

A COMPREHENSIVE GUIDE FOR THE SAFE OPERATION OF MODEL AIRCRAFT, SMALL UNMANNED AIRCRAFT, UAVs, DRONES & SMALL SURVEILLANCE AIRCRAFT IN JERSEY

1 Introduction

- 1.1 This guide has been put together by Jersey Air Traffic Control in conjunction with the Jersey Director of Civil Aviation (DCA) and the Jersey Model Aero Club to provide guidance to operators of Small 'Unmanned' Aircraft (SUA) and Small 'Unmanned' Surveillance Aircraft (SUSA) who wish to operate on Jersey.
- 1.2 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 popularity along with utilisation for a wide range of photographic, cinematographic and survey tasks. Operations in urban areas require an additional understanding of the complexities of the environment and of the safety and operational limitations that are appropriate for parishes and towns. Similarly, operational restrictions apply in the vicinity of Jersey Airport and surrounding airspace for the protection of general air traffic including commercial flights into and out of Jersey.
- 1.3 In addition to the general guidance regarding the operation of SUA in this document, specific guidance for operators wishing to undertake **AERIAL WORK** and **SURVEILLANCE** (any filming and photographic activity) operations within Jersey Airspace is given in Appendix B.
- 1.4 New Legislation concerning the operation of Small Aircraft came into force on 15th August 2014. This legislation has been integrated into the new Air Navigation (Jersey) Law 2014 which came into force on 16th December 2014. This document has been compiled to reflect local regulations and includes guidelines and best practice as established in both the UK and Channel Islands.
- 1.5 A copy of article 52 of the Air Navigation (Jersey) Law 2014 can be found in appendix A.
- 1.6 All reference to SUA and SUSA in this guide should be interpreted to apply to other 'model aircraft' of the same category but which may be known by alternative names such as Drone, Unmanned Aerial Vehicle (UAV), Unmanned Aircraft System (UAS), Remotely Piloted Vehicle (RPV), Remotely Piloted Aircraft System (RPAS), Small Aircraft, Helicopter, Helicam, Multi Rotor, etc.

2 Scope

- 2.1 This document is generally targeted at the use by civilian operators in Jersey of SUA & SUSA with a mass below 7kg as additional restrictions exist pertaining to the operation of larger models.
- 2.2 The Jersey Model Aero Club is currently the only organisation on the Island which has permissions in place with the Director of Civil Aviation and ATC for the operation of SUA with a mass between 7kg and 20kgs.

3 Terminology

- 3.1 **Small Unmanned Aircraft** means any unmanned aircraft, other than a balloon or a kite, having a mass of not more than 20 kilograms without its fuel but including any articles or equipment installed in or attached to the aircraft at the commencement of its flight.
- 3.1.1 Many such SUA are of the electrically powered 'multi rotor' type. However, the term SUA refers to all unmanned model aircraft including other electric types, internal combustion, turbine powered aircraft and gliders.
- 3.1.2 For electrically propelled aircraft, the battery itself is considered to be a part of the aircraft - it is the battery's charge that is the fuel. Accordingly the aircraft weight for the purposes of local rules should be determined including its flight batteries.
- 3.2 **Small Unmanned Surveillance Aircraft (SUSA)** means any SUA which is equipped to undertake any form of surveillance or data acquisition. Basically if you attach any form of camera to any small unmanned aircraft it becomes a Small Surveillance Aircraft regardless of whether or not data is streamed back to the operator.
- 3.3 **Congested Area** means, in relation to a city, town, or settlement, any area which is substantially used for residential, commercial, industrial, or recreational purposes.
- 3.4 **Aerodrome Traffic Zone** means the airspace extending from the surface to a height of 2,000 feet above the level of the aerodrome within the area bounded by a circle centred on the notified mid-point of the longest runway and having a radius of 2 nautical miles.
- 3.4.1 Jersey Aerodrome Traffic Zone (Red Circle)



- 3.5 **Aerial work** means any purpose (other than commercial air transport) for which an aircraft is flown if valuable consideration is given or promised in respect of the flight or the purpose of the flight.
- 3.5.1 Operators/Pilots should carefully consider the "purpose of the flight". If the flight is being conducted as part of any business/commercial undertaking then it will most likely be deemed to be aerial work.
- 3.5.2 It should be noted that the 'valuable consideration' element may not be restricted solely to the operator/pilot. For example: If the purpose of the flight was to obtain photographs/video which were then 'gifted' to a charity or such like who in turn received 'valuable consideration' this would most likely still come under the definition of 'Aerial Work'.
- 3.5.3 Please see Appendix B for examples of what might be considered Aerial Work.

4 The Requirements

4.1 The tables below identifies the current applicable legal requirements relating to the use of small aircraft. Other regulation may also apply.

Air Navigation (Jersey) Law 2014 Article 147 Endangering safety of any person or property		SUA 0-7 kg	SUSA 0-7 kg	SUA 7- 20 kg	SUSA 7-20 kg
147	A person shall not recklessly or negligently cause or permit an aircraft to endanger any person or property.	✓	✓	✓	✓

Air Navigation (Jersey) Law 2014 Article 52 Regulation of small unmanned aircraft		SUA 0-7 kg	SUSA 0-7 kg	SUA 7- 20 kg	SUSA 7-20 kg
52(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 unmanned aircraft so as to endanger persons or property.	✓	✓	✓	✓
52(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.	✓	✓	✓	✓
52(3)	The person in charge of a small unmanned aircraft shall 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.	✓	✓	✓	✓
52(4)	The person in charge of a small unmanned aircraft shall not fly the aircraft – (a) at a height of more than 400 feet above the surface; or (b) within an aerodrome traffic zone during the notified hours of watch (if any) of the air traffic control unit at that aerodrome, unless the permission of the appropriate air traffic control unit has been obtained.	✓	✓	✓	✓
52(5)	The person in charge of a small unmanned aircraft which has a mass of more than 7 kilograms, excluding its fuel but including any articles or equipment installed in or attached to the aircraft at the commencement of its flight, shall not fly the aircraft in Class A, C, D or E airspace unless the permission of the appropriate air traffic control unit has been obtained.			✓	✓
52(6)	The person in charge of a small unmanned aircraft shall not fly the aircraft for the purposes of aerial work except in accordance with a permission granted by the Director.	✓	✓	✓	✓
52(7)	The person in charge of a small unmanned surveillance aircraft shall not fly the aircraft in any of the circumstances described in paragraph (8) except in accordance with a permission issued by the Director.		✓		✓
52(8)	The circumstances referred to in paragraph (7) 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 (9) and (10), within 50 metres of any person.		✓		✓
52(9)	Subject to paragraph (10), during take-off or landing, a small unmanned surveillance aircraft shall not be flown within 30 metres of any person.		✓		✓
52(10)	Paragraphs (8)(d) and (9) 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.		✓		✓
52(11)	In this Article “small unmanned surveillance aircraft” means a small unmanned aircraft that is equipped to undertake any form of surveillance or data acquisition.		✓		✓

5 General Operational Considerations

5.1 Endangerment and Safety

- 5.1.1 Article 52 of the Air Navigation (Jersey) Law 2014 deals with the concept of endangerment and safe operation of any SUA on Jersey.
- 5.1.2 The Jersey Model Aero Club flying site at Les Landes is currently the only notified site on the Island where the operation of powered SUA takes place. This site is identified in the Jersey section of the UK Aeronautical Information Publication (AIP) and use of the site for the operation of SUA is restricted to Club Members and their invited guests. This area of Les Landes was designated a Site of Special Interest (SSI) in January 1996 and members of the club are required to follow specific safety procedures to mitigate both the risk to the General Public and also the Environment. The club restricts the operation of internal combustion, turbine and noisier electric models to certain times of the day and rigorously enforces the need for all operators to hold appropriate insurance.
- 5.1.3 The Jersey Model Aero Club has registered with Jersey ATC a number of cliff based gliding sites along with some additional locations where members may occasionally operate “appropriate” smaller electric aircraft.
- 5.1.4 There is no doubt that on a small island such as Jersey where space is relatively limited, the operator of a SUA must carefully consider both the type of aircraft to be flown and the location they intend to operate in. The British Model Flying Association (BMFA) handbook, although based on UK Legislation, provides a wealth of information regarding the safe operation of small unmanned aircraft and is recommended reading for any operator.

5.2 Visual Line of Sight (VLOS)

- 5.2.1 Unless an exemption has been given by the DCA, SUA may not be operated beyond the direct, unaided VLOS of the operator.
- 5.2.2 This prohibits the operation of SUA under **First Person View**. (See para 9)
- 5.2.3 The standard DCA permission for aerial work normally limits the SUA/SUSA VLOS to a height not exceeding 400 feet above ground level and to a distance not beyond the visual range of the operator and in any event no greater than 500m.

5.3 Operating height

- 5.3.1 All SUA in Jersey are restricted to operations not exceeding 400 feet above ground level unless the permission of Jersey Air Traffic Control (ATC) has been obtained.

5.4 Jersey Airspace

- 5.5 The size of Jersey and the location of the Airport often require that aircraft operating at low level on Visual Flight Rules (VFR) adhere to notified routes and procedures to avoid traffic conflicts.
- 5.6 Any operation of SUA/SUSA within 2nm of Jersey Airport must be authorised by Air Traffic Control (ATC) prior to flight.
- 5.7 Due to their small size and ability to operate out of small sites, most SUA are particularly difficult to see against the island 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.

- 5.8 Therefore in addition to maintaining direct, Visual Line of Sight (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.**

6 Data Protection

- 6.1 The DCA and ATC 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.
- 6.2 Where information collected by surveillance aircraft relates to personally identifiable information the person in charge (as defined) must ensure that where applicable, all requirements of the Data Protection (Jersey) Law 2005 are complied with.
- 6.3 Specifically, where the data are (or intended to be) processed for anything other than domestic purposes, the person in charge may be required to notify with the Office of the Information Commissioner. Further, all personal data collected must be processed in compliance with the data protection principles as set out in the Law.
- 6.4 Further information regarding the Law is available on www.dataprotection.gov.je

7 Aircraft and Public Liability Insurance

- 7.1 Although 'model' aircraft of less than 20 kg are not necessarily required to have specific aviation insurance, SUA operators are strongly advised to have sufficient Public Liability insurance to cover their type of SUA activity.
- 7.2 Members of the Jersey Model Aero Club are affiliated to the British Model Flying Association and membership includes public liability insurance on a personal basis.

8 Regulatory Enforcement

- 8.1 The DCA takes breaches of aviation Law seriously and will seek to prosecute in cases where dangerous and illegal flying has taken place.
- 8.2 The first such prosecution in the UK by the Civil Aviation Authority 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 (A road bridge with traffic) (Article 167 of the UK Air Navigation Order 2009). The individual was fined £800 at a District Magistrate Court, plus costs of £3,500.
- 8.3 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.

9 First Person View (FPV)

- 9.1 First Person View normally involves mounting a small video camera and an analogue video transmitter to SUA and flying by means of a live video down-link, commonly displayed on video goggles or a portable LCD screen.
- 9.2 Article 52(3) of the Air Navigation (Jersey) Law 2014 requires the operator to maintain direct unaided visual contact with the SUA at all times and as such FPV flight is not permitted in Jersey Airspace.
- 9.3 UK CAA exemptions for the operation of FPV flight are not applicable to Jersey.

10 Do you need permission to operate a Small Unmanned Aircraft with a mass of less than 20kgs?

- 10.1 Essentially, the person controlling a SUA/SUSA is fully responsible for the safe operation of any flight, but it is important to consider whether a permission (not a licence) from the Jersey Director of Civil Aviation or Jersey Air Traffic Control is needed.

- 10.2 You **must request permission** from the DCA if you plan to:
- i. fly the aircraft on a commercial basis (i.e. conducting 'aerial work' See Para 3.5)
 - or
 - ii. fly a camera/surveillance fitted aircraft within congested areas or closer (than the distances listed within Article 52(8) & (9) of the Air Navigation (Jersey) Law 2014) to people or properties (vehicles, vessels or structures) that are not under your control.
- 10.3 DCA Permission **is not required** if the aircraft will not be flown close to people or properties, and you will not get 'valuable consideration' (i.e. payment) from the flight.
- 10.4 Permission **is required** from Jersey ATC if you plan to fly the aircraft within 2nm of Jersey Airport or above 400ft agl or for the flight of any aircraft with a mass in excess of 7kgs. *Please contact atcinfo@jerseyairport.com for the appropriate request form.*
- 10.5 The regulations are intended to protect people and /or properties that are not involved in the activity. They are also aimed at being as 'light a touch' and as proportionate as possible, so there is a great deal that can be done (especially for private or recreational flights) without the need to approach the DCA or ATC at all.

11 Queries

- 11.1 Any queries or requests for further information regarding the operation of SUA/SUSA should be addressed in the first instance to Jersey Air Traffic Control: atc@jerseyairport.com

12 Additional resources

- 12.1 Office of the Director of Civil Aviation www.gov.je/pages/contacts.aspx?contactId=149
- 12.2 British Model Aircraft Association www.bmfa.org.uk
- 12.3 Jersey Model Aero Club www.jmaconline.co.uk
- 12.4 UK Civil Aviation Authority guidance on operation SUA www.caa.co.uk/uas
- 12.5 The following Guidance material is available on the UK CAA website. www.caa.co.uk
- 12.5.1 The following documents (available on the CAA Website) refer to UK legislation; however, the guidance contained within these documents can be considered industry best practice.
- 12.5.2 CAP 658 Model Aircraft: **A Guide to Safe Flying**
- 12.5.3 CAP 722 Unmanned Aircraft System Operations in UK Airspace

Appendix A

Article 52 of the Air Navigation (Jersey) Law 2014

1 Regulation of small unmanned aircraft

- (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 unmanned 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 shall 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.
- (4) The person in charge of a small unmanned aircraft shall not fly the aircraft –
 - (a) at a height of more than 400 feet above the surface; or
 - (b) within an aerodrome traffic zone during the notified hours of watch (if any) of the air traffic control unit at that aerodrome,
 unless the permission of the appropriate air traffic control unit has been obtained.
- (5) The person in charge of a small unmanned aircraft which has a mass of more than 7 kilograms, excluding its fuel but including any articles or equipment installed in or attached to the aircraft at the commencement of its flight, shall not fly the aircraft in Class A, C, D or E airspace unless the permission of the appropriate air traffic control unit has been obtained.
- (6) The person in charge of a small unmanned aircraft shall not fly the aircraft for the purposes of aerial work except in accordance with a permission granted by the Director.
- (7) The person in charge of a small unmanned surveillance aircraft shall not fly the aircraft in any of the circumstances described in paragraph (8) except in accordance with a permission issued by the Director.
- (8) The circumstances referred to in paragraph (7) 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 (9) and (10), within 50 metres of any person.
- (9) Subject to paragraph (10), during take-off or landing, a small unmanned surveillance aircraft shall not be flown within 30 metres of any person.
- (10) Paragraphs (8)(d) and (9) 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.
- (11) In this Article “small unmanned surveillance aircraft” means a small unmanned aircraft that is equipped to undertake any form of surveillance or data acquisition.

Notes: The above article should not be considered in isolation and although Article 174 of the Air Navigation (Jersey) Law 2014 provides some exceptions from the rest of the order the following Articles continue to apply to the operation of any small unmanned aircraft:

1(1) & (4)	Interpretation
47(1)	Power to prohibit or restrict flying
52	Regulation of Small unmanned Aircraft
97	Aerial Work
98	Aerial application permission for purposes of agriculture etc.
147	Endangering safety of any person or property
166(1)(b)	Power to prevent aircraft flying

For electrically propelled aircraft, the battery itself is considered to be a part of the aircraft - it is the battery's charge that is the fuel. Accordingly the aircraft weight for the purposes of local rules should be determined including its flight batteries.

Appendix B

AERIAL WORK

1 The following guidance is published in order provide a basic introduction as to the legislative requirements and operational considerations relating to the use of Small Unmanned Aircraft for the purposes of **Aerial Work and Surveillance (filming and photographic)** operations within **Jersey Airspace**.

1.1 The person in charge of a small unmanned aircraft shall not fly the aircraft for the purposes of aerial work except in accordance with a permission granted by the Director.

Article 52(5) Air Navigation (Jersey) Law 2014

1.2 **Aerial Work** means any purpose (other than commercial air transport) for which an aircraft (Includes Small Unmanned Aircraft) is flown if valuable consideration is given or promised in respect of the flight or the purpose of the flight.

1.3 The legislation itself uses the term "valuable consideration" instead of "payment". This term has a very wide meaning, and includes the provision of goods and services.

1.3.1 Operators/Pilots should carefully consider the "purpose of the flight". If the flight is being conducted as part of any business/commercial undertaking then it will most likely be deemed to be aerial work.

1.3.2 Some examples of what may be considered Aerial Work:

- A neighbour giving you £40/Crate of Beer for some aerial photos of their house.
- Estate agent taking aerial photos of a client's property.
- Building/site surveyor/inspector etc.... aerial survey work
- Any training flight conducted as a requirement of maintaining currency in accordance with an aerial work permit.
- Taking photographs and selling them to the media, putting online for sale etc....

1.3.3 The above list is by no means exhaustive and if an operator is in any doubt regarding the nature of a flight they should contact the Director of Civil Aviation for advice.

1.3.4 It should be noted that the 'valuable consideration' element may not be restricted solely to the operator/pilot. For example: If the purpose of the flight was to obtain photographs/video which were then 'gifted' to a charity or such like who in turn received 'valuable consideration' this would most likely still come under the definition of 'Aerial Work'.

2 Operational Safety Requirements and Considerations

2.1 Under Article 147 of the Air navigation (Jersey) Law 2014 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 environments of St Helier or any other Parish 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.

2.2 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.

2.3 Each specific limitation can only be varied or exempted in accordance with a permission or exemption granted by the DCA. For operations in congested areas, any SUA operator will need to apply to the DCA for permission to fly a **CAMERA EQUIPPED** SUA:

i. **Over or within 150 metres of any congested area.**

ii. **Over or within 150 metres of an organised open-air assembly of more than 1,000 persons.**

- iii. **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).**
- 2.4 Such a permission would be suitable for those SUA operators that find they are frequently engaged in towns and villages 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.
- 2.5 The standard DCA permission for Aerial Photography in the SUA in the 7 kg or less category normally requires all operators to be trained in accordance with current UK CAA requirements.
- 2.6 With regard to pilot qualifications, in order to grant a permission, the DCA will normally require some proof of the pilot's overall airmanship skills and awareness and his/her ability to operate the aircraft safely– this is not a 'Civil Pilots Licence', but it is an independent assessment of an individual's knowledge and operating capabilities and is also a means for the CAA to ensure that everyone has at least the same basic knowledge.
- 2.7 There are two UK companies which are currently able to assess pilot competence on behalf of the CAA (they also charge for this). These organizations may also offer a service to help people through the process of obtaining UK CAA permission. Please note that a UK CAA permission is not valid in Channel Island Airspace and as such may not be required for an operator who wishes to operate solely within Channel Island Airspace on a permission granted by the Jersey DCA. The organizations assessment would normally be sufficient evidence for the Jersey Director of Civil Aviation to issue a local permission.
- i. **Resource UAS** – their assessment is called the 'Remote Pilot Qualification-Small' (RPQ-S)
<http://www.resource-uas.co.uk/>
- ii. **EuroUSC** – their assessment is called the 'Basic National Unmanned Aircraft Systems Certificate-Small' (BNUC-S)
<http://www.eurousc.com/>
- 2.8 Any DCA permission issued is aircraft specific based on an approved operations manual and all flights are to be co-ordinated with Jersey ATC.
- 2.9 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.
- 2.10 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

iv. 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.

2.10.1 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 in the UK 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.

2.10.2 A DCA 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 or other local authorities.

2.11 Operational Factors for SUA Flights within Congested Areas

2.11.1 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 gimbaled-mount should also be checked at this time to avoid unnecessary calibration flights.
- 2.11.2 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.
- 3 Aircraft Airworthiness Standards for Aircraft Flying Within a Congested Area**
- 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.