

Safety Code of Practice 54

1st Edition Feb 2017

UNMANNED AIR VEHICLES (DRONES)



Contents

	Summary.....	4
	Scope	4
	Responsibilities.....	5
	Duties of managers	5
1	Duties of staff and students	6
2	Duties of tenants	6
3	Duties of tenants	6
3.1	General requirements	6
3.2	Health and safety information	7
3.3	Task and equipment selection.....	7
4	Task and equipment selection.....	7
4.1	Competence and training	7
4.2	Academic project or research	7
4.3	Legal requirements for Specialist Drones	8
4.3.1	Academic project or research	7
4.3.2	Risk assessments and method statements	8
4.4	Control and management	8
4.5	Permissions	8
4.5.1	Academic project or research	7
4.5.2	Barriers and operating areas	8
5	Technical considerations	9
5.1	Weather assessments	9
5.1.1	Academic project or research	7
5.1.2	Visibility.....	9
5.2	Quick assessment guide	9
5.2.1	Academic project or research	7
5.3	Inspection.....	9
5.3.1	Load considerations	9
5.3.2	Specialist equipment	9
5.3.3	Control equipment	10
5.4	Video equipment	10
6	Other requirements for carried equipment	10
6.1	Academic project or research	7
6.2	Nuisance	10
6.3	Nuisance	10
7	Off Campus Use	10
	Special Risks	10
	Members of the Public	10
	Restricted Airspace	10
	Animals	11

Legislation	11
Further information.....	11
Version control.....	13

8

9

Appendix 1:

SUMMARY

Unmanned Aerial Vehicles (UAVs) or Drones are becoming increasingly common for both recreational and business uses. All UAVs have the potential to cause injury. There are legal constraints as well as health and safety risks issues to be considered whenever Schools/ Services or individuals wish to use them. This Safety Code of Practice sets out

1 University requirements for the use and management of all forms of UAVs on University property or whilst off campus on University business.

The main risks in UAV flying are:

- Hitting people, property, overhead cables and trees
- Coming into conflict with manned aircraft
- Privacy
- Noise and general nuisance
- For combustion powered vehicles there are flammability and exhaust issues particularly if they are used indoors

SCOPE

2 This Code is relevant to all School/Services that own, contract in or hire UAVs, and to individuals who wish to operate a UAV for recreational purposes on University property. It provides detailed guidance on the selection of UAVs; legal requirements for use; and regulatory permissions required.

The Code covers any powered flight by a remotely controlled or unmanned air vehicle. It does not cover balloons or kites or manned flights. The following additional definitions and terms are also used:

- UAV – Unmanned Aerial Vehicle
- UAS- Unmanned Aircraft Systems
- RPA- Remotely Piloted Aircraft
- SUSV- Small Unmanned Surveillance Vehicle
- SUA- Small Unmanned Aircraft
- ROA- Remotely Operated Aircraft
- RCMA- Radio Controlled Model Aircraft
- Helicams
- Drones
- Multirotor aircraft/copter

Further definitions are listed in the Air Navigation Order 2009 (ANO 2009) produced by the UK Civil Aviation Authority.

The scope covers both indoor and outdoor use of UAVs; use for commercial and research purposes including but not limited to photography, surveillance for building maintenance purposes and data acquisition; and hobby/recreational use.

RESPONSIBILITIES

Duties of managers

Heads of Schools/Function and other unit managers must ensure that:

- 3 • You have a full understanding of where the UAV fits within the categories as outlined in ANO 2009 i.e. below 20kg or above and that the required constraints are met to comply with legislation.
- 3.1 • A full and valid risk assessment (RA) for the task to be undertaken has been completed. Note: for the purpose of UAV flying, generic RAs are not suitable; all RAs must be specific for the task and location.
- The users of the UAV if above 20kg must have attended pilot training if operating in urban areas particularly if operating within the range of students or public. The full requirements of operating a UAV above 20kg are set out in the UK Civil Aviation guide to Unmanned Aircraft and includes a list of certified instruction companies:

<https://www.caa.co.uk/Commercial-industry/Aircraft/Unmanned-aircraft/Unmanned-Aircraft/>

- Where UAVs are used for commercial purposes i.e. where there is a financial gain that they report in advance to the UoR Insurance Office that they will be undertaking commercial work involving UAVs. This will include any research where the School is in receipt of funding where the use of the UAV will form part of the work.
- Any UAV of more than 20kg is registered with the CAA (see the link above) unless they have been issued with an exemption under 'Part B Exemption Conditions'. Registration may also include the need for certification, inspection of the craft and for it to carry a CAA issued registration ID.
- Approval is to be obtained from the University via the Event Notification system before flying on university property (see <http://www.reading.ac.uk/internal/events-guide/evtg-event-approval.aspx>) and is obtained from other landowners when flying elsewhere.
- The only exception to the Event Notification route is where a UAV will be used repeatedly as part of a research project i.e. regular crop inspections on UoR farms. In such cases, those wishing to fly the UAV are to seek permission of the Director of Estates.

Table 1:

AIRCRAFT MASS	AIRWORTHINESS APPROVAL	REGISTRATION WITH CAA	OPERATING PERMISSION	PILOT QUALIFICATION
Under 20kg	No	No	Yes (see Note 1)	Yes (see note 1 & 2)
Over 20kg	Yes (see note 3)	Yes (see note 3)	Yes	Yes (see note 2)

Notes for Table 1:

1. Applicable for aircraft used for commercial Aerial Work or if flown within a congested area.

2. Equivalent pilot experience will be considered on a case by case basis but a formal training course is recommended.
3. It may be possible to obtain certain exemptions for airworthiness and registration purposes i.e. one off manufacture for research purpose and flown on own property.

Duties of staff and students

All staff and students must ensure that:

- 3.2
- They fully understand the constraints on weight i.e. less than 20 kg excluding consumable fuel or over 20 kg.
 - They fully understand the constraints on flying for financial reward i.e. that they are registered with the CAA and have a pilot's license.
 - They are in possession of a valid RA for that flight
 - When operating a UAV weighing more than 20kg the requirements of CAA restrictions are understood and followed (see the link above).
 - Obtain university or landowners approval.
 - CAA approval/permission, depending on the vehicle and purpose of the flight.

Duties of tenants

3.3

Any tenant operating a UAV on University property must:

- Seek approval from the Director of Estates before flying.
- Comply with the CAA rules for use of UAVs
- Have adequate insurance that specifically covers UAV flying.

4

GENERAL REQUIREMENTS

When operating a UAV the operator/pilot must not recklessly or intentionally put people or animals at risk. A key principle is that the UAV is flown within its operating envelope with full and unaided i.e.:

- visual line of sight
- not closer than 150m to a congested area (vehicles or pedestrians).
- no higher than 120m and no further than 500m from the operator.
- not directly overhead (at any height) or within 50 metres of persons, vehicles, vessels and property,

Unless permission has been granted by the CAA.

Health and safety information

Before any UAV is built or purchased:

- the CAA guide on UAVs must be read and understood so as to fully assess the level of control and administration that will be required.
- 4.1 • an assessment of the need for training is undertaken and it is confirmed that suitably qualified individuals will be able to do the envisaged tasks i.e. maintenance, flight planning etc. See table 1.
- a specific RA must be undertaken, appropriate for the type of UAV and the site.
- If operating a UAV over 20kg that the UoR Insurance teams have been contacted.

Task and equipment selection

- 4.2 Before deciding to use an UAV, the use of alternative equipment should be considered e.g. portable scaffold towers, Mobile Elevated Work Platforms (MEWPs) may be more appropriate for surveillance tasks. The ability to physically get close and touch a structure, or being able to operate in a wider range of weather conditions (including night events) should be taken into account. Whatever equipment is selected, operator training and competency must be considered.

Competence and training

4.3

The required competence for UAV operations will be dependent on the weight of the UAV, see table 1 and section 9 of this Code of Practice. Up to 20kg the requirement is that the operator is assessed as competent by his or her management. For UAVs above 20kg CAA rules will apply and training by one of the approved providers will be required.

4.3.1

Academic project or research

Where the UAV is part of a defined project or research that may have a commercial outcome i.e. new aircraft designs or software systems; the exemption for registration of the pilot and certification of the UAV to undertake commercial work is permitted, this exemption is to permit developers to try out a number of designs without having to repeatedly register. However, if the UAV is being used to provide a service that is paid for, it may require contact with the CAA for confirmation that the exemption is still valid.

As an example, a team is assessing the use of a 'filler' product to be used in concrete bridge repair and they use a UAV to assess bridges and buildings for damage that may well be good targets for the 'filler'. The use of photographs and video taken by the UAV may well be considered as 'commercial gain' if they are later used as part of the sales literature for the process.

Legal requirements for Specialist Drones

The use of a UAV or Drone to deliver, drop items or to carry out dedicated surveillance will almost certainly class the UAV or Drone as a Specialist device. Such specialist UAVs may require certification by the CAA and potential users should read the guidance on the CAA web site.

4.3.2 Risk assessments and method statements

Any risk assessments or method statements should directly relate to the specific UAV, the location it is to be used in and the task to be undertaken. Generic RAs are not sufficient and will not meet the needs of the CAA rules for UAV use.

4.4

The use of standard operating procedures for routine tasks i.e. fuelling, pre-flight testing and setting out barriers are a useful method of managing operations but are not risk assessments. A risk assessment on a flight could cover aspects such as management of 'onlookers' and what to do if animals become alarmed. It should be as wide ranging as possible to ensure that you have fully thought out the issues.

Control and management

4.5 It must be clear who is in control of the UAV and can control its operations, in terms of both physical control and management control.

4.5.1 Permissions

4.5.1

For operations on campus, due regard to who will be affected by the flight as a noise or visual nuisance factor as well as a privacy issue must be considered. Therefore, the University Events Notification system must be used.

UAV flights are often controversial and will illicit strong feelings that are often out of proportion to the true effect. For operations off campus permissions from the land owner are an absolute requirement.

For operations near an airfield or a registered flying site i.e. ridge soaring flight paths for Gliders, Hang gliders or Paragliders, users must reference existing Notification of Air Movements (NOTAMs <http://notaminfo.com/ukmap>). Note: it is unlikely that permission would ever be given.

4.5.2 Airspaces in the UK are classified under Article 166 of the Air Navigation Order 2009 and areas classed as A,C,D and E are subject to control by either military or civil Air Traffic Controls (ATC) and contact with the controlling ATC is required for permission to fly. Note, maps for flying are different to terrestrial maps and any planned off campus flying should refer to flight maps.

Barriers and operating areas

When using UAVs in public access areas it is worth considering using barriers and signs to warn passers-by. In some cases this will be an essential requirement.

Guidance:

The perceptions that UAVs are toys makes some people underestimate the hazard of rapidly rotating blades and the impact hazard of a 2-5 kg drone in flight.

TECHNICAL CONSIDERATIONS

Weather assessments

- 5 All UAVs are subject to weather, it is a requirement that any drone use has within its RA the restrictions on wind etc. and those involved with flying the UAV have a means of accurately measuring wind speed when they fly. This requires a measuring device, reliance cannot be placed solely on weather forecasts and reports.

Visibility

- Any flight must remain in full visibility and those restrictions to visibility such as fog and low cloud should ground the craft immediately. Further issues could be low light or even a low sun that prevents visibility, all of these issues must be set out in the operating instructions.

Quick assessment guide

- 5.1.2 There are three quick 'Rules of Thumb' to be used in flight planning:

- Light, enough and in the right direction to aid visibility
- Wind limits for flying
- Range of visibility (Fog, Low Cloud).
- Time, is there time enough to complete the flight before any of the conditions above would come into effect.

5.2 Inspection

A formal process of inspection should be written and followed before every flight and should cover:

- Fuel, sufficient for the task and not excessive
- Controls, as most control units are battery powered you should ensure that the controls are fully charged
- 5.2.1 • Load, secure and balanced.

Load considerations

- 5.3 The fitting of a dropping mechanism to a UAV requires competent authority certification and no load may be dropped where it may injure or damage persons or property. Therefore, any fitted load on a UAV must be inspected with this constraint in mind.

Specialist equipment

Certain types of equipment may require further certification or licensing e.g. the fitting of lasers. If non-standard equipment is being considered, a technical review and possible certification may well be required.

In areas used by other Radio Controlled devices care must be taken to ensure that interference with the flying controls due to frequency interference does not take place.

Control equipment

There is a known problem with many of the low end UAV control systems interfering with both other UAVs and other radio devices such as computer Wi-Fi systems and Go-Pro camera systems. In larger and more sophisticated systems the use of frequency hopping and encryption is used to prevent either loss of control or interference to other systems. A review of manufacturers' literature and the internet will identify any issues.

5.3.1

Video equipment

There are a number of legal issues with Video from UAVs, with privacy being one of the key issues. The ability to retain images will subject the system to Freedom of Information requests to see the recorded images, the possibility that a request to view the images should form part of the planning and operation. Any Freedom of Information requests should be passed via the University FOI office.

5.3.2

Other requirements for carried equipment

Where ancillary equipment is carried it will form part of the all up weight of the UAV and regardless of its purpose or the fact that the UAV may only be carrying it for part of the flight, its inclusion may take it over the 20Kg limit.

5.3.3

Nuisance

5.4

The noise and distraction factor of a UAV should not be underestimated and it is worthwhile confirming its noise levels before flying anywhere noise may be an issue. HS&S can provide data on the noise levels being emitted.

6

OFF CAMPUS USE

6.1

Special Risks

Along with all of the issues above the use of a UAV off campus should be confirmed with the UoR Insurance Officer. Ownership of any outcome of a CCTV footage may rest with the owner of the land being used and such risks should form part of the planning.

6.2

Members of the Public

6.3

Members of the public may not fly UAVs on University property without permission; they will also not be exempted from the need to carry out a formal risk assessment. The requirement to be insured for third party risks will also be a requirement.

Restricted Airspace

Restricted airspace is any location designated as such by the CAA, in addition to the areas outlined in Para 4.5.1 above the CAA has also specified that UAVs may not be flown:

- Over or within 150m of any congested areas.
- Over or within 150m of any organised event or assembly of more than 1000 persons.
- Within 50m of any vessel, vehicle or structure not within the control of the person in charge of the UAV.
- Within 50m of any person who is not involved with the flying of the UAV.

ANIMALS

Animals for the purpose of legislation are also to be protected from UAV flying. Anyone considering using a UAV for observing animals should consider the following:

7

- They have the same exemptions as people for how close you can fly (see para 7.3 above).
- Animals may be scared and act erratically risking harm to themselves or others when alarmed by a UAV
- Some animals, particularly birds can be very territorial and may attack the UAV risking harm to themselves and others by disrupting the UAV flight.

LEGISLATION

8

The following legislation is relevant to UAV operations:

- Health and Safety at Work etc. Act 1974
- Management of Health and Safety at Work Regulations 1999
- Provision and Use of Work Equipment Regulations 1998
- The Air Navigation Order 2009 (SI2009 No. 3015)
- The Rules of the Air Regulations 2015 (SI2015 No.840)
- The Air Navigation (General) Regulations 2006 (SI2006 No. 601)
- Permanent Air Navigation (Restriction of Flying) Regulations
- The Civil Aviation Authority Regulations 1991 (SI1991 No.1672).
- The Data Protection Act 1998
- The Human Rights Act 1998 (Article 8)

9

FURTHER INFORMATION

The following documents can provide further more detailed information:

- CAP 658 CAA 'Model Aircraft: A guide to safe flying'
(<http://www.caa.co.uk/application.aspx?catid=33&pageType=65&appid=11&mode=detail&id=5631>)
- CAP 722 CAA 'Unmanned Aircraft System Operations in UK Airspace – Guidance'
(<http://www.caa.co.uk/CAP722>)
- CAA Approved training schools for UAV:

- 3ic Ltd
- Aerial Motion Pictures
- Cambridge UAV
- Commercial Drone Training Ltd
- Drone Pilot Academy Ltd
- UAV8 Ltd
- Sky Futures Ltd
- British Model Flying Association (<http://www.bmfa.org/>)

Version control

VERSION	KEEPER	REVIEWED	APPROVED BY	APPROVAL DATE
XX	H&S	Every four years	XXXXX	XX/XX/XX
Appendix 1:				
XX	H&S	Annually	XXXXX	XX/XX/XX