

ICAO RPAS Symposium



**RPAS operator responsibilities:
Ensuring that staff are trained/competent;
and safe planning of operations from start to
finish**

Michael Gadd
Business Lead, UAS
Safety & Airspace Regulation Group

UAS Key Principles

- **CAA's responsibility is to Protect the Public**
- **UAS are Aircraft** – simply an evolution of aviation
- **They are Piloted** – albeit remotely
- **Equivalence** – to manned aviation
 - doesn't mean 'identical', looking for an equivalent capability
- **No 'automatic rights'** - to airspace or special privileges
- **What are the differences?**
 - Control Inputs for flight management - Complexity
 - Dealing with failures/malfunctions – 'what the pilot would have done'
 - Collision avoidance – 'see and avoid / detect & avoid'

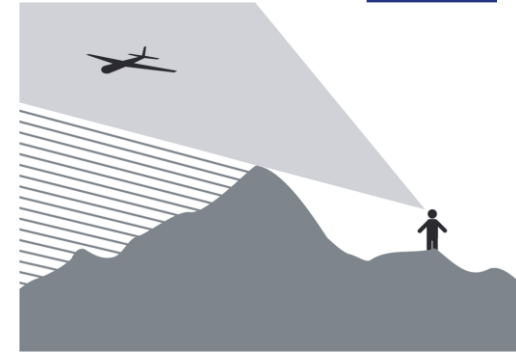
SAFE TO FLY & FLOWN SAFETY

'Airworthy' Aircraft -- Competent Operators/Pilots

UAS Ops Within UK Airspace

▪ **Visual Line of Sight (VLOS)**

- ‘See and Avoid’ responsibilities through direct visual observation
(i.e. you have to be able to see it sufficiently to manage it)
- Limited range - Size/Colour, weather conditions, Radio Link
- 400ft vertical, 500m horizontal – generally accepted limits



▪ **Beyond Visual Line of Sight (BVLOS)**

- ‘Detect and Avoid’ capability – technical solution
- May need Segregated Airspace (if no DAA system fitted)
- Clear evidence of ‘aviation threat management’

UK Regulations & Guidance



UK – Civil Aviation Act

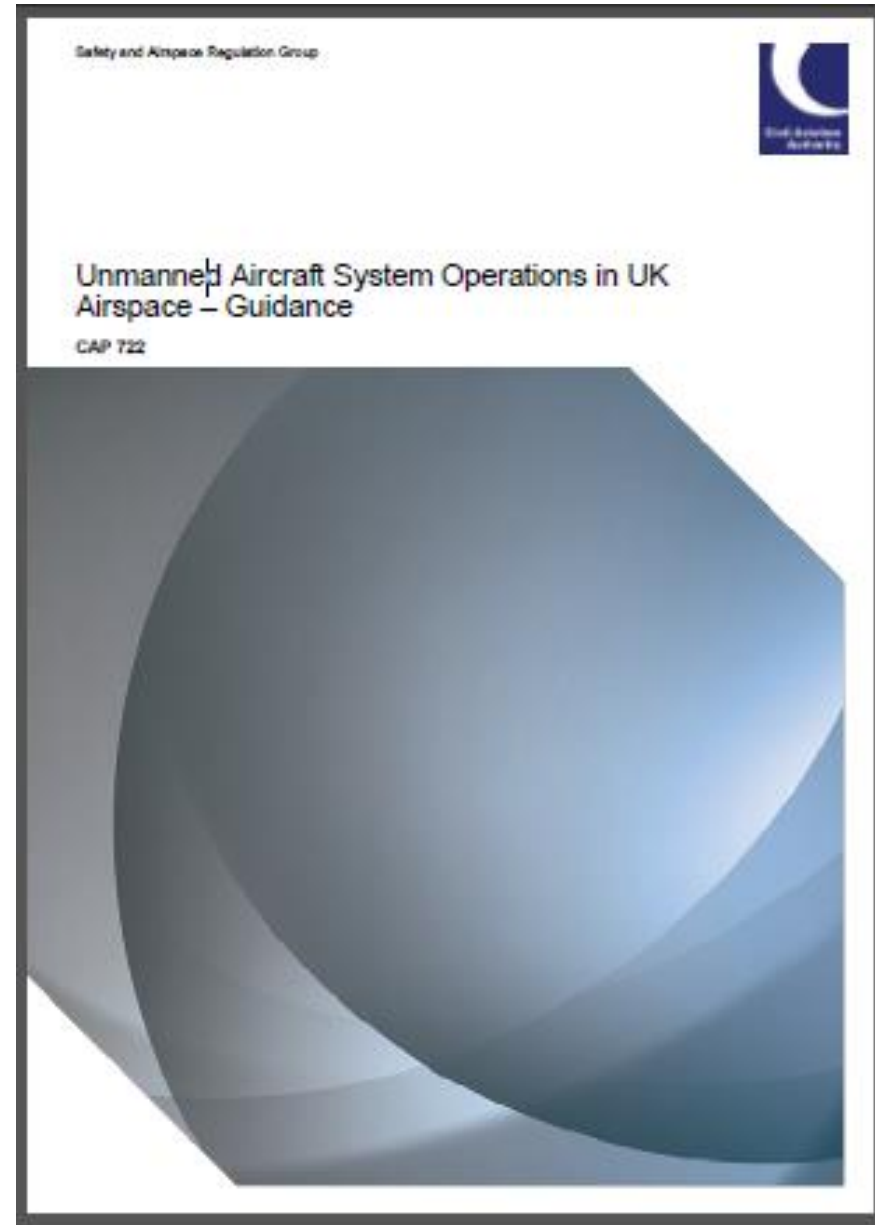
Air Navigation Order
(CAP 393)

British Civil Airworthiness
Requirements
(CAP 553 & 554)

Information & Procedures
(CAP 562)

Specific Guidance
(CAP 722, Edition 6 & IN-2017/018)

Web: www.caa.co.uk



ANO 2016 - Key Articles

■ 241 – Endangerment

- ‘A person shall not recklessly or negligently permit an aircraft to endanger persons or property’

■ 94 – Small Unmanned Aircraft (20kg or less)

- (1) A person shall not cause or permit any article or animal (whether or not attached to a parachute) to be dropped from a small aircraft so as to endanger persons or property.
- (2) The person in charge of a small unmanned aircraft may only fly the aircraft if reasonably satisfied that the flight can safely be made.
- (3) The person in charge of a small unmanned aircraft must maintain direct, unaided visual contact with the aircraft sufficient to monitor its flight path in relation to other aircraft, persons, vehicles, vessels and structures for the purpose of avoiding collisions.

ANO 2016 - Key Articles, cont.

- **94 – Small Unmanned Aircraft (Continued)**
 - (4) The person in charge of a small unmanned aircraft which has a mass of more than **7 kg** excluding its fuel but including any articles installed in or attached to the aircraft at the commencement of its flight, must not fly the aircraft:
 - (a) in Class A, C, D or E airspace unless the permission of the appropriate air traffic control unit has been obtained;
 - (b) within an aerodrome traffic zone during the notified hours of watch of the air traffic unit (if any) at that aerodrome unless the permission of any such air traffic control unit has been obtained; or
 - (c) at a height of more than 400 feet above the surface unless it is flying in airspace described in sub-paragraph (a) or (b) above and in accordance with the requirements for that airspace.
 - (5) The person in charge of a small unmanned aircraft must not fly such an aircraft for the purposes of commercial operations except in accordance with a permission granted by the CAA.

ANO 2016 - Key Articles, cont.

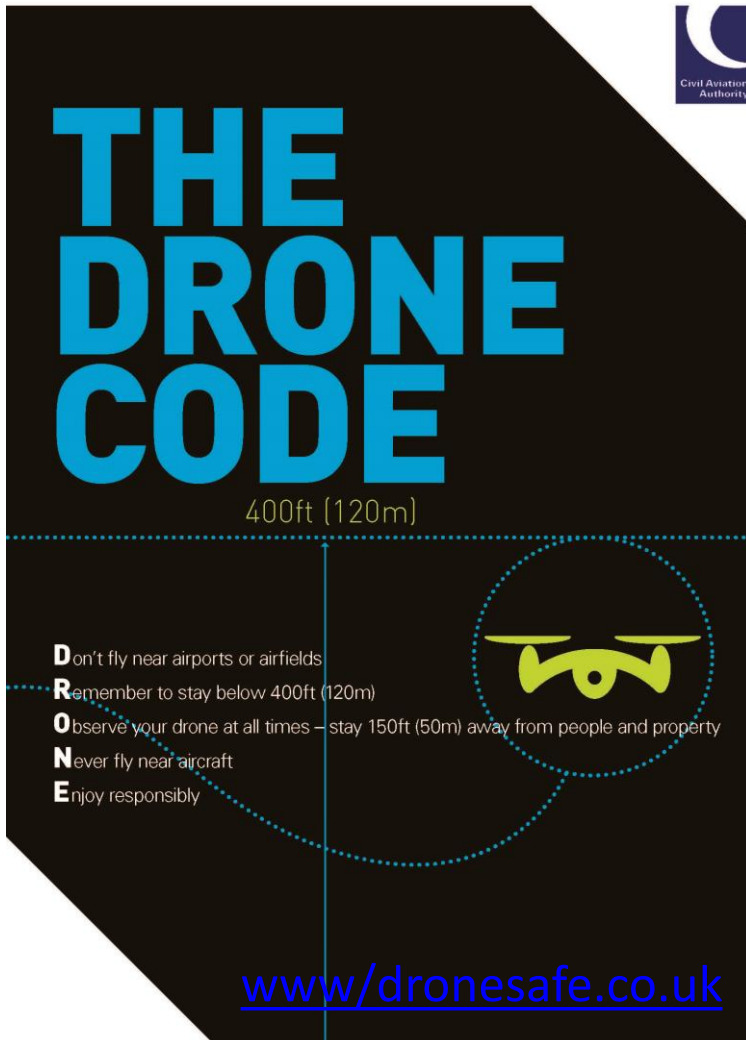


▪ 95 – Small Unmanned Surveillance Aircraft

- (1) The person in charge of a small unmanned surveillance aircraft must not fly the aircraft in any of the circumstances described in paragraph (2) except in accordance with a permission issued by the CAA.
- (2) The circumstances referred to in paragraph (1) are:
 - (a) over or within 150 metres of any congested area;
 - (b) over or within 150 metres of an organised open-air assembly of more than 1,000 persons;
 - (c) within 50 metres of any vessel, vehicle or structure which is not under the control of the person in charge of the aircraft; or
 - (d) subject to paragraphs (3) and (4), within 50 metres of any person.
- (3) Subject to paragraph (4), during take-off or landing, a small unmanned surveillance aircraft must not be flown within 30 metres of any person.
- (4) Paragraphs (2)(d) and (3) do not apply to the person in charge of the small unmanned surveillance aircraft or a person under the control of the person in charge of the aircraft.
- (5) In this article 'a small unmanned surveillance aircraft' means a small unmanned aircraft which is equipped to undertake any form of surveillance or data acquisition.
- **Congested Area** – *In relation to a city, town or settlement, any area which is substantially used for residential, commercial, industrial or recreational purposes.*

Small UAS Operations

- **Leisure Users:**
 - Must adhere to the Regulations but no specific Permission required.



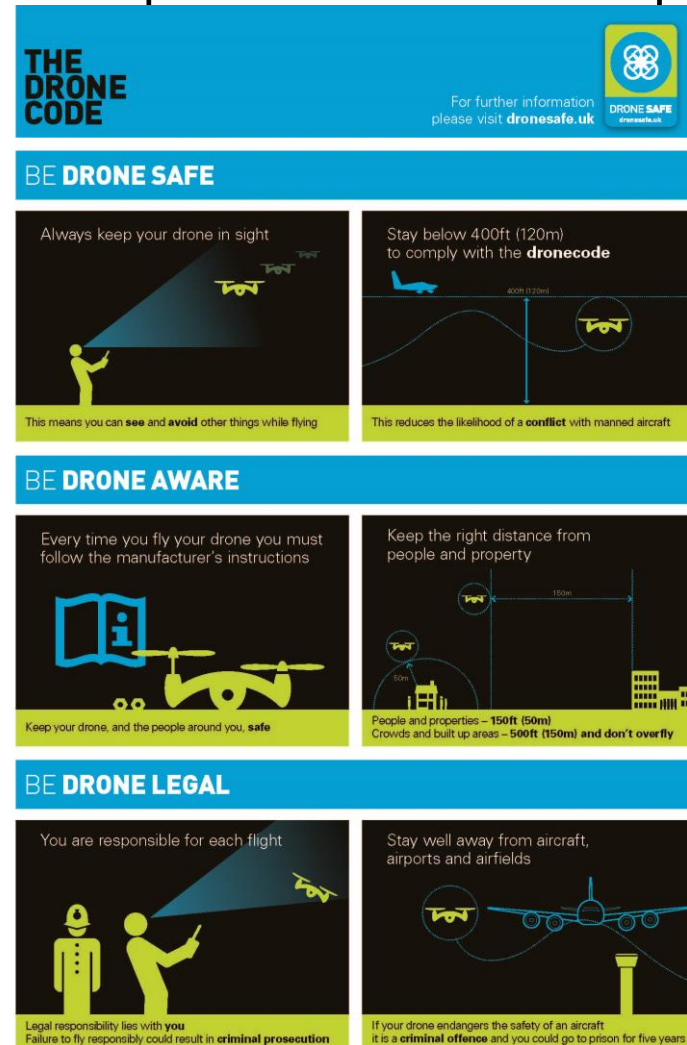
THE DRONE CODE

400ft (120m)

Don't fly near airports or airfields
Remember to stay below 400ft (120m)
Observe your drone at all times – stay 150ft (50m) away from people and property
Never fly near aircraft
Enjoy responsibly

www.dronesafe.co.uk

Civil Aviation Authority



THE DRONE CODE

For further information please visit dronesafe.uk

BE DRONE SAFE

Always keep your drone in sight

This means you can see and avoid other things while flying

Stay below 400ft (120m) to comply with the **dronecode**

This reduces the likelihood of a conflict with manned aircraft

BE DRONE AWARE

Every time you fly your drone you must follow the manufacturer's instructions

Keep your drone, and the people around you, safe

Keep the right distance from people and property

People and properties – 150ft (50m)
Crowds and built up areas – 500ft (150m) and don't overfly

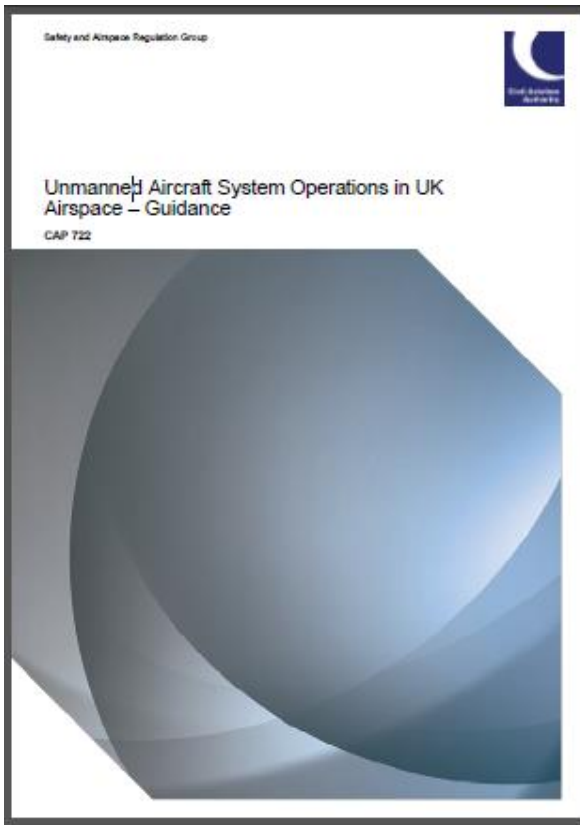
BE DRONE LEGAL

You are responsible for each flight

Legal responsibility lies with you
Failure to fly responsibly could result in **criminal prosecution**

Stay well away from aircraft, airports and airfields

If your drone endangers the safety of an aircraft it is a **criminal offence** and you could go to prison for five years



CAP 722

“Unmanned Aircraft System Operations in UK Airspace – Guidance”

Edition 6, 31 March 2015

- **WHY ?** - Demonstrate that UAS Operations are ‘safe enough’
- **WHAT ?** - Operation Centric Approach – focus on top level entity.
 - Level of Regulation proportionate to potential consequence
- **HOW ?** - CONOPS/safety case approach for UAS
 - What system? How it is to be used? Where is it to be used?
 - What happens when things go wrong?
 - Outlines requirements for Permissions/Exemptions

Small UAS Operations

- **Commercial Operators**

- Must adhere to the Regulations but a specific **Permission** is required for -

“...any operation of an aircraft other than for public transport —

(a) which is available to the public; or

(b) which, when not made available to the public, is performed under a contract between an operator and a customer, where the latter has no control over the operator,

in return for remuneration or other valuable consideration.”

Small UAS Permissions



- **‘Standard’ Permission**
 - Allows commercial work and operations within the conditions of Articles 94 and 95

- **‘Non-standard’ Permission**
 - Allows commercial work and operations outside of the conditions of Articles 94 and 95
 - For example, any mass – ops within 50m of third parties, over crowds for any mass
 - operations in congested areas for UAS over 7kg

- Application for a Permission requires an Operations manual with details of –
 - Organisation, management systems, key accountabilities, procedures etc.
 - The class/type of aircraft used
 - **Evidence of ‘remote pilot’ competency**
 - Operating Safety Case (OSC) produced by applicant to provide risk assessment approach and mitigations

Remote Pilot Competency



- The applicant for a Permission must provide suitable evidence of remote pilot competency. This must address three critical elements:
 - Adequate theoretical knowledge/general airmanship;
 - Successful completion of a practical flight assessment on the class of SUA that is being applied for; and
 - A minimum amount of recent flying experience on the class of SUA that is being applied for.

- Theoretical knowledge:
 - Air Law/Responsibilities, UAS Airspace Operating Principles, Airmanship and Aviation Safety, Human Factors, Meteorology, Navigation/Charts, Aircraft Knowledge, Operating Procedures

- Practical flight assessment:
 - Pre-flight actions including:
 - Mission planning, airspace considerations and site risk-assessment; Aircraft pre-flight inspection and set-up; Knowledge of the basic actions to be taken in the event of an aircraft emergency or potential mid-air collision hazard
 - In-flight procedures including:
 - Maintaining an effective look-out and remaining within Visual Line of Sight (VLOS); Performing accurate and controlled flight manoeuvres at representative heights and distances; Monitoring of aircraft status and endurance limitations; Demonstration of a 'fail-safe' features, e.g. return-to-home' function following control-link transmission failure
 - Post-flight actions including:
 - Shutting down/making-safe the aircraft; Post-flight inspection and recording of relevant data

Remote Pilot Competency Demonstration



- Demonstration can be made by -
 - Recommendation from CAA Approved National Qualified Entity (NQE)
 - Alternative means of compliance, e.g. previous aviation qualification

- NQE's –
 - Full Category –
 - Recommendations that an individual has successfully demonstrated meeting all three critical elements of the competency assessment.
 - A full category NQE may also make an assessment of and recommendation regarding the prospective operator's Operations Manual
 - Restricted Category –
 - Recommendations that an individual has successfully demonstrated meeting the practical flight assessment only

- NQE is a UK National approval. Hence, can only operate in UK and make recommendations for UK operations.

- Further information –
 - CAP 722, Appendix E
 - & Information Notice (IN) – 2017/018

 - www.caa.co.uk/uas

Thank You

mike.gadd@caa.co.uk

