (Observers) involved will be required to provide as much detailed information as possible pertaining to the incident in question.