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## Small Unmanned Aircraft Operations Within London and Other Towns and Cities

This Information Notice contains information that is for guidance and/or awareness.

Recipients are asked to ensure that this Information Notice is copied to all members of their staff who may have an interest in the information (including any 'in-house' or contracted maintenance organisations and relevant outside contractors).

<b>Applicability:</b>	
<b>Aerodromes:</b>	All Aerodromes
<b>Air Traffic:</b>	All ATC Units
<b>Airspace:</b>	Not primarily affected
<b>Airworthiness:</b>	Not primarily affected
<b>Flight Operations:</b>	All Unmanned Aircraft Systems Operators
<b>Licensed/Unlicensed Personnel:</b>	All Unmanned Aircraft Systems Operators

### 1 Introduction

- 1.1 The purpose of this Information Notice is to provide guidance to operators of Small Unmanned Aircraft (SUA) and Small Unmanned Surveillance Aircraft (SUSA) who wish to operate within congested areas in relation to towns and cities. The latest generation of commercially-available SUA have very advanced capabilities in relation to their size and cost; this has led to a surge in their utilisation for a wide range cinematographic and survey tasks and an increasing demand for their employment in urban areas. Operations in urban areas require an additional understanding of the complexities of the environment and of the safety and operational limitations that are suitable for London and other towns and cities.
- 1.2 In addition to the general guidance on areas of operation in this Information Notice, additional specific airspace guidance for operators wishing to undertake aerial work and surveillance (filming and photographic) operations within London is given in [paragraph 5](#). Most of the principles and procedures described will also apply to other large towns and cities within the UK. London has been featured due to its combined characteristics of population density, commercial air traffic volumes, large blocks of controlled airspace down to the surface, two major airports, a low-level helicopter route system, a central licensed heliport and several specialised restricted areas.
- 1.3 All reference to SUA and SUSA in this Information Notice should be interpreted to apply to other aircraft of the same category but that may be known by an alternative name such as 'Drone', Unmanned Aerial Vehicle (UAV), Unmanned Aircraft System (UAS), Remotely Piloted Vehicle (RPV), Remotely Piloted Aircraft System (RPAS) etc.

- 1.4 This Information Notice covers the use of SUA by civil operators and does not include military systems. Comprehensive guidance on Unmanned Aircraft System (UAS) operations in UK airspace can be found in [CAP 722](#).

## 2 Definitions

- 2.1 'SUA' means any unmanned aircraft, other than a balloon or a kite, having a mass of not more than 20 kg without its fuel but including any articles or equipment installed in or attached to the aircraft at the commencement of its flight. The majority of such SUA are of the electrically-powered 'multi-rotor' type whose typical flight endurance with a payload is in the order of 6-15 minutes.
- 2.2 'SUSA' means a SUA which is equipped to undertake any form of surveillance or data acquisition.
- 2.3 A 'Congested Area' is defined in Article 255 of the Air Navigation Order (ANO) 2009. The definition states that a 'Congested Area' means any area in relation to a city, town or settlement which is substantially used for residential, industrial, commercial or recreational purposes. Operations of SUA within congested areas may be permitted in specific circumstances as described in the remainder of this Information Notice.

## 3 The Requirements

- 3.1 The table below shows that the applicable legal requirements in articles 166 and 167 of the ANO 2009 for the operation of any SUA depend upon the weight of the aircraft and whether or not it is surveillance equipped. The CAA-issued aerial work permission may allow some exemptions against Article 167(1) and (2) dependent on the weight of the aircraft.

<b>The requirements in the ANO 2009 for SUA (Small Unmanned Aircraft of weights between 0 and 20 kg)</b>	<b>SUA 0-7 kg</b>	<b>SUA &gt;7 kg</b>	<b>SUSA 0-7 kg</b>	<b>SUSA &gt;7 kg</b>
166(1) A person must not cause or permit any article or animal (whether or not attached to a parachute) to be dropped from a SUA so as to endanger persons or property.	✓	✓	✓	✓
166(2) The person in charge of a SUA may only fly the aircraft if reasonably satisfied that the flight can safely be made.	✓	✓	✓	✓
166(3) The person in charge of a SUA 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.	✓	✓	✓	✓

<b>The requirements in the ANO 2009 for SUA (Small Unmanned Aircraft of weights between 0 and 20 kg)</b>	<b>SUA 0-7 kg</b>	<b>SUA &gt;7 kg</b>	<b>SUSA 0-7 kg</b>	<b>SUSA &gt;7 kg</b>
<p>166(4) The person in charge of a SUA which has a mass of more than 7 kg excluding its fuel but including any articles or equipment installed in or attached to the aircraft at the commencement of its flight, must not fly the aircraft —</p> <p>(a) in Class A, C, D or E airspace unless the permission of the appropriate air traffic control unit has been obtained;</p> <p>(b) within an aerodrome traffic zone during the notified hours of watch of the air traffic control unit (if any) at that aerodrome unless the permission of any such air traffic control unit has been obtained; or</p> <p>(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) and in accordance with the requirements for that airspace.</p>		✓		✓
<p>166(5) The person in charge of a SUA must not fly the aircraft for the purposes of aerial work except in accordance with a permission granted by the CAA.</p>	✓	✓	✓	✓
<p>167(1)&amp;(2) The person in charge of a SUSA must have permission from the CAA to fly —</p> <p>(a) over or within 150 metres of any congested area;</p> <p>(b) over or within 150 metres of an organised open-air assembly of more than 1,000 persons;</p> <p>(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</p> <p>(d) except when taking off and landing (see below), within 50 metres of any person.</p>			✓	✓
<p>167(3)&amp;(4) During take-off or landing, a SUSA must not be flown within 30 metres of any person except that it can be flown within 30 metres of the person in charge of the SUSA or another person under the control of the person in charge of the SUSA.</p>			✓	✓

## 4 General Operational Considerations

### 4.1 Visual Line Of Sight (VLOS)

4.1.1 Unless an exemption has been given by the CAA, SUA may not be operated beyond the direct, unaided VLOS of the operator. The standard CAA permission for aerial work limits the SUA/SUSA VLOS to a height not exceeding **400 feet** above ground level and a distance not beyond the visual range of the operator, or a maximum distance of **500 metres**.

### 4.2 Data Protection

4.2.1 The CAA permission process to operate a SUA is only intended to assist in ensuring the flights can be accomplished safely. The permission does not extend rights to any other purpose such as the collection of images, data or for advertising purposes.

4.2.2 Aircraft operators and pilots should be aware that the collection of images of identifiable individuals, even inadvertently, when using surveillance cameras mounted on a SUSA, may be subject to the Data Protection Act. As this Act contains requirements concerning the collection, storage and use of such images, SUA operators should ensure that they are complying with any such applicable requirements or exemptions. Further information about the Data Protection Act and the circumstances in which it applies can be obtained from the [Information Commissioner's Office](#).

### 4.3 Aircraft and Public Liability Insurance

4.3.1 EU Regulation (EC) No. 785/2005 contains insurance requirements dependent on the aircraft weight category. Although 'model' aircraft of less than 20 kg are not required to have this type of aviation insurance, commercial SUA Operators are strongly advised to have sufficient Public Liability insurance to cover their type of SUA activity.

## 5 London Airspace Considerations

### 5.1 London Aerodromes and Aerodrome Traffic Zones

5.1.1 London Heathrow and London City airports exert a major influence over the characteristics of London airspace and often require that any aircraft operating low-level Visual Flight Rules (VFR) flights adhere to notified routes and procedures to avoid traffic conflict. This is particularly true of VFR helicopter flights in and around London, which are often under active control and confined to a route-structure with changing altitude limitations. Information on this low-level VFR helicopter route structure is provided in the [London Heathrow \(EGLL\)](#) entry in the AD section of the Integrated Aeronautical Information Publication (IAIP) and portrayed on Helicopter Routes in the London Control Zone chart (Scale 1: 50,000, Series GSGS 5542). Operators are strongly advised to have a current copy of this chart available when on-site.

5.1.2 Due to their small size and ability to operate out of small sites in towns and cities, SUA are particularly difficult to see against an urban backdrop versus the relatively much larger size of a manned aircraft. The majority of SUA do not have an anti-collision beacon (although they may have other lights of lesser illumination - typically LEDs) and they are not currently required to be fitted with a transponder. The small size and the open-framework, symmetrical structure of a multi-rotor SUA mean that it may not be clearly visible until at a much closer distance than would be the case between two manned aircraft, particularly when the SUA is hovering or moving slowly. Sighting of a SUA from another aircraft is likely to be a 'late sighting' with reduced time to alter course.

5.1.3 Therefore in addition to maintaining direct, visual VLOS and keeping to a height of no more than 400 feet above the surface, SUA pilots should avoid and give way to manned aircraft at all times. SUA must fly no higher than 300 feet when operating directly below the London helicopter routes, whether on land or over the Thames. Any flight directly below the helicopter

routes must be authorised by Air Traffic Control (ATC) prior to flight (see paragraph 5.1.6 below).

- 5.1.4 In addition to the helicopter route structure and information on London Heathrow and London City, the AD section of the IAIP also includes data and charts for **London Heliport (EGLW)**. The London Heliport Aerodrome Traffic Zone (ATZ) comprises a 2 NM circle from the surface to 2,000 feet and has an associated Local Flying Area (LFA) to the south from the surface up to 1,000 feet. The airspace dedicated to London Heliport may well cover areas where SUA wish to fly including the River Thames and riverside developments.
- 5.1.5 London has several unlicensed helicopter landing sites including hospital helipads, the Vanguard helipad at the Isle of Dogs, as well as numerous Police helicopter and air ambulance flights, aircraft of which may loiter at low-level or land and take off from any of the Capital's streets or parks. All of these types of helicopter operations may therefore be affected by SUA operations particularly when approaching to land or departing from a site; SUA operators should take active precautionary measures to avoid creating a collision risk.
- 5.1.6 Under ANO 2009 Article 166, operators of SUA weighing 7 kg or less are not required to gain permission from ATC in Class A, C, D or E airspace. However, Article 166 also states that a person in charge of a small unmanned aircraft 'may only fly the aircraft if reasonably satisfied that the flight can safely be made' and that they 'must maintain direct, unaided visual contact with the aircraft ... for the purpose of avoiding collisions'. In practical terms, SUA could present a particular hazard when operating near an aerodrome or other landing site due to the presence of manned aircraft taking off and landing within the SUA VLOS height range of 400 feet. In the case of flights in close proximity to the main London airports, London Heliport and the low-level helicopter route system, SUA pilots of aircraft of all weight categories should contact the appropriate ATC service providers and advise them of their activities prior to flight. This airmanship action would help to meet the requirement for operators to 'only fly the aircraft if reasonably satisfied that the flight can be safely made' in regards to forewarning other aircraft that are in receipt of an air traffic service. Contact details for aerodromes and Air Traffic Services (ATS) are in the AD and ENR entries of the **IAIP**.
- 5.1.7 Pilots of SUA in the weight range 7 kg – 20 kg must in any case obtain the permission of the appropriate ATC unit for flights within Class A, C, D or E (if instituted) airspace.
- 5.1.8 On contacting the appropriate ATS, the SUA operator must pass sufficient information to allow the Controller to assess whether the aircraft will be a collision risk 'factor' to other aircraft. Notice to Airmen (NOTAM) action at each site is generally not required due to the typically small scale, duration and operating limitations of SUA operations. Such a requirement should, however, form part of the risk assessment process, particularly outside of controlled airspace and when several SUA will be operating together ('swarming').

## **5.2 London Restricted Areas EG R157, R158 and R159**

- 5.2.1 The Air Navigation (Restriction of Flying) (Hyde Park) Regulations 2004, Air Navigation (Restriction of Flying) (City of London) Regulations 2004 and Air Navigation (Restriction of Flying) (Isle of Dogs) Regulations 2004 within **CAP 393** lay down restrictions on aircraft operations (which include SUA) within three defined airspace areas: EG R157 (vicinity of Hyde Park), EG R158 (vicinity of the City of London) and EG R159 (vicinity of the Isle of Dogs). These Restricted Areas are described in the IAIP at **ENR 5.1** and are marked on current VFR charts. The restrictions require, with certain exceptions, that no aircraft shall fly below 1,400 feet AMSL within these areas unless in accordance with an Enhanced Non-Standard Flight (ENSF) clearance issued by the appropriate ATC unit.
- 5.2.2 The procedure for gaining an ENSF clearance for these Restricted Areas is described at IAIP ENR 1.1, paragraph 4.1.6 and the clearance is initially granted by NATS. Operators can utilise

the web-based application process at the [NATS website](#) and will then need to comply with any conditions imposed by the clearance. Operators should note that the ENSF process also involves security considerations that would apply to any flight by a SUA whether or not engaged in aerial work or equipped for surveillance or data acquisition. The ENSF process may take up to 21 days before the grant of an approval.

## 6 Congested Area Operations

### 6.1 Protection of Third Parties

6.1.1 Under ANO 2009 Article 138, operators of SUA must not recklessly or negligently cause or permit their aircraft to endanger any person or property. SUA flights within the densely-populated urban environment of London and other towns and cities have a high probability of causing endangerment unless conditions are put on their use so that they reduce the risk to third parties, i.e. the general public. SUA do not currently have any recognised design, certification or other airworthiness standards and therefore operational restrictions have been established that limit the circumstances and locations at which the aircraft can be operated (see [paragraph 4](#)). Each specific limitation can only be varied or exempted in accordance with a permission or exemption granted by the CAA. For operations in congested areas, a SUA operator will need to apply to the CAA for permission to fly a camera-equipped SUA:

- Over or within 150 metres of any congested area.
- Over or within 150 metres of an organised open-air assembly of more than 1,000 persons.
- When not engaged in take-off or landing, within 50 metres of any person, vessel, vehicle or structure which is not under the control of the person in charge of the aircraft (during take-off or landing this may be reduced to 30 metres or less if attendant persons are under the control of the person in charge of the aircraft).

Such a permission would be suitable for those SUA operators that find they are frequently engaged in towns and cities to carry out work for film and TV productions, advertising agencies, marketing or other publicity events, photographic work for large property developments or survey or infrastructure inspections at industrial sites. **There is no guarantee that permission can be granted to reduce these distances, especially for any SUA weighing more than 7 kg.**

6.1.2 The standard CAA permission for SUA in the 7 kg or less category allows flight within congested areas to within 50 metres of persons, structures etc. (or within 30 metres if the persons are under the control of the person in charge of the aircraft). This category cannot fly within 150 m of open-air assemblies of 1,000 people or more.

6.1.3 A SUSA in the weight category 7-20 kg is not normally allowed to fly within congested areas. An operator may apply to the CAA to have their existing permission varied for specific flights dependent on a number of factors detailed below at paragraphs 6.2 and 6.3. These variations are currently granted only on an exceptional basis and should not be relied upon by the operator as the foundation of their business model.

6.1.4 In any circumstances or weight category, it should be noted that flights directly overhead persons and vehicles will not be allowed at any height in a congested area unless they are under the control of the person in charge of the aircraft.

6.1.5 Fully certified manned aircraft such as helicopters are not restricted by this overflight requirement and are more suitable for the full range of flight manoeuvres and direct overhead film and photographic activity.

6.1.6 Persons under the control of the person in charge of the aircraft can generally be defined as:

- Persons solely present for the purpose of participating in the SUA flight operation.
- Persons under the control of the event or site manager who can reasonably be expected to follow directions and safety precautions to avoid unplanned interactions with the SUA. Such persons could include building-site or other industrial workers, film and TV production staff and any other pre-briefed, nominated individuals with an essential task to perform in relation to the event.

6.1.7 Spectators or other persons gathered for sports or other mass public events that have not been specifically established for the purpose of the SUA operation are generally not regarded as being 'under the control of the person in charge of the aircraft'. In principle, persons under the control of the person in charge of the aircraft at a **mass public event** must be able to:

- elect to participate or not to participate with the SUA flight operations;
- broadly understand the risk posed to them inherent in the SUA flight operations;
- have reasonable safeguards instituted for them by the site manager and SUA operator during the period of SUA flight operations; and
- not have restrictions placed on their engagement with the purpose of the event or activity for which they are present if they do not elect to participate with the SUA operation.

**Note:** As an example, it is not sufficient for persons at a public event to have been informed of the operations of the SUA via such means as public address systems, website publishing, e-mail, text and electronic or other means of ticketing, etc. without being also able to satisfy the points above. Permissions have, however, occasionally been granted for SUA flights at public events and these involved a segregated take-off site within the main event, with the SUA operating only vertically within strict lateral limits that keep it directly overhead the take-off site. Such flights were also limited by a height restriction and the tolerance of the SUA to wind effects and battery endurance.

6.1.8 A CAA permission only addresses the flight safety aspects of the flight and does not constitute permission to disregard the legitimate interests of other statutory bodies such as the Police, the Highway Agency, Transport for London or local authorities.

## 6.2 Operational Factors for SUA Flights Within Congested Areas

6.2.1 In order to fly a SUA in a congested area, SUA operators must establish safety and operational control measures that prevent the SUA from endangering the general public. Operators are advised to ensure that their existing risk assessment and operating procedures address the enhanced measures required for congested areas. The procedures should address all relevant aspects of the congested areas they intend to operate within, taking into account any special circumstances or local conditions. Such measures may include but not be limited to:

- **Segregation.** Segregating the activities from public interference by placing physical barriers and cordons, or using other built/natural features that effectively separate the SUA operation from the general public.
- **Crowd control.** Marshalling or other active crowd control measures that restrict access to the area within which the SUA is operating.
- **Wind and turbulence.** Taking account of changes of wind strength and direction at varying heights above the surface. Windshear, 'rotor' and 'curl-over' effects may be present at any point on the planned flight path caused by interactions between buildings and strong winds or when transitioning from flight over a land to a water surface.

- **Utilisation of other agencies.** Liaising with the Police, local authorities and other controlling agencies/organisation to gain official road closures, traffic cessation or site access restrictions.

**Note:** These measures should ideally be proportionate to the risk posed by the SUA bearing in mind the limited flight times and size and weight of the aircraft. Temporary restrictions may suffice in some cases. Restrictions that would be suitable for a full-size aircraft such as a helicopter in most cases would not be applicable to a SUA.

- **Radio Frequency (RF) interference.** Pilots should take account of the possible reduction in operating range in an urban environment due to the heavy use of communications (mobile telephone, WiFi etc.) equipment and other sources of electromagnetic spectrum / RF interference. Mitigation for the consequences of weak or lost GPS signal due to masking by buildings should be considered along with the general RF saturation level. The use of a spectrum analyser is recommended to assist in assessing the level of local electromagnetic and RF congestion in the 2.4 GHz or 35 MHz frequency range.
- **Emergency procedures.** SUA emergency procedures planned to be implemented during controller / transmitter / loss of GPS guidance failure modes should be able to be put into effect without breaching the minimum separation distances or flying directly overhead persons/vehicles. An automatic 'Return-to-Base' feature should not cause a hazard to anyone off the nominal flight path; this may limit the SUA to mainly vertical flight paths directly above the launch point.
- **Test flights.** It is desirable to conduct limited test flights (hover controllability check) and other systems tests at the launch point before committing to the full flight profile. The integration and correct set-up of the camera and gimbal-mounted should also be checked at this time to avoid unnecessary calibration flights.

6.2.2 The procedures and limitations on the use of the SUA that will be used to establish these control measures should be stated in the SUA operators' operations manual.

### 6.3 Aircraft Airworthiness Standards for Aircraft Flying Within a Congested Area

6.3.1 SUA in the weight category 20 kg and below do not currently have any recognised standards of design, certification, production or continued airworthiness (maintenance). Whilst this has allowed the rapid growth and development of the SUA industry, it has also meant that operational limitations have had to be placed on their use as previously described.

6.3.2 It is envisaged that any long-term exemption from the current SUA operational limitations will need to be based on a deeper technical assessment and understanding of the airworthiness characteristics and capabilities of each individual aircraft. This assessment process would be undertaken by CAA Airworthiness Certification staff (or an appropriately accredited body) who will examine the technical 'safety case' put forward by the SUA operator for their particular operation. In outline, the 'safety case' would assess:

- the organisation's/individual's competences to undertake the planned work;
- the technical specification, systems integrity and capabilities of the SUA;
- the organisation's/individual's ability to mitigate the hazardous outcome of various failure scenarios; and
- the organisation's/individual's ability to maintain the in accordance with the accepted technical specification.

6.3.3 Developments on the assessment process and the associated fee structure will be the subject of a specific Information Notice when finalised.

## **7 Regulatory Enforcement**

- 7.1 The CAA takes breaches of aviation seriously and will seek to prosecute in cases where dangerous and illegal flying has taken place. The first such prosecution in the UK took place in April 2014 when an individual was convicted of two offences including flying a small unmanned surveillance aircraft within 50 metres of a structure (bridge with traffic) (Article 167 of the Air Navigation Order 2009). The individual was fined £800 at a District Magistrate Court, plus costs of £3,500.
- 7.2 This conviction followed the case of a photographer accepting a caution for using a SUA for commercial gain without permission. The photographer had sold footage from his quadcopter to media organisations. More information on the regulation of SUA, including a list of operators with permission to fly SUA for commercial use, is available at [www.caa.co.uk/uas](http://www.caa.co.uk/uas).

## **8 Queries**

- 8.1 Any queries or requests for further guidance as a result of this communication should be addressed to the [FOD.Admin@caa.co.uk](mailto:FOD.Admin@caa.co.uk) e-mail address.

## **9 Cancellation**

- 9.1 This Information Notice will remain in force until March 2015.