

- 7.10 Although these categories would appear to exclude the vast majority of UAS applications, all occurrences related to UAS operations which are considered to have endangered, or might have endangered, any aircraft (including the subject unmanned aircraft) or any person or property, must still be reported to the CAA via the MOR Scheme. This applies equally to all UAS categories, regardless of the aircraft's mass or certification state. It also includes UK registered UAS operating outside UK airspace.
- 7.11 Appendix B to CAP 382 lists the types of occurrence that are likely to fall into the definition of a 'reportable occurrence'. Whilst some of the listed occurrences would clearly only apply to manned aviation, many will apply equally to UAS, in particular those associated with the operation of the aircraft; there are also failure modes that are UAS specific. In addition to those listed in CAP 382, other, more UAS-specific, reportable occurrences include events such as:
- Loss of control/datalink – where that loss resulted in an event that was potentially prejudicial to the safety of other airspace users or third parties.
 - Navigation failures;
 - Pilot station configuration changes/errors:
 - between Pilot Stations;
 - transfer to/from launch control / mission control stations;
 - display failures.
 - Crew Resource Management (CRM) failures/confusion;
 - Structural damage/heavy landings;
 - Flight programming errors (e.g. incorrect speed programmed);
 - Any incident that injures a third party.

Source Documents

The Civil Aviation (Investigation of Air Accidents and Incidents) Regulations 1996.

Air Navigation Order 2009 – Article 226.

CAP 382 (The Mandatory Occurrence Reporting Scheme).

Regulation (EU) No. 996/2010 on the investigation and prevention of accidents and incidents in civil aviation.

ICAO Annex 13 – Aircraft Accident and Incident Investigation.

Points of Contact

Accident / Serious Incident:

Air Accidents Investigation Branch
Farnborough House
Berkshire Copse Road
Aldershot
HANTS
GU11 2HH
24 hour Accident/Incident reporting line: +44 (0) 1252 512299

(Administration/general enquiries)

Tel: +44 (0) 1252 510300

Fax: +44 (0) 1252 376999

E-mail: enquires@aaib.gov.uk

Mandatory Occurrence Reporting:

Safety Data
Civil Aviation Authority
Aviation House
Gatwick Airport South
West Sussex
RH6 0YR
Tel: +44 (0) 1293 573220
Fax: +44 (0) 1293 573972
E-mail: sdd@caa.co.uk

Chapter 8

Leasing

Introduction

- 8.1 CAP 722 does not address the leasing of communication links. This will be addressed separately once the ICAO RPAS Panel reaches a conclusion on this subject. Until an ICAO position on leasing communication links is reached, it will only be possible to take limited certification credit for communication links between the control station(s) and air vehicle(s).

Aim

- 8.2 The aim of this chapter is to clarify the position of the CAA with respect to the leasing, chartering, code sharing, interchanging and franchising of UAS.

Policy

- 8.3 Where an AOC holder wishes to lease, charter, code share, franchise or interchange a UAS it is strongly recommended that they communicate with the CAA in order to obtain the most appropriate and detailed guidance.
- 8.4 Further guidance can be found in the “Aircraft Leasing – Approval Requirements under the EASA Air Operations Regulation” document which can be found on the CAA website.
- 8.5 It is anticipated that at some point in the future there will be a desire for commercial organisations to be able to lease UAS or parts thereof. If UAS are being operated commercially then any leasing arrangements will need to meet the relevant operational rules.

Lead Agency

- 8.6 At this time, with the exception of wet leasing of third country aircraft, in the UK the CAA has responsibility for oversight of aircraft leasing.
- 8.7 The issuance of approvals for wet leasing of third country aircraft is currently the responsibility of the Department of Transport.

Appendices

APPENDIX A**Operational Factors for SUA Flights within Congested Areas**

Operational Factors for SUA Flights within Congested Areas

A1 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 must 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.
- 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 will 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.

- 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 land to over water.

- Radio Frequency (RF) interference. Pilots must take account of the possible reduction in operating range in an urban environment due to the heavy use of communications equipment (mobile telephone, Wi-Fi etc.) and other sources of electromagnetic spectrum/RF interference. Mitigation for the consequences of weak or lost GPS signal due to masking by buildings must 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 must 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 must 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 will also be checked at this time to avoid unnecessary calibration flights.

A2 The procedures and limitations on the use of the SUA that will be used to establish these control measures must be stated in the Volume 1 of the UAS OSC.

Site Survey Assessment

A3 The use of non-established sites for flying UA requires an assessment of the suitability of that site to be made prior to commencing operations. Such an assessment must be made using a site visit and available information from at least the aeronautical charts, as well as other sources of information such as the UK Aeronautical Information Service (www.ais.org.uk), digital imagery (Google Earth/ Maps etc.), Ordnance Survey maps etc.

A4 Typical elements of an assessment that could affect the safety of the flight would include:

- the type of airspace and specific provisions (e.g. Controlled Airspace);
- other aircraft operations (local aerodromes or operating sites);
- hazards associated with industrial sites or such activities as live firing, gas venting, high-intensity radio transmissions etc.;
- local by-laws;

- obstructions (wires, masts, buildings etc.);
- extraordinary restrictions such as segregated airspace around prisons, nuclear establishments etc. (suitable permission may be needed); habitation and recreational activities;
- public access;
- permission from landowner;
- likely operating site and alternative sites;
- weather conditions for the planned flight;
- minimum separation distances from persons, vessels, vehicles and structures.

Overflight of People

- A5 In the absence of airworthiness certification, the overflight of persons not under the control of the pilot is restricted and described in the conditions of the Permission issued by the CAA. For UA of 20 kg and below, ANO 2009 Articles 166 and 167 define the separation distances that must be applied. For UA operations over 20 kg, the overflight of persons may be allowed subject to the assessment of the UAS Operating Safety Case and / or airworthiness certification and appropriate operational procedures such as Ballistic Recovery Systems (BRS) (e.g. parachutes).
- A6 The safety case for the overflight of people must include an assessment of the Kinetic Energy Limits and the method of flight termination (e.g. BRS). Two crash scenarios must be considered in determining the impact kinetic energy of the UA, as follows:
- a free-fall from 400 ft for all UA;
 - additionally, for a UA capable of high forward speed, a maximum impact speed (set as 1.4 x maximum achievable steady speed in level flight).
- A7 Assuming negligible aerodynamic drag, an object dropped from 400 ft will hit the surface at 95 kt and the kinetic energy at impact will be 95 kJ if the mass of the object is 80 kg. If the object exhibits significant aerodynamic drag (without reliance upon any on-board parachute deployment system), the impact velocity will be less and a higher mass may be permissible without exceeding a calculated 95 kJ.
- A8 In the second scenario and with a maximum speed of 70 kt, 95 kJ equates to a mass of 75 kg. The mass can be increased up to a maximum of 150 kg, provided the maximum achievable steady level flight speed is sufficiently low that the energy limit is not exceeded (e.g. at 150 kg a maximum speed of 49 kt is permitted).

Safety Statement

{The person responsible ²⁴ for the safe conduct of all of the Company's operations must make and sign this statement. The statement must include, as a minimum, a statement that the company is safe to operate in the proposed environment, that the system(s) to be employed can be operated safely and a commitment to operate within the bounds of this UAS OSC, the Operations Manual and any CAA permission granted. Where necessary it must also include a commitment to conduct further mitigation actions detailed within this UAS OSC. A commitment to safety, as a priority, must be detailed.}

²⁴ e.g. Accountable Manager, CEO, Company Director, etc

