United Kingdom

Civil Aviation Authority

Official Record Series 9

CAA Decision to revoke and adopt AMC and GM for UK Reg (EU) 2019/947 pursuant to Article 76(3) UK Reg (EU) 2018/1139

DECISION No. 16

Publication date: 7 December 2022

Decision amending Acceptable Means of Compliance (AMC) and Guidance Material (GM) for UK Reg (EU) 2019/947 regarding the rules and procedures for the operation of unmanned aircraft

Background

1. CAA UK-EU Transition Decision No. 1 adopted a form of Acceptable Means of Compliance (**"AMC"**) as means by which the requirements in Regulation (EU) 2019/947 as retained (and amended in UK domestic law) under the European Union (Withdrawal) Act 2018 (**"UK Reg (EU) 2019/947"**) could be met. That decision also adopted Guidance Material (**"GM"**) as non-binding explanatory and interpretation material on how to achieve the requirements in **UK Reg (EU) 2019/947**.

2. The CAA has decided to revoke the AMC and GM adopted on 1 January 2021 and adopt revised AMC and GM in respect of **UK Reg (EU) 2019/947**.

Decision

1. The CAA, under Article 76(3) of Regulation (EU) No 2018/1139 as retained (and amended in UK domestic law) under the European Union (Withdrawal) Act 2018, has decided to:

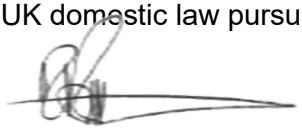
   a. Revoke the UK AMC and GM adopted for **UK Reg (EU) 2019/947** by CAA UK-EU Transition Decision No. 1 dated 22 December 2020; and

   b. Adopt the AMC and GM for **UK Reg (EU) 2019/947** attached at Schedule 1.

2. This Decision will remain in force unless revoked or amended by the CAA.

Definitions

All references to UK Reg (EU) 2019/947 are to those Regulations as retained and amended in UK domestic law pursuant to the European Union (Withdrawal) Act 2018.



Rob Bishton

For the Civil Aviation Authority and the United Kingdom

Date of Decision: 7 December 2022

Date of Decision Coming into force: 7 December 2022

Schedule 1

GM1 Article 2 Definitions

This Article defines a number of terms that are used within UK Regulation (EU) 2019/947.

The definitions appear in the order that they appear in the regulation, rather than being listed alphabetically.

Definitions that are published in:

- Regulation (EU) 2018/1139 as retained (and amended in UK domestic law) under the European Union (Withdrawal) Act 2018 (*Basic Regulation*), hereafter referred to as UK Regulation (EU) 2018/1139; or
- Regulation (EU) 2019/945 as retained (and amended in UK domestic law) under the European Union (Withdrawal) Act 2018 (*UAS Delegated Regulation*), hereafter referred to as UK Regulation (EU) 2019/945

are not replicated in this Article.

GM1 Article 2(1) Definitions

DEFINITION OF 'UAS'

The following are considered 'flying objects' rather than an Unmanned Aircraft (UA):

- Paper aeroplane
- Hand launched glider, but only those with no moveable control surfaces or remote-control link
- Frisbees, darts and other thrown 'toys'.

This is because the definition of a UA is:

'Any aircraft operating or designed to operate autonomously or to be piloted remotely without a pilot on board'.

And the definition of an aircraft is:

'Any machine that can derive support in the atmosphere from the reactions of the air other than reactions of the air against the earth's surface.'

GM1 Article 2(3) Definitions

DEFINITION OF 'ASSEMBLIES OF PEOPLE'

Assemblies of people have been defined by the ability of people to move around freely, and therefore move out of the way of an out-of-control UA.

There are no strict numbers defined above which a group of people would turn into an assembly of people as different situations would result in different conclusions. An assembly must be evaluated qualitatively, based on the ability of people within that group to move away from any risk posed by the UAS operation.

Qualitative examples of assemblies of people are:

a) sport, cultural, religious or political events;

b) music festivals and concerts;

c) marches and rallies;

d) parties, carnivals and fêtes.

GM1 Article 2(4) Definitions

DEFINITION OF 'UAS GEOGRAPHICAL ZONE'

The term UAS Geographical Zone does not include UAS airspace restrictions established under other regulations, such as the Air Navigation Order (ANO). A UAS Geographical Zone is an airspace restriction, established under Article 15.

AMC1 Article 2(7) Definitions

DEFINITION OF 'VISUAL LINE OF SIGHT OPERATION'- 'UNAIDED VISUAL CONTACT'

'Unaided', in this context means without the use of any other equipment, such as binoculars, telescopes, cameras or any other such equipment.

This does not include corrective lenses, which may be worn.

Note:

Provision is made in Article 4(1)(d), and UAS.OPEN.060(4), for an UA to be flown in the Open category, beyond the visual line of sight of the Remote Pilot (RP) (due to the RP using 'follow-me' mode, or when making use of an UA Observer and FPV equipment).

Further guidance material on the use of FPV equipment can be found in GM1 UAS.OPEN.060(4).

DEFINITION OF 'VISUAL LINE OF SIGHT OPERATION'- 'CONTROL THE VISUAL FLIGHT PATH'

In order to control the visual flight path of the UA, it must be kept within a suitable distance of the RP such that they can monitor the aircraft's position, orientation and the surrounding airspace at all times.

GM1 Article 2(7) Definitions

DEFINITION OF 'VISUAL LINE OF SIGHT OPERATION'- 'CONTROL THE VISUAL FLIGHT PATH'

Being able to control the visual flight path of the UA means keeping it within a suitable distance of the RP, such that the RP can maintain control of the flight path of the UA, to avoid a collision with other aircraft, people, obstacles or the ground. This distance depends on a number of factors, including:

- The eyesight of the RP;
- The size of the UA;
- The visual conspicuity of the UA (colour, and contrast of the UA against the backdrop from the viewpoint of the RP);
- Any navigation lighting on board the UA;
- The weather conditions (fog, sun-glare etc);
- Terrain and any other obstacles that may obscure the view of the UA from the RP;
- Whether the operation is during the hours of daylight, or night. Although there are not specific limitations on operating at night, the visual conspicuity of the UA and ambient lighting, may affect

the distance to which the UA may be flown from the RP.

This distance will likely vary on each flight depending on these factors, and the RP should be able to identify at what point VLOS can no longer be maintained.

Just because the UA is still *visible* (for example, a dot in the sky), this does not mean that it meets the definition of VLOS. A RP must be able to visually determine the aircraft's orientation at all times. While this may potentially be aided by navigation lights, the sole use of telemetry to indicate UA orientation to the RP is not considered as acceptable.

GM1 Article 2(16) Definitions

DEFINITION OF 'PRIVATELY BUILT'

Any UA which is designed and built by an individual or organisation for their own use, and which is not class marked in accordance with UK Regulation (EU) 2019/945, is defined as privately built.

GM1 Article 2(17) Definitions

DEFINITION OF 'AUTONOMOUS OPERATION'

The implementation of a pre-programmed emergency procedure; for example, the automatic RTH function due to the loss of C2, does not constitute an autonomous operation.

An autonomous operation should not be confused with an automatic or automated operation, which refers to an operation following pre-programmed instructions that the UAS executes whilst the RP is still able to intervene in the flight.

GM1 Article 2(18) Definitions

DEFINITION OF 'UNINVOLVED PERSONS'

The primary focus for UAS operations is the protection of people that are not a part of the operation (i.e., third parties). Within the UAS regulations, they are referred to as 'uninvolved persons'.

The regulation sets out that 'uninvolved persons' means an individual, or group of individuals, who either:

- are not, in any way, participating in the UAS Operation; or
- have not received clear instructions and safety precautions from the RP, the UAS Operator or a person nominated by the UAS Operator, to follow throughout the operation and in the event the UAS exhibits any unplanned behaviour.

A person is considered to be 'participating' in the operation, if they are the UAS Operator, or acting on behalf of the UAS Operator, for example, the RP, or another member of the flight or supporting ground crew.

GM1 Article 2(22) Definitions

DEFINITION OF 'MAXIMUM TAKE-OFF MASS (MTOM)'

The MTOM includes all the elements on board the UA, including the motors, propellers, electronic equipment and antennas, batteries /fuel, oil and all other fluids and the payload, including sensors and

their ancillary equipment.

Privately built UA, and some off the shelf UA do not have a MTOM defined. In this case, the mass of the aircraft at the time of take-off should be used instead, when interpreting the term 'MTOM' within the regulation.

Although the UAS Regulations refer to 'maximum take-off mass' (MTOM) throughout, this term creates some confusion when referring to home-built or other non-class marked UA where an MTOM has not been defined by the manufacturer.

Take-off Mass (Article 22)

The term 'take-off mass' is also used when referring to non-class marked aircraft, but only within one article (Article 22 – transitional arrangements) and the term is not specifically defined.

For these aircraft, any reference to 'take-off mass should be taken to mean the mass of the UA at the point of take-off for that particular flight.

GM1 Article 3 Categories of UAS Operations

BOUNDARIES BETWEEN THE CATEGORIES OF UAS OPERATIONS

a) Boundary between Open and Specific

A UAS operation is not in the Open category when at least one of the general criteria listed in Article 4 of the UAS Regulation is not met (e.g., when operating beyond visual line of sight (BVLOS)) or when the detailed criteria for a subcategory are not met (e.g. operating a 10 kg UA close to people when subcategory A2 is limited to 4 kg UA).

During the course of a Specific category flight, the UA may be flown in such a manner that it enters the Open category. The RP may not actively decide which category they are flying in, this is purely a function of the operational, and technical characteristics of the operation.

The UAS Operator and RP must comply with the relevant responsibilities throughout the flight at all times. The RP and UAS Operator should comply with the Specific Category requirements, as detailed within the Operational Authorisation, for their operation, throughout the operation.

For example, the requirement to maintain a flying log-book is a requirement of an OA when operating within the Specific category. If a portion of the flight takes place within the Open category, the Remote Pilot is not expected to only log the portion of the flight in the Specific category, they should log the entire flight.

b) Boundary between Specific and Certified

Article 6 of the UK Regulation (EU) 2019/947 and Article 40 of UK Regulation (EU) 2019/945 define the boundary between the Specific and the Certified category. The first article defines the boundary from an operational perspective, while the second one defines the technical characteristics of the UA; they should be read together.

UAS operations must be carried out within the Certified category when they:

- are conducted over assemblies of people with a UA that has characteristic dimensions of 3m or more; or
- involve the transport of people; or
- involve the carriage of dangerous goods that may result in a high risk for third parties inthe event of an accident.

In addition, a UAS operation is deemed within the Certified category when, based on the safety risk assessment as detailed in Article 11, the competent authority considers that the safety risk cannot be mitigated adequately without it being operated within the Certified category.

GM1 Article 4(1)(d) Open Category UAS Operations

VLOS

In general, the UA must be kept within VLOS of the RP at all times, however provision is made in Article 4, which permits the UA to not be within VLOS of the RP when making use of a UA Observer.

A UA Observer may be used within the Open category, to assist the RP with keeping the UA in VLOS. Further information on the UA Observer may be found in section GM1 UAS.OPEN.060(4).

GM1 Article 4(1)(e) Open Category UAS Operations

MAXIMUM HEIGHT

Where maximum vertical height is described within the regulation as 120m this may also be approximated to 400ft, for the purpose of this document.

Height, in the context of this document, for most UAS operations refers to the geometric height of the UA above the ground.

In some more complex cases, barometric altitude measurement may be used. In this case, it is vital to understand the differences between geometric and barometric measurements.

AMC1 Article 4(1)(f) Open Category Operations

DROPPING OF MATERIAL

For the purpose of this article, the term 'dropping of material' shall be taken to also include 'projecting' and 'lowering' of articles, whilst in flight.

GM1 Article 6 Certified Category of UAS Operations

UAS OPERATIONS IN THE CERTIFIED CATEGORY

Article 6 should be read alongside UK Regulation (EU) 2019/945 Article 40.

Article 6 addresses UAS operations and UK Regulation (EU) 2019/945 Article 40 addresses the UAS itself. This separation was necessary to comply with UK Regulation (EU) 2018/1138 (*the Basic Regulation)*, which sets out that the requirements for UAS operations and registration are in UK Regulation (EU) 2019/947, and that the technical requirements for UAS are in UK Regulation (EU) 2019/945. The reading of the two articles results in the following:

a) the transport of people is always in the Certified category. The UAS must be certified in accordance with Article 40 and the transport of people is one of the UAS operations identified in Article 6 as being in the Certified category;

b) flying over assemblies of people with a UA that has a characteristic dimension of less than 3m may be carried out in the Specific category unless one of the conditions outlined within 'GM1

Article 3 Categories of UAS operations (b)' is met; and

c) the transport of dangerous goods is in the Certified category if, following an accident, it would pose a high risk to third parties.

In addition, a UAS operation is deemed within the Certified category when, based on the safety risk assessment as detailed in Article 11, the competent authority considers that the safety risk cannot be mitigated adequately without it being operated within the Certified category.

AMC1 Article 6(1)(b)(iii) Certified Category of Operations

CARRIAGE OF DANGEROUS GOODS

The carriage of dangerous goods must be carried out within the Certified category if there is a high safety risk to third parties following an accident.

Note:

The operation may be carried out within the Specific category if this safety risk is mitigated sufficiently. This may be achieved with the use of a crash protected container or by adjusting the scope/location/nature of the operation, or by a combination of both.

AMC1 Article 7(2) Rules and Procedures for the Operation of UAS

STANDARDISED EUROPEAN RULES OF THE AIR

Article 7(2), states that "UAS operations in the 'Specific' category shall be subject to the applicable operational requirements laid down in UK (EU) Commission Implementing Regulation No 923/2012".

This text refers to the Standardised European Rules of the Air (SERA).

Not all requirements within SERA are relevant to UAS in the Specific category. UAS Operators should consider the requirements listed below and their relevance to the intended operation, and incorporate the requirements of those within their Operations Manual (OM), as procedures, as necessary. The inclusion of such procedures within the OM, as with any other procedures, will make them mandatory for the UAS Operator to follow.

The CAA may apply any additional applicable requirements of Regulation 923/2012 to operations via Operational Authorisations (OA) as conditions and limitations, depending on the operation and the result of the risk assessment process.

The table below sets out some applicable operational requirements from SERA and their applicability to UAS Operations in the Specific category.

Further information on the SERA requirements listed below can be found within *Regulation (EU) 923/2012 as retained (and amended in UK domestic law) under the European Union (Withdrawal) Act 2018* hereafter referred to as UK Regulation (EU) 923/2012, and its associated AMC/GM.

Item	Description	Applicability
SERA.2020 - Psychoactive Substances	Requirement not to undertake a function critical to safety of aviation when under the influence of any psychoactive substance, which	All Specific category UAS Operations

	impairs human performance, and not to engage in any problematic use of such substances.	
SERA.3101 - Negligence	Requirement to not operate an aircraft in a negligent or reckless manner, so as to endanger life or property.	All Specific category UAS Operations.
SERA.3145 – Prohibited and Restricted Areas	Requirement not to fly within a Prohibited or Restricted area, unless in accordance with the conditions of the area.	All Specific category UAS Operations.
SERA.3205 - Proximity	Requirement to not operate an aircraft in such proximity to other aircraft as to create a collision hazard.	All Specific category UAS Operations.
SERA.3135 - Formation Flights	Certain requirements to follow when flying within a formation, and to not fly in a formation unless pre- arranged with each pilot.	As required- for example, certain BVLOS operations with multiple aircraft.
SERA.3201 - Collision Avoidance	Explanation that nothing within SERA relieves the pilot from the responsibility to take collision avoidance action.	As required- for example, certain BVLOS operations.
SERA.3210 - Right of way	Requirements on the right of way between certain types of aircraft, and manoeuvres that must be taken to avoid collisions.	As required- for example, certain BVLOS operations.
SERA.3215 - Lighting	Certain requirements for aircraft lighting.	As required- for example, certain BVLOS operations.
SERA.3401 - Time	Certain requirements on the use of coordinated universal time (UTC).	As required- for example, certain BVLOS operations.
SERA Section 4- Flight Plans	Certain requirements on the use of flight plans.	As required- for example, certain BVLOS operations.
SERA.6005 (b) – Operations within a TMZ	Requirement to carry and operate a transponder when operating within a Transponder Mandatory Zone.	As required- for example, certain BVLOS operations.

AMC1 Article 8 Remote Pilot Competence

SPECIFIC CATEGORY REMOTE PILOT COMPETENCE

The necessary level of pilot competence will be identified by the UAS Operator, as set out under Article 11(5)(f), in accordance with UAS.SPEC.050(1)(d)(i).

In order to demonstrate pilot competence for Specific category VLOS operations a RP must hold a UK General VLOS Certificate (GVC) GVC, as a minimum.

The UAS Operator may identify further qualifications that the RP must have, within the risk assessment process.

'*NQE full recommendations'* are a previous version of the GVC course, and although no longer issued, some RPs may still hold these qualifications. These qualifications have been superseded by the GVC, and

as such the CAA will no longer recognise them after 01 January 2024; until this date, the CAA will recognise their use for operations under an existing OA. Any UAS Operator applying for a new OA, will need to select an alternative pilot competence qualification, such as the GVC.

UAS Operators conducting more complex operations, who's RPs may hold other qualifications, must ensure that their RPs have a full understanding of the applicable UAS regulations. This may be achieved by either ensuring they hold a valid GVC, or by carrying out internal training. UAS Operators who chose to carry out internal training, must ensure the theoretical knowledge syllabus described later in this AMC, is followed.

Note:

Other qualifications with the same name (i.e. GVC) issued outside the UK, are not automatically recognised by the CAA. Any such qualifications that are recognised as equivalent to the UK GVC, will be promulgated separately to this document.

GENERAL VLOS CERTIFICATE

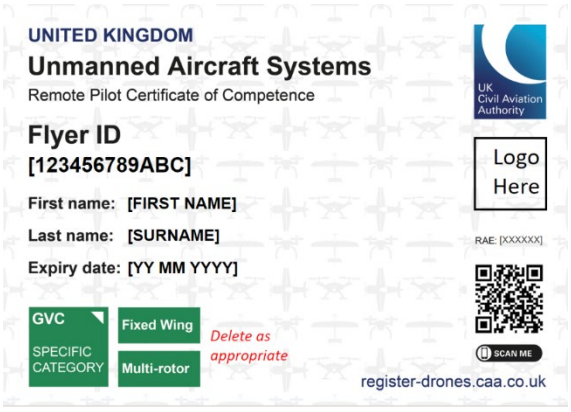
In order to qualify for the issue of a GVC, a RP must:

- Have completed the Open category online training material (AMC1UAS.OPEN.20(4)(b) & UASOPEN.040(3) & UASOPEN.0302(a); and
- Complete the Open category online assessment, and have obtained a Flyer ID; and
- Complete the necessary theoretical knowledge training; and
- Complete the necessary practical training in order to pass the practical flight test; and
- Have an OM, that can be provided for the practical flight test; and
- Complete the theoretical knowledge examination; and
- Complete the practical flying test

The theoretical knowledge examination and the practical flying test shall take place at a Recognised Assessment Entity (RAE).

On successful completion of the above elements, the RAE may issue the candidate with a General VLOS Certificate.

The format of this certificate, shall follow this template:



Note:

The CAA will provide RAEs with full versions of these templates for use.

THEORETICAL KNOWLEDGE EXAMINATION

The examination will comprise a minimum of 40 questions, which cover the syllabus sufficiently, as set out in the syllabus below.

The questions may be multiple choice, with a choice of no fewer than 4 answer options. Questions may also be long answer questions.

The examination may be electronic, or paper based, but must be closed book format (i.e. without reference to external material). The pass mark shall be no less than 75%. The duration of the exam is to be agreed between the RAE and the CAA.

If a candidate is re-sitting the examination, they shall answer a different set of questions.

THEORETICAL KNOWLEDGE SYLLABUS

Subject	Areas to be covered
Air Law/Responsibilities	**Terminology** **The UAS Regulation Package** ▪ Overall principles ▪ UAS operating categories ▪ Specific Requirements ▪ The Air Navigation Order **General overview** ▪ Responsibilities – UAS Operator, RP ▪ Avoidance of collisions ('See and Avoid', i.e. Visual Line of Sight principles) **Other Regulation** ▪ Incident and accident reporting and investigation: Mandatory Occurrence Reporting (MOR) & European Coordination Centre for Accident and Incident Reporting Systems (ECCAIRS) Portal, Air Accident Investigation Branch (AAIB) notification ▪ Airprox reporting ▪ Investigation handling/ assistance **Insurance** ▪ aircraft and third-party liability (EU785/ 2004 compliance)
UAS Airspace Operating Principles	**Airspace overview** ▪ Flight Information Regions (FIR) ▪ Airspace classifications ▪ Differing considerations, controlled airspace ▪ Flight Restriction Zone (FRZ), Aerodrome Traffic Zone (ATZ), gliding/ parachuting/ microlight sites etc ▪ Danger Areas, Prohibited Areas, Restricted Areas ▪ Temporary Airspace Reservations **Obtaining information/approvals** ▪ UK Aeronautical Information Publication (AIP) ▪ Aeronautical Information Circulars (AICs) ▪ Notices to Airmen (NOTAMs) ▪ Permission and ENSF process ▪ Whom to contact **UAS Operations** ▪ Visual Line of Sight (VLOS)
Airmanship and Aviation Safety	**Good airmanship principles** ▪ Aircraft safe to operate ▪ RP fit to operate aircraft ▪ Proper planning and preparation ▪ Hazard identification

Subject	Areas to be covered
	Flight Safety ▪ Avoiding collisions ▪ 'See and Avoid' with respect to manned aircraft and other air users **Perception** ▪ Distance, height and speed awareness ▪ Planning, go/ no go decisions ▪ Overflight of people, crowds and gatherings ▪ Congested area operations ▪ Flights at night **Operational mitigations for ground and air risks** **RP logbooks and Technical log books**
Human Performance Limitations	**Medical fitness** ▪ Crew health precautions ▪ Alcohol, drugs, medication ▪ Medical restrictions **Fatigue** ▪ Flight duration/ flight workload ▪ Time of flight ▪ Working hours ▪ Effects of weather ▪ Outdoor, remote and lone working ▪ Crew/colleague management ▪ Depth perception ▪ Blind spot ▪ Scan technique ▪ Decision process ▪ Public/ third parties ▪ Stress/ pressure from 'customers'
Meteorology	**Introduction to obtaining and interpreting weather information** ▪ Weather reporting resources ▪ Reports, forecasts and meteorological conventions appropriate for typical UAS flight operations ▪ Local weather assessments **Effects of weather on the UA** ▪ Wind – urban effects, gradients, masking, turbulence ▪ Temperature – precipitation, icing, turbulence ▪ Visibility factors ▪ Clouds – Cumulonimbus (CB) hazards (including lightning)

Subject	Areas to be covered
Navigation/Charts	**Basic map reading (OS)** – 1:50,000 and 1:25,000 **Aviation charts** – 1:500,000 and 1:250,000 ▪ Interpretation ▪ Specialised charts (e.g. London helicopter routes) ▪ Understanding of basic terms **Aeronautical units of measurement (Ft, km, Nm)** **Elevation, Altitude and height measurement** **GPS principles** ▪ How it works and limitations
UAS General Knowledge	**Basic principles of flight** **Fixed-wing, rotary wing and multi-rotor** **Command and Control (C2)** ▪ Datalink frequencies/ spectrum ▪ Manual intervention/ override ▪ Flight control modes **Limitations** ▪ Operational envelope ▪ Stability ▪ Mass and MTOM ▪ Centre of gravity ▪ Effect of payload on flight **Operating guides** ▪ Flight procedures/ basic drills ▪ Emergencies[1] **Maintenance of system** ▪ Scheduled maintenance and repairs ▪ Security of aircraft/ attached items ▪ Manufacturer's recommendations ▪ Assessment - 'safe to be flown?' **Technical mitigations** ▪ For ground and air risks
Operator Responsibilities	**UAS Operator Responsibilities, as set out in the regulation and AMC/GM** **Development of operational procedures** ▪ Development of an OM

[1] See GM1 UAS.OPEN.060(2)(b) Responsibilities of the Remote Pilot.

Subject	Areas to be covered
Operating Procedures	**Pre-planning** ▪ Consideration of intended task Site assessment ▪ Establishing a safe operating environment ▪ Hazard identification & risk assessment ▪ Mitigating measures ▪ Site owner's permission Situational awareness ▪ Location ▪ Airspace ▪ Aerodromes ▪ Obstructions ▪ Public right of way Communications ▪ Operating alone ▪ Liaison with Air Traffic Control ▪ Operating with other air users Pre-flight ▪ Pre-flight checklist ▪ Security of attachments/ payload ▪ Airworthiness ▪ Failsafe check ▪ Battery condition ▪ Weather In Flight ▪ In-flight monitoring ▪ Fuel/ battery status ▪ Visual Line of Sight ▪ Emergency actions: (Emergency Response Plan), loss of control/ flyaway, malfunctions[2] ▪ Deconfliction/ separation ▪ Designated landing area not clear Post-flight ▪ Post-flight actions - debrief/ logging of flight details ▪ Post-flight maintenance Security ▪ Public access to aircraft and control ▪ Other security considerations

[2] See GM1 UAS.OPEN.060(2)(b) Responsibilities of the Remote Pilot.

PRACTICAL FLYING TEST

The practical test element assesses whether the RP can safely undertake a range of VLOS operations whilst adhering to a set of procedures in the OM. The test will be conducted against the OM produced by the candidate. This can either be developed by the candidate themselves, or by the UAS Operator (if separate to the RP).

The RAE staff responsible for the assessment tasks will have adequate knowledge and competence of the operations of the type of UA that is to be flown during the test. The person responsible for conducting the practical flight assessment may also offer suitable training to the student prior to conducting the assessment.

The practical flying test will be conducted outdoors and at a location that is suitable for conducting the test (i.e. of suitable dimensions, volume and airspace class).

The RAE will include practical demonstrations of manoeuvres, relevant to the candidate's OM, that display the RP's ability to safely position and control the aircraft. Manoeuvres may be demonstrated individually, or as part of a more generalised operating scenario; they must be clearly described and illustrated within the RAE's application documentation and will be subject to assessment for suitability during the approval process.

The RAE will define the pass/fail criteria for the practical flight test assessment. As a guide, the criteria should consist of a combination of:

- 'Minor' errors – cumulative up to a maximum of 7, at which point the test is failed;
- 'Major' errors – cumulative up to a maximum of 3, at which point the test is failed;
- 'Safety' errors – any single safety error will result in an automatic failure.

The practical test must be summarised in a written report that details the test scenario that was used, the manoeuvres undertaken and an assessment of the examinee's performance for each 'section' of the test, along with guidance on areas for improvement where applicable. Reports must also contain details of the examinee, the assessor, any additional personnel involved and the date and location of the test.

A record of each practical assessment must be retained by the RAE for a minimum of 5 years.

PRACTICAL FLYING TEST ASSESSMENT CRITERIA

Subject	Areas to be covered
Pre-Flight Actions	**Mission planning (to include meteorological checks), airspace considerations, and site risk-assessment** ▪ Identify the objectives of the intended operation ▪ Ensure that the defined operational volume and relevant buffers (e.g. ground risk buffer) are suitable for the intended operation ▪ Identify any obstacles in the operational volume that could hinder the intended operation ▪ Consider whether the air flow may be affected by topography or by obstacles in the operational volume

Subject	Areas to be covered
	▪ Consider any external factors that may affect the flight, and assess their impact on the operation ▪ Review the relevant airspace information (including on UAS geographical zones) that can have an impact on the intended operation ▪ Confirm that the UAS is suitable for the intended operation ▪ Ensure that the selected payload is compatible with the UAS being used for the operation ▪ Determine the measures necessary to comply with the limitations and conditions applicable to the operational volume and ground risk buffer for the intended operation in accordance with the OM procedures for the relevant scenario ▪ Identify and, where necessary, implement the procedures to operate in FRZs or controlled airspace, including a protocol to communicate with ATC and obtain clearance and instructions ▪ Confirm that all the necessary documents for the intended operation are on site ▪ Ensure all participants are sufficiently briefed on the details of the planned operation **Aircraft pre-flight inspection and set-up (including flight controller modes and power-source hazards)** ▪ Assess the general condition of the UAS in accordance with the procedures contained within the OM and manufacturer's instructions ▪ Ensure the set-up procedures are completed correctly in accordance with the manufacturer's instructions ▪ Ensure that all the removable components of the UAS are properly secured ▪ Make sure that the UAS software configurations are compatible/ up to date ▪ Check that the UAS instruments are calibrated appropriately, as required by the intended operation ▪ Identify any fault, damage or configuration that may compromise the intended operation ▪ Ensure the propulsion energy level (e.g. battery life, or other fuel supply) is sufficient for the intended operation

Subject	Areas to be covered
	▪ Confirm that the flight termination system of the UAS and its triggering system are compliant ▪ Check the correct functioning of the C2 link ▪ Activate the geo-awareness system and upload the information to it (if geo-awareness system is available) ▪ Set the height, speed and distance limitation systems (if available) ▪ Set the direct remote identification system (if fitted) ▪ 'Pre-take-off verbal briefing' given by the examinee stating the basic actions to be taken in the event of an aircraft emergency or if a mid-air collision hazard arises during the flight
In Flight Procedures	▪ Maintain an effective look-out and keep the aircraft within Visual Line of Sight (VLOS) at all times ▪ Maintain situational awareness, particularly with respect to: o Location of the aircraft in relation to other airspace users o Meteorological conditions o Obstacles, terrain and uninvolved persons ▪ Perform accurate and controlled flight manoeuvres at representative heights and distances (including flight in manual/ non-GNSS assisted mode or equivalent where fitted) **Take-off procedures;** ▪ Perform after take-off/functionality checks ▪ Hover in position (Multirotor/ Helicopter/ VTOL FW only) ▪ Transition from hover into forward flight (Multirotor/ Helicopter/ VTOL FW) o Climb and descent to/ from level flight o Turns in level flight o Speed control in level flight o Transition from forward flight into hover (Multirotor/ Helicopter/ VTOL FW) o Precision manoeuvring in hover (Multirotor/ Helicopter/ VTOL FW) o Approach and landing

Subject	Areas to be covered
	○ Actions following failure of a motor/ propulsion system (according to aircraft type)[3] ○ Evasive action (manoeuvres) to avoid collisions ○ Real-time monitoring of aircraft status and endurance limitations **Flight under abnormal conditions** ▪ Display continuous awareness of, and consideration for, the safety of third parties on the ground ▪ Deal correctly with a partial or complete loss of power to the Unmanned Aircraft System (UAS) while ensuring the safety of any third parties ▪ Manage the UA's flight path in abnormal situations ▪ Manage a situation when the UAS positioning equipment is impaired ▪ Manage a situation where an uninvolved person enters the zone of operation and take appropriate measures to maintain safety ▪ React to, and take the appropriate corrective action for, a situation where the UA is likely to exceed the limits of the intended operating area ▪ Take the appropriate action for a situation when another aircraft approaches the operating area and is in confliction with the UA ▪ Demonstrate the recovery method following a deliberate (simulated) loss of the C2 Link. In place of any rotary wing 'return to home' function, fixed-wing aircraft may demonstrate an equivalent procedure that results in a suitably automated, low-impact descent and landing. When demonstrating this function, the student must also demonstrate how collisions will be avoided
Post-flight Actions	▪ Shut down and secure/make safe the UAS ▪ Post-flight inspection and recording of any relevant data relating to the general condition of the UAS (its systems, components and power-sources), controller functionality and crew fatigue ▪ Conduct a debriefing of the operation with all relevant personnel

[3] See GM1 UAS.OPEN.060(2)(b) Responsibilities of the Remote Pilot.

Subject	Areas to be covered
	▪ Identify situations where an occurrence report may be necessary and complete the required occurrence report

GM1 to Article 11 Rules for Conducting an Operational Risk Assessment

The CAA is currently adapting the previously published AMC for Article 11. Until this is complete, and adopted as AMC/ GM to Article 11, then UAS Operators should continue to use CAP 722A for guidance when producing a risk assessment.

GM2 to Article 11 Rules for Conducting an Operational Risk Assessment

Predefined Risk Assessment

When a UAS Operator applies for an OA, they must submit a risk assessment as required by Article 11 of the IR. This may be conducted using the methodology as described in GM1 Article 11.

Alternatively, a UAS Operator may submit a request for an OA based on the mitigations and provisions described within a Predefined Risk Assessment (PDRA), as published by the CAA. In the case of a PDRA, the CAA has conducted a risk assessment that is compliant with Article 11.

A PDRA significantly reduces the administrative burden on both the operator and the CAA for simple, repeatable type operations. A UAS Operator provides a 'shortened' application to the CAA based on a series of requirements covering topics such as RP competency, OM contents, etc. Accompanying any PDRA based authorisation will be a set of prescriptive conditions an operator must comply with. These conditions form part of the risk mitigation measures identified by the CAA during the creation of a given PDRA.

The CAA will publish PDRAs separately to this AMC/ GM. Operators wishing to make use of PDRAs should use the relevant PDRA to complete the necessary parts of the OM. Completion of the risk assessment part of the OM (Volume 3) is not required, as this has already been carried out. Full instructions on how to make use of a PDRA, and what to submit to the CAA, can be found within CAP 722H.

Note:

A PDRA only addresses safety risk; consequently, additional limitations and provisions might exist within an operation such as security, privacy, environmental protection, the use of the radio frequency (RF) spectrum, etc. It is for the operator to identify and mitigate against non-safety risks.

GM1 to Article 14(1) Registration of UAS Operators and Certified UAS

ACCURACY OF THE REGISTRATION SYSTEMS

UAS Operators, when registering themselves or their certified UAS, are required to provide accurate information and update the registration data when it changes.

The CAA will keep this registration data accurate within the Registration database.

An example of data that may change over time includes the UAS Operator address, email address, telephone number, and name by proof of deed poll.

UAS Operators, especially those conducting UAS operations for leisure, may decide to fly their UAS only for a short period; therefore, it is possible that even if the database of the registration system contains many registered UAS Operators, only some of them are active.

The CAA defines a duration period for the validity of 1 year, for the registration of all UAS Operators. If the UAS Operator does not renew their registration, it will expire. The CAA may also decide to suspend or revoke the registration number if the UAS Operator's conduct justifies such a measure.

UAS Operators have the ability to request to deactivate their registration if they no longer wish to have it active, this feature allows the CAA to improve level of accuracy of active operators in the database.

GM1 Article 14 (5)(a)(ii) Registration of UAS Operators and Certified UAS

Article 14(5)(a)(ii) Sensor able to capture personal data

In relation to the registration of UAS Operators under this article, the capture of images or other data solely for the use of controlling or monitoring the aircraft is not considered to be applicable to the meaning of 'a sensor able to capture personal data.

For example, a camera used solely for the purpose of first-person view flying (when accompanied by a UA Observer), that is not recording, is not considered a sensor able to capture personal data.

GM1 Article 14(5A) Registration of Small Control Line Model Aircraft

Small control line model aircraft are attached via a restraining device to the ground, or to a person, via a cable, or series of cables. As such, the need to identify the RP and operator via an Operator ID is not required, as the RP will either be attached to the aircraft by these cables or will be in the immediate vicinity of the aircraft, if it is fixed to the ground.

Control of the aircraft is maintained by manoeuvring the control cables, which manipulate the control surfaces in order to maintain control of the aircraft.

AMC1 Article 14(6) Registration of UAS Operators and Certified UAS

UAS OPERATOR REGISTRATION NUMBER

The unique UAS Operator digital registration number that is issued by the CAA consists of seventeen (17) alphanumeric in total split into 3 sections, arranged as follows:

(1) the first three alphanumeric (upper-case only) shall be 'GBR' corresponding to the ISO 3166 Alpha-3 code;

(2) The characters 'OP', which is a fixed field, meaning 'Operator'; and

(3) Twelve randomly generated characters that consist of alphanumeric (upper-case) characters, with the exception of the following characters: A, E, I, O, U, 1 and 0.

AMC1 Article 14(8) Registration of UAS Operators and Certified UAS

DISPLAY OF REGISTRATION INFORMATION

UAS Operators must display their registration number (known as an 'Operator ID') on every UA that they operate within the Open and Specific categories.

a) The Operator ID must be displayed in a manner that ensures it is readable when the UA is on the ground, without the need to use any special devices other than corrective spectacles or lenses.

b) The Operator ID must be:

   i. clear and in block capitals taller than 3mm

   ii. secure and safe from damage

   iii. on the main body of the aircraft

c) If the size of the UA does not allow the Operator ID to be clearly displayed externally, or the UA is a model aircraft that represents a real manned aircraft where an external marking would spoil the realism of the representation, a marking inside the UA, in a compartment that can be accessed easily and without the need for any tools is acceptable.

In addition to the compulsory printed Operator ID, a further QR code (quick response code) may also be used. This may link to the CAA registration check service, on the CAA website.

UA whose design is subject to certification are required to be registered in accordance with Annex IX of UK Regulation (EU) 2018/1139 (and Articles 24 to 32 of ANO 2016 unless they are flying under an exemption). Once the CAA has processed the application, the aircraft will be issued with a registration ID consisting of five characters starting 'G-' (e.g., G-ABCD) and the details will be entered into the Aircraft Register. The registration must be displayed permanently on the aircraft in accordance with Article 32 of the ANO.

GM1 Article 14(8) Registration of UAS Operators and Certified UAS

DISPLAY OF REGISTRATION INFORMATION

The purpose of displaying the registration ID ('Operator ID') on the UA, is to enable the operator to be linked to the individual UA, either in order to re-unite them should the UA become lost, or for enforcement purposes.

For this reason, it is not appropriate to expect a third party to be able to access the Operator ID within a compartment in the UA using specialist tools, or to have access to a QR code scanner. As such, the Operator ID must be displayed fully, on the outside, or within an easy to access internal compartment.

AMC1 Article 14 (10)- Small Control Line Model Aircraft Definition

The restraining device must be of a sufficient strength to secure the aircraft safely to a point on the ground, either fixed, or to the RP, taking into account the force exerted on the restraining device, from the mass of the aircraft and the acceleration experienced during flight.

GM1 Article 15 Operational Conditions for UAS Geographical Zones

Availability of UAS Geographical Zone data

Information on permanent airspace restrictions which affect the operation of UAS are notified within the AIP (Section ENR 5.1), and all permanent restrictions which impact UAS can be accessed via a downloadable file contained within the AIS website.

Article 16- UAS Operations in the Framework of Model Aircraft Clubs and Associations

AMC and GM for Article 16 can be found in Annex B to this document.

AMC1 Article 19(2) Safety Information

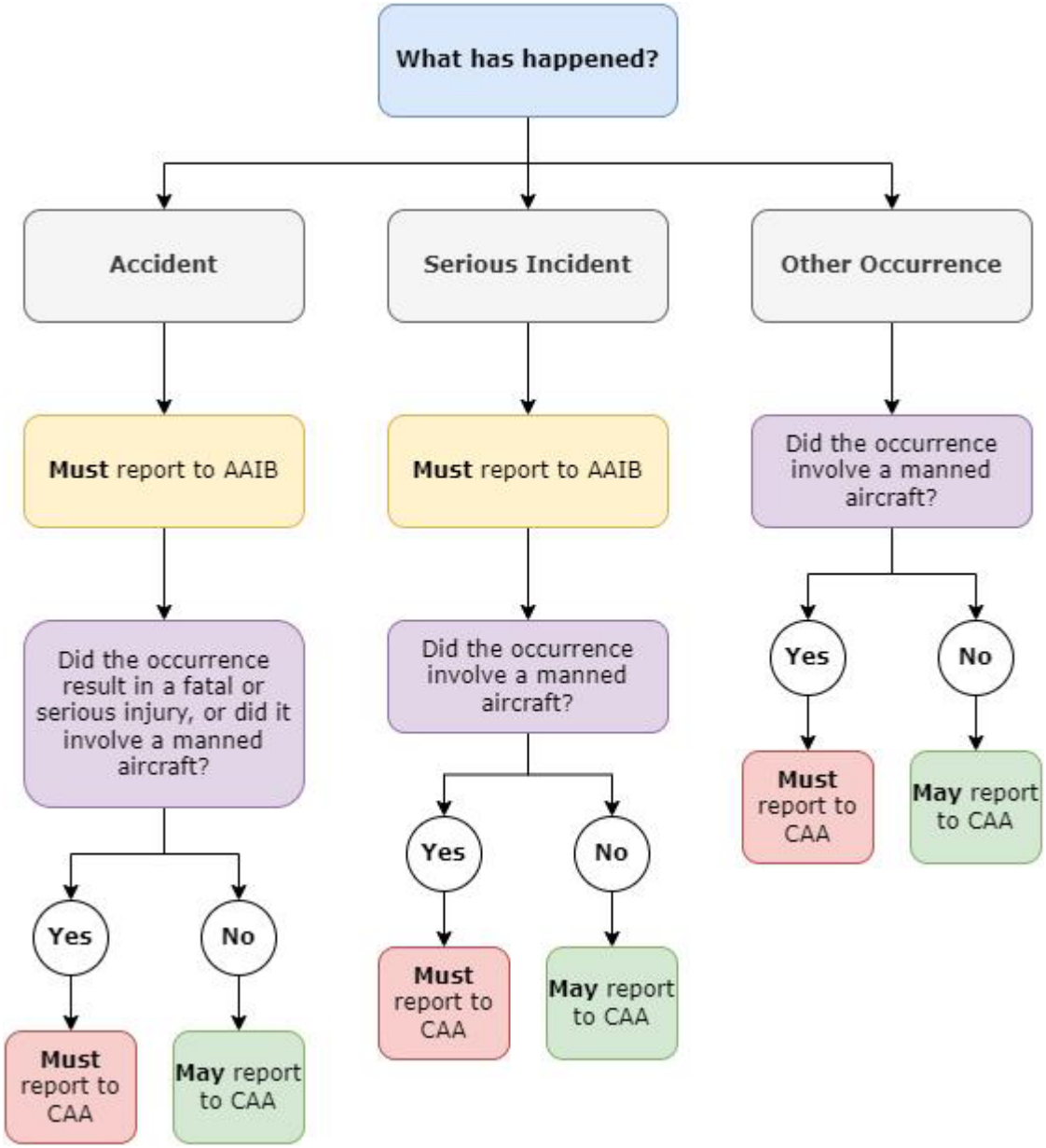
OCCURENCE REPORTING - CAA

Occurrence reports must be submitted through the Mandatory Occurrence Reporting (MOR) process, using the ECCAIRS portal, which can be found here (https://aviationreporting.eu). When making a report, UAS Operators should also include their registration number (Operator ID), and state whether an OA is held. Further guidance can be found in CAP1496.

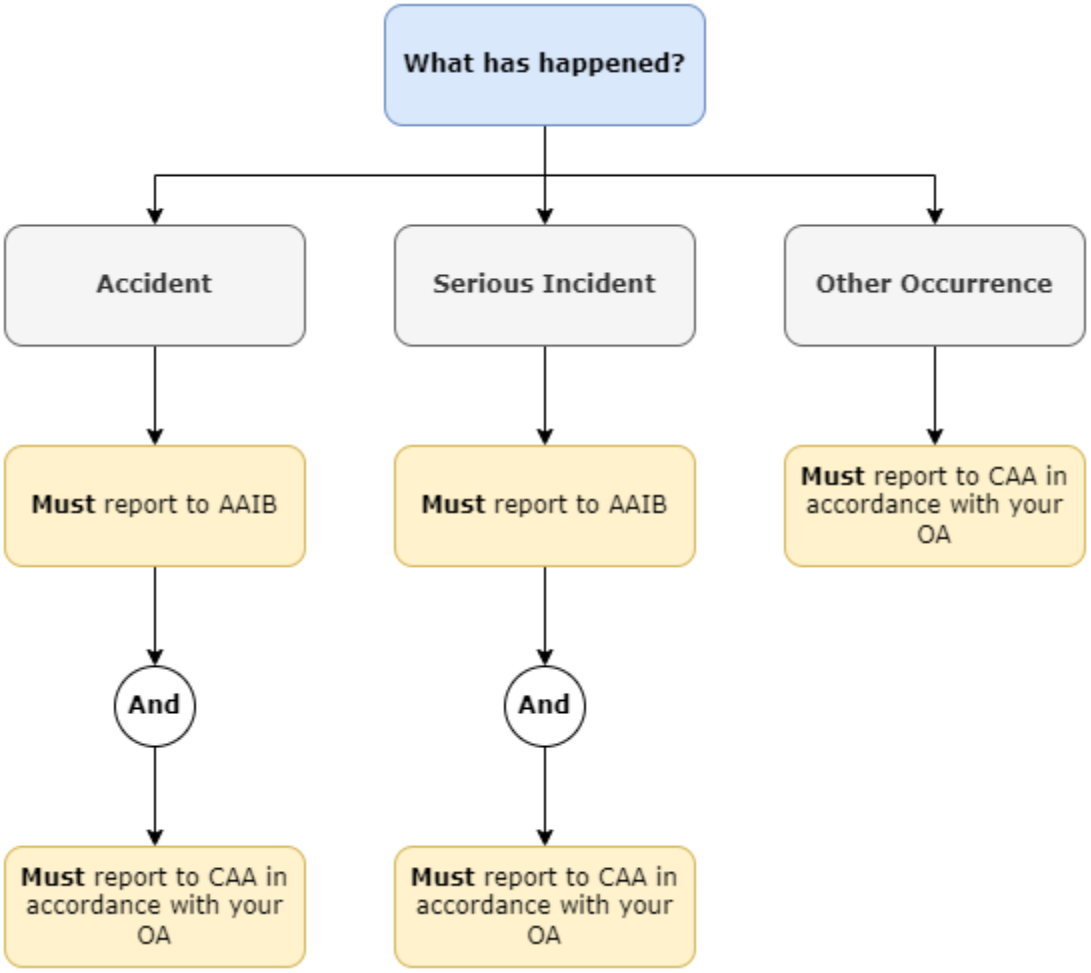
Consideration should also be given to supplementary safety reporting channels, for example:

- Confidential Human Factors Incident Reporting Programme (https://chirp.co.uk/aviation/).

OPEN CATEGORY REPORTING REQUIREMENTS



SPECIFIC CATEGORY REPORTING REQUIREMENTS



GM1 Article 19(2) Safety Information

USE OF THE ECCAIRS PORTAL

Reporting to the CAA should take place via the ECCAIRS portal (*AMC1 Article 19(2), above*).

It should be noted that when selecting the UK, within this system, it explains that the user is reporting as an ICAO state, and not under regulation EU 376/2014. This is because the UK has left the EU, and so reports are made under *Regulation (EU) 376/2014 as retained (and amended in UK domestic law) under the European Union (Withdrawal) Act 2018, hereafter referred to as UK Regulation (EU) 376/2014*, rather than the European version of that regulation.

OCCURRENCE REPORTING - CAA

According to UK Regulation (EU) 376/2014, occurrences shall be reported when they refer to a condition which endangers, or which if not corrected or addressed would endanger an aircraft, its occupants, any other person, equipment or installation affecting aircraft operations.

Obligations to report apply in accordance with UK Regulation (EU) 376/2014, Article 3(2). This limits the mandatory reporting of UA occurrences to those that involve a fatal or serious injury or involve a manned aircraft. Other occurrences may be reported voluntarily.

Occurrence reporting systems are not established to attribute blame or liability.

Occurrence reporting systems are established to learn from occurrences, improve aviation safety and

prevent recurrence.

The purpose of occurrence reporting is to improve aviation safety by ensuring that relevant safety information is reported, collected, stored, protected, exchanged, disseminated and analysed. Organisations and individuals with a good air safety culture will report effectively and consistently. Every occurrence report is an opportunity to identify root causes and prevent them contributing to accidents where people are harmed.

The safe operation of UAS is as important as that of manned aircraft. Injuries to third parties, or damage to property, can be just as severe. Proper investigation of each accident, serious incident or other occurrence is necessary to identify causal factors and to prevent repetition. Similarly, the sharing of safety related information via good reporting is critical in reducing the number of future occurrences.

REPORTING TO THE AAIB

Reporting requirements to the AAIB are set out under a different regulation. Further guidance on how to report to the AAIB can be found on their website.

GM1 Article 22

TAKE-OFF MASS

Further information on the term ‘take-off mass’ can be found in GM1 Article 2(22).

GM1 UAS.OPEN.010 General Provisions

MAXIMUM HEIGHT

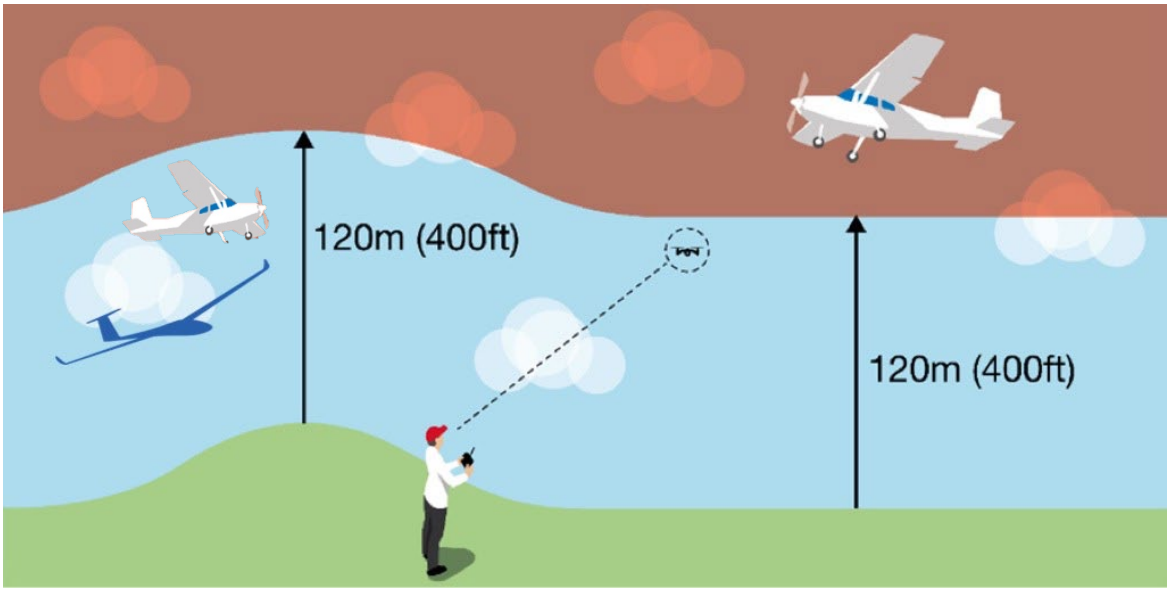
The RP must ensure that the UA is kept at a distance less than 120m (*approximated to 400 ft for the purpose of this document*) from the terrain. This is not a 'vertical height', but a geometric distance between the UA and the closest point of the surface of the Earth.

In most cases, this distance will be measured as a GPS height, rather than barometric height. Where a barometric measured height is used, the effects of atmospheric pressure and temperature on the measurement of height, should be understood.

This height limit applies from the surface of the Earth, and not from an elevated point on a structure or building.

The picture below shows how the maximum height that the UA may reach changes according to the topography of the terrain. In addition, if the flight is being conducted within a geographical zone with a lower maximum height or altitude (as defined in the associated restrictions of the geographical zone), the RP must ensure that the UA always complies with those limitations.

The entity responsible for an artificial obstacle, referred to in point UAS.OPEN.010(3), must explicitly grant the UAS Operator permission to conduct an operation close to the obstacle, e.g., a building, or antenna.



GM1 UAS.OPEN.010(4) General Provisions

OPERATIONS WITH UNMANNED SAILPLANES

This provision was included to allow model gliders to continue to operate along slopes. Strictly applying the 120 metres distance from the closest point of the surface of the earth would have had disproportionate consequences. These operations have been conducted successfully for decades. Two measures have been put in place to reduce the risk:

a) A MTOM limited to 10 kg to reduce the consequences of an impact. 10 kg covers the vast majority of gliders in operation.

b) The maximum height above the RP is limited to 120 m, which reduces the air risk.

AMC1 UAS.OPEN.020(1) and (2) UAS Operations in Subcategory A1

OPERATIONAL LIMITATIONS IN SUBCATEGORY A1

As a principle, the rules prohibit overflying assemblies of people. There is a distinction between class C1/C0 UAS and privately built UAS with MTOM of less than 250 g.

a) For UAS flying under the 'A1 Transitional' provisions of Article 22(a): Before starting the UAS operation, the RP must assess the area and must reasonably expect that no uninvolved person will be overflown. This evaluation must be made taking into account the configuration of the site of operation (e.g., the existence of roads, streets, pedestrian or bicycle paths), the ability to secure the site, and the time of the day. In case of an unexpected overflight, the RP must reduce as much as possible the duration of the overflight, for example, by flying the UAS in such a way that the distance between the UA and the uninvolved people increases, or by positioning the UAS over a place where there are no uninvolved people.

b) Non-class marked UAS with MTOM less than 250g, or privately built UAS with MTOM less than 250 g: These UAS may fly over uninvolved people (but not over assemblies of people) however, flight over uninvolved people should be avoided whenever possible, and extreme caution should still be used.

Uninvolved people should only be overflown when absolutely necessary, to achieve the aim of the flight and should be minimised as much as possible.

When flying in an area with uninvolved people, the RP should allow for a ground safety buffer to prevent accidental overflight in the event of loss of propulsion, by using the 1:1 rule. The RP must be aware of their responsibilities as set out in UAS.OPEN.060(2)(d), and in GM1 UAS.OPEN.060(2)(d), with regard to maintaining control of the UA.

The operational limitations above, in relation to the overflying of uninvolved people, do not apply to uninvolved people inside buildings. The RP is ultimately responsible for maintaining safe horizontal distances including from uninvolved people entering and exiting buildings. This includes consideration for open areas such balconies and roofs.

AMC1 UAS.OPEN.020(4)(b) and UAS.OPEN.030(2)(a) and UAS.OPEN.040(3) UAS Operations in Subcategories A1, A2 and A3

COMPLETION OF OPEN CATEGORY ONLINE TRAINING

The 'Flyer ID' online training course and test must be completed by RPs of UA with a mass of 250g or more, i.e.

- A2 subcategory- all UA (note- in the A2 subcategory, an additional qualification must also be held- see AMC1 UAS.OPEN.030(2)(c).
- A3 subcategory- all UA.

The RP must complete the training course and test provided by the CAA Drone and Model Aircraft

Registration System (DMARES) (https://register-drones.caa.co.uk/).

In certain circumstances, where provision is included within a model aircraft association Article 16 Authorisation, RPs may complete a model aircraft association training course and test instead of the CAA DMARES test. Following completion of this test, the CAA will issue the RP with a 'Flyer ID' number, which is equivalent to the completion of the CAA DMARES Flyer ID test. In this instance the RP does not need to undertake the CAA DMARES Flyer ID test, a RP may only hold one Flyer ID.

AMC2 UAS.OPEN.020(4)(b) and UAS.OPEN.030(2)(a) and UAS.OPEN.040(3) UAS Operations in Subcategories A1, A2 and A3

PROOF OF COMPLETION OF OPEN CATEGORY ONLINE TRAINING

Upon receipt of proof of a RP passing the online theoretical examination, the CAA will provide the following proof of completion to the RP. The proof may be provided in electronic form

The certificate will contain the following two elements:

(1) The identifier provided by the CAA (the 'Flyer ID'). The identifier has the following format:

NNN-RP-XXXXXXXXXXXX

Where:

i. **NNN** is the ISO 3166 Alpha-3 code of the country issuing the certificate (GBR);

ii. **RP** is a fixed field, meaning RP; and

iii. **XXXXXXXXXXXX** are 12 alphanumeric characters (upper-case only)) with the exception of the following characters: A, E, I, O, U, 1 and 0 defined by the CAA.

As an example: (GBR-RP-9WM5CGTWGC37); and

(2) QR code providing a link to the UK *Flying drones and model aircraft* web page where the information related to the RP is stored. Through the 'RP identifier' ('Flyer ID Number') information related to the Open category competence of the RP can be retrieved by the RP.

(1)

(2)

AMC1 UAS.OPEN.020(5)(c) and (d), UAS.OPEN.030(3) and UAS.OPEN.040(4)(c), (d) and (e) UAS Operations in Subcategories A1, A2 and A3

MODIFICATION OF A UAS WITH A CLASS MARK

See GM1 Article 2(16).

AMC1 UAS.OPEN.030(1) UAS Operations in Subcategory A2

SAFE HORIZONTAL DISTANCE FROM UNINVOLVED PERSONS

(a) The horizontal distance of the UA from uninvolved persons is defined as the distance between the points where the UA would hit the ground in the event of a vertical fall and the position of the uninvolved persons.

(b) The safe horizontal distance of the UA from uninvolved persons is variable and is dependent on the performance and characteristics of the UAS involved, the weather conditions and the segregation of the overflown area. The RP is ultimately responsible for the determination of this distance however, the distance from uninvolved persons must always be greater than 30m.

(c) The horizontal distances described above do not apply to uninvolved people inside buildings. The RP is ultimately responsible for maintaining safe horizontal distances including from uninvolved people entering and exiting buildings. This includes consideration for open areas such balconies and roofs.

Article 22 gives provision for some non-class marked UA to be operated within the A2 subcategory but limits the minimum horizontal distance from uninvolved people to 50m.

GM1 UAS.OPEN.030(1) UAS Operations in Subcategory A2

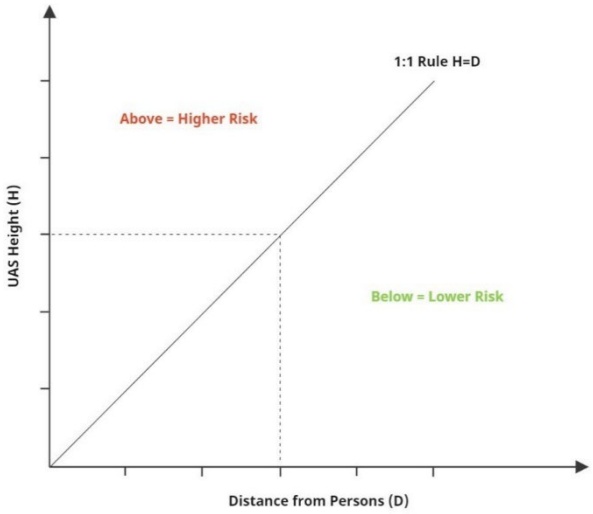
OPERATIONS IN SUBCATGORY A2

Subcategory A2 addresses operations during which flying close to people is intended for a significant portion of the flight. The minimum horizontal distance from uninvolved people is 30m. The RP is also required to have successfully passed an additional examination (known as the A2 CofC) in order to fly in sub-category A2.

<u>The 1:1 ‘rule’</u>

The ‘1:1 rule’ is a principle which can be used to identify when the minimum separation distance from uninvolved people may need to be increased, and by how much. It is based on the relationship between the UA’s height and its distance from the uninvolved person (the 1:1 line).

The horizontal separation between the UA and uninvolved people should not be less than the height of the aircraft. The higher the aircraft, the further it will travel should it suffer a catastrophic failure, and therefore the higher the likelihood of it colliding with uninvolved people, and so the separation distance must be increased (or the height reduced). This is so that, in the event of a propulsion failure, the UA is not likely to fall in an area with uninvolved people present.



RPs should aim to maintain a horizontal separation distance that is greater than, or equal to, the aircraft's height, using the same units of measurement.

Operations where the aircraft's height is greater than the separation distance (i.e. above the 1:1 line) should be avoided or kept to the absolute minimum time necessary, due to the increased risk.

GM1 UAS.OPEN.030(2)(a) UAS Operations in Subcategory A2

COMPLETION OF A1/A3 REMOTE PILOT COMPETENCE

See AMC1 UAS.OPEN.020(4)(b) and UAS.OPEN.030(2)(a) and UAS.OPEN.040(3) UAS operations in subcategories A1, A2 and A3.

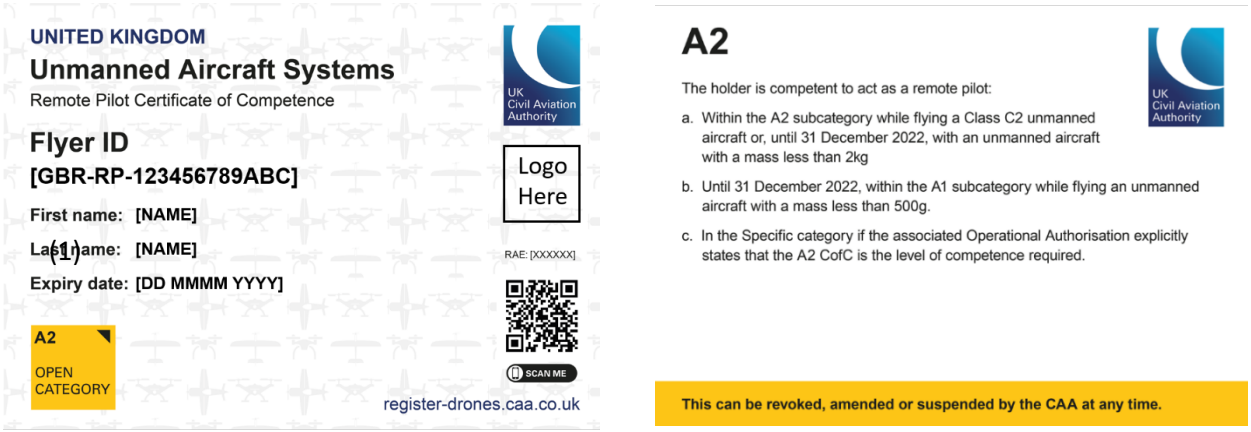
AMC1 UAS.OPEN.030(2)(b) and (c) UAS Operations in Subcategory A2

REMOTE PILOT CERTIFICATE OF COMPETENCY

After verification that the applicant:

- Has Passed the online theoretical knowledge examination; and
- Has completed and declared the self-practical training; and
- Has passed the additional theoretical knowledge examination provided by the competent authority or by an entity recognised by the competent authority,

The CAA, or an entity designated by the CAA, will provide a certificate of competency to the RP.



The certificate has the following elements:

(1) The identifier provided by the CAA (*Flyer ID*) has the following format:

GBR-RP-XXXXXXXXXXXX

Where:

1. **GBR** is the ISO 3166 Alpha-3 code of the Great Britain;
2. **RP** is a fixed field meaning Remote Pilot; and
3. **XXXXXXXXXXXX** are 12 alphanumeric characters that form the unique identifier.

AMC2 UAS.OPEN.030(2)(b) UAS Operations in Subcategory A2

PRACTICAL SELF-TRAINING

(a) The aim of the practical self-training is to ensure that the RP can demonstrate at all times the ability to:

(1) operate the UAS within its limitations;

(2) complete all manoeuvres with smoothness and accuracy;

(3) exercise good judgment and airmanship;

(4) apply their theoretical knowledge; and

(5) maintain control of the UA at all times in such a manner that the successful outcome ofa procedure or manoeuvre is assured.

(b) The RP must complete the practical self-training with a UAS that features the same flight characteristics (e.g. fixed wing, rotorcraft), control scheme (manual or automated, humanmachine interface) and a similar weight as the UAS intended for use in the UAS operation. This implies the use of a UA with an MTOM of less than 4 kg and bearing the Class 2 marking after the transition period defined in Article 22 has ended.

(c) If a UAS with both manual and automated control functions is used, the practical self-training must be performed with both control functions. If this UAS has multiple automated features, the RP must demonstrate proficiency with each automated feature.

(d) The practical self-training must contain at least flying exercises covering take-off or launch and landing or recovery, precision flight manoeuvres remaining in a given airspace volume, hovering in all orientations, or loitering around positions when applicable. In addition, the RP must exercise procedures for abnormal situations (e.g., a return-to-home function, if available), as stipulated in the user's manual provided by the manufacturer.

(e) This must be completed prior to taking the test described in AMC1 UAS.OPEN.030(2)(c). This practical training must be completed within the confines of the A1 or A3 subcategory, and may be completed at either a RAE, or by the individual.

PRACTICAL COMPETENCIES FOR PRACTICAL SELF-TRAINING

When executing the practical self-training, RPs should perform as many flights as they deem necessary to gain a reasonable level of knowledge and the skills to operate the UAS safely.

The following list of practical competencies must be considered:

(a) Preparation of the UAS operation:

(1) make sure that the:

(i) chosen payload is compatible with the UAS used for the flight;

(ii) operating area is suitable for the intended operation; and

(iii) UAS meets the technical requirements of any geographical zone that is being flown within;

(2) define the area of operation in which the intended operation takes place in accordance with UAS.OPEN.040;

(3) define the area of operation considering the characteristics of the UAS;

(4) identify the limitations published for any relevant geographical zone (e.g., FRZs around aerodromes, Prohibited, Restricted or Danger areas, etc), and if needed, seek authorisation by the entity responsible for such zones;

(5) identify any obstacles and the potential presence of uninvolved persons in the area of operation that could hinder the intended UAS operation; and

(6) check the current meteorological conditions and the forecast for the time planned for the operation.

(b) Preparation for the flight:

(1) assess the general condition of the UAS and ensure that the configuration of the UAS complies with the instructions provided by the manufacturer in the user's manual;

(2) ensure that all removable components of the UA are properly secured;

(3) make sure that the software installed on the UAS and in the command unit is the latest version published by the UAS manufacturer;

(4) calibrate the instruments on board the UA, if required;

(5) identify possible conditions that may jeopardise the safety of the intended UAS operation;

(6) check the status of the battery and make sure it is sufficient for the intended UAS operation;

(7) update the geo-awareness system; and

(8) set the height limitation system, if required.

(c) Flight under normal conditions:

(1) using the procedures provided by the manufacturer in the user's manual, familiarise withhow to:

i. take off (or launch)

ii. carry out a stable flight:

iii. hover in case of multirotor UA;

iv. perform coordinated large turns;

v. perform coordinated tight turns;

vi. perform straight flight at a constant altitude;

vii. change direction, height and speed;

viii. follow a path;

ix. return of the UA towards the RP after the UA has been placed at adistance that no longer allows its orientation to be distinguished, in case of multirotor UA;

x. perform horizontal flight at different speed (critical high speed or critical low speed), in case of fixed wing UA;

xi. keep the UA outside any relevant airspace restrictions, unless holding an authorisation to enter;

xii. use some external references to assess the distance and height of the UA;

xiii. perform return to home procedure — automatic or manual;

xiv. land (or recovery); and

xv. perform landing procedure and missed approach in case of fixed wing UA; and

(2) maintain a sufficient separation from obstacles;

(d) Flight under abnormal conditions, where an abnormal condition is one which involves the use of additional procedures to continue the flight safely:

(1) manage the UAS flight path in abnormal situations;

(2) manage a situation where the UAS positioning equipment is impaired;

(3) manage a situation of incursion of a person into the area of operation, and take appropriate measures to maintain safety;

(4) manage the exit from the operating area as defined during the flight preparation;

(5) manage the incursion of a manned aircraft into/ near to the area of operation;

(6) manage the incursion of another UAS into the area of operation;

(7) deal with a situation of a loss of attitude or position control generated by external phenomena such as Electromagnetic Interference (EMI);

(8) resume manual control if fitted on the UAS, when automatic systems render the situationdangerous; and

(9) carry out the loss of C2 link procedure.

(e) Briefing, debriefing and feedback:

(1) conduct a review of the UAS operation; and

(2) identify situations when an occurrence report is necessary and complete the occurrencereport.

AMC1 UAS.OPEN.030(2)(c) Additional A2 Online Test

DECLARATION OF COMPLETION OF SELF-PRACTICAL TRAINING

The applicant shall declare that they have completed the self-practical training, described in AMC1 and AMC2 UAS.OPEN.030(2)(b). This declaration shall be made in writing to the RAE that the applicant has chosen to attend, for completion of the training course described below.

The applicant shall provide evidence as part of their declaration to the RAE confirming that the self-practical training has been completed, by means of a flight log, to demonstrate that flight time has been recorded, during the self-practical training.

GM1 UAS.OPEN.030(2)(c) Additional A2 Online Test

DECLARATION OF COMPLETION OF SELF-PRACTICAL TRAINING

No specific minimum flight time is set out in regulation, in order to demonstrate completion of the self-practical training. When the applicant declares that they have completed the training, they must

demonstrate that they have undertaken the flight time, that they declare they have undertaken during this self-practical training.

AMC2 UAS.OPEN.030(2)(c) Additional A2 Online Test

PASS AN ADDITIONAL THEORY TEST

The additional theory test shall be completed at an RAE.

The examination may be electronic, or paper based, but must be 'closed book' – i.e. without reference to other material, other than that specifically referred to within a question (i.e. charts/maps).

The examination shall comprise a minimum of 30 multiple choice questions and is to be 75 minutes in duration. The pass mark shall be at least 75%.

A candidate with a recognised disability or additional needs will be granted an additional 15 minutes to complete the examination upon request.

If, following a failure of a previous attempt, an examination is being repeated, the student must sit a different set of questions to that used previously.

A Flyer ID must be held prior to commencing the additional theory test (see AMC1 UAS.OPEN.020(4)(b) and UAS.OPEN.030(2)(a) and UAS.OPEN.040(3)).

Following completion of the self-practical training, declaration to the RAE and completion of the additional theory test, the RAE shall issue the applicant with a certificate- the 'A2 Certificate of Competence'.

Note:

The CAA will issue RAEs with copies of templates to be used.

QUESTIONS TO BE DISTRIBUTED ACROSS THE FOLLOWING SUBJECTS

The questions shall be comprised from the following topics:

Subject	Areas to be Covered
Meteorology	▪ Introduction to obtaining and interpreting weather information ▪ Weather reporting resources ▪ Reports, forecasts and meteorological conventions appropriate for typical UAS flight operations ▪ Local weather assessments ▪ Effects of weather on the UA ▪ Wind – urban effects, gradients, masking, turbulence ▪ Temperature – precipitation, icing, turbulence ▪ Visibility factors ▪ Clouds – Cumulonimbus (CB) hazards (including lightning) ▪ IP43 (International Protection) IEC/EN 60529 standards with regard to water ingress

Subject	Areas to be Covered
UAS Flight Performance	**Typical operational envelope of a rotorcraft, fixed wing and hybrid configurations** ▪ Basic principles of flight **Operating guides** ▪ Flight procedures/basic drills ▪ Emergencies[4] **Maintenance of system** ▪ Scheduled and repairs ▪ Manufacturer's recommendations ▪ Assessment 'safe to be flown?' **Mass and balance and centre of gravity (CG)** ▪ Consideration of the overall balance when attaching gimbals, payloads ▪ Understand meaning of MTOM ▪ Security of the payload ▪ Payload characteristics – how differences can affect the stability of a flight ▪ CG – differences between different types of UA **Batteries** ▪ Understand the terminology used for batteries (e.g. memory effect, capacity, c-rate) ▪ Differences in battery types ▪ Understand how a battery functions (e.g. charging, usage, danger, storage) ▪ Battery safety - how to help prevent potential unsafe conditions
UAS Operating Principles	**UAS operations** ▪ Visual Line of Sight (VLOS) ▪ Avoiding collisions – 'See and Avoid' ▪ Decision process ▪ Stress/pressure from 'customers' ▪ Occurrence reporting and investigation **Congested area operations** ▪ Planning and preparation ▪ Hazard identification ▪ Overflight of people ▪ Public/third parties – crowds and gatherings **Medical fitness**

[4] See GM1 UAS.OPEN.060(2)(b) Responsibilities of the Remote Pilot.

Subject	Areas to be Covered
	▪ Crew health precautions ▪ Alcohol, drugs, medication, medical restrictions ▪ Fatigue ○ Flight duration/flight workload ○ Outdoors and lone working **Technical and operational mitigations for ground risk** **Low speed mode function** **Evaluating distance from people** **1:1 rule**

GM1 UAS.OPEN.030(3) UAS Operations in Subcategory A2

MODIFICATION OF A UAS WITH A CLASS MARK

See GM1 Article 2(16).

AMC1 UAS.OPEN.040(1) Operations in Subcategory A3

ENDANGERMENT OF UNINVOLVED PEOPLE

If an uninvolved person enters the area of the UAS operation, the RP must, where necessary, adjust the operation to ensure the safety of the uninvolved person and discontinue the operation if the safety of the UAS operation cannot be ensured.

GM1 UAS.OPEN.040(1) Operations in Subcategory A3

SAFE DISTANCE FROM UNINVOLVED PEOPLE

The safe distance of the UA from uninvolved persons is variable and is heavily dependent on the performance and characteristics of the UAS involved, the weather conditions and the segregation of the overflown area. The RP is ultimately responsible for the determination of this distance.

It is advised that, as a general rule, a 50m horizontal separation distance from uninvolved people is used as a method to comply with the requirement to ensure the safety of uninvolved people. This minimum distance may need to be increased based on other factors, such as kinetic energy, controllability, height and other such factors.

Uninvolved people should only be overflown when absolutely necessary, to achieve the aim of the flight and must be minimised as much as possible.

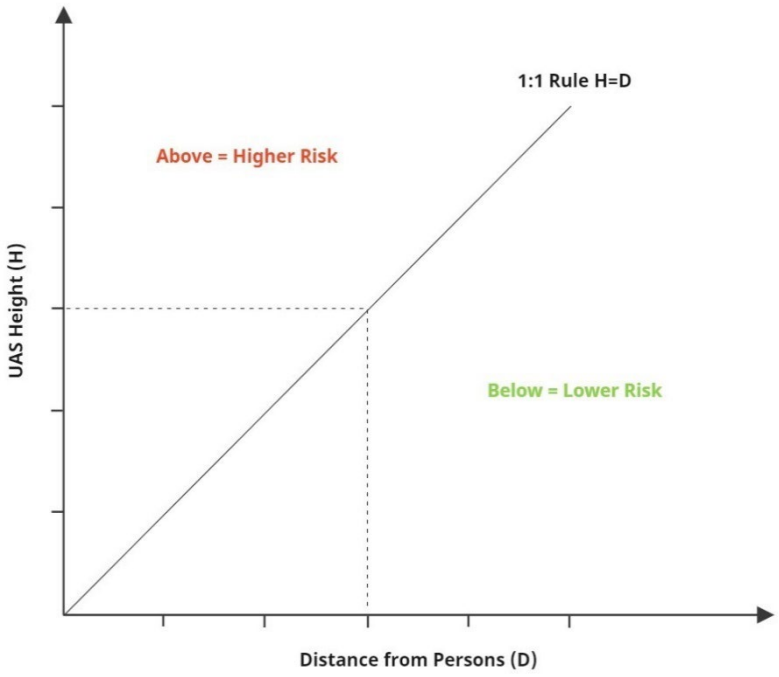
When flying above uninvolved people, some horizontal separation should be maintained. The necessary horizontal separation depends on factors, such as wind direction, trajectory of the UA and height of the UA.

The RP must be aware of their responsibilities as set out in UAS.OPEN.060(2)(d), and in GM1 UAS.OPEN.060(2)(d), with regard to maintaining control of the UA.

The 1:1 rule:

The '1:1 rule' is a principle which can be used to identify when the minimum separation distance from uninvolved people may need to be increased, and by how much. It is based on the relationship between the UA's height and its distance from the uninvolved person (the 1:1 line).

The horizontal separation between the UA and uninvolved people should not be less than the height of the aircraft. The higher the aircraft, the further it will travel should it suffer a catastrophic failure, and therefore the higher the likelihood of it colliding with uninvolved people, and so the separation distance must be increased (or the height reduced). This is so that, in the event of a propulsion failure, the UA is not likely to fall in an area with uninvolved people present.



GM1 UAS.OPEN.040(2) UAS Operations in Subcategory A3

RESIDENTIAL, COMMERCIAL, INDUSTRIAL AND RECREATIONAL AREAS

The definition of residential, commercial, and recreational areas incudes individual buildings in remote locations.

GM1 UAS.OPEN.040(3) UAS Operations in Subcategory A3

COMPLETION OF A1/A3 REMOTE PILOT COMPETENCE

See AMC1 UAS.OPEN.020(4)(b) and UAS.OPEN.030(2)(a) and UAS.OPEN.040(3) UAS operations in subcategories A1, A2 and A3.

GM1 UAS.OPEN.040(4)(c), (d) and (e) UAS Operations in Subcategory A3

MODIFICATION OF A UAS WITH A CLASS MARK

See GM1 Article 2(16).

AMC1 UAS.OPEN.050(1) Operations in Subcategory A3

OPERATIONAL PROCEDURES

The UAS Operator is responsible for developing procedures that are adapted to the type of operations and to the risks involved, and for ensuring that those procedures are complied with. The extent of the detail that needs to be provided within those procedures will vary depending on the relative complexity of the operation and/or the organisation involved.

Written procedures may not always be necessary, especially if the UAS Operator is also the only RP. The limitations of the Open category and the operating instructions provided by the UAS manufacturer may be considered sufficient.

If the UAS Operator employs more than one RP, the UAS Operator must:

(a) develop procedures for UAS operations in order to coordinate the activities between its employees; and

(b) establish and maintain a list of their personnel and their assigned duties.

For UAS Operators who wish to develop procedures, guidance can be found in the AMC and GM to Article 11.

GM1 UAS.OPEN.050(2) Responsibilities of the UAS Operator

EFFICIENT USE OF RADIO SPECTRUM TO AVOID HARMFUL INTERFERENCE- VHF RADIO COMMUNICATIONS

The incorrect and illegal use of VHF Radiotelephony (RT) can cause significant impact to airspace users who require its use for communication with an ATS provider, especially in critical phases of flight or during an emergency. VHF radio communication should not be required in the Open category.

It should be noted that the use of VHF RT is strictly controlled, and requires the pilot to hold an appropriate licence, and to use an appropriately licenced radio for air-air, air-ground or ground-ground use.

It is the responsibility of the UAS Operator to ensure that the radio spectrum used for the C2 Link and for any payload communications complies with the relevant Ofcom requirements and that any licenses required for its operation have been obtained.

Frequency bands are allocated by Ofcom, details can be found on the Ofcom website and include IR 2030 – UK Interface Requirements 2030 which covers licence exempt short range devices. Applications for the assignment of frequencies within the bands must be addressed to Ofcom.

Licencing of frequency allocations is the responsibility of Ofcom and hence, where required, all applications for a frequency assignment should be directed in the first instance to Ofcom. In frequency bands where the CAA is the assigning authority, then the application will be passed to the CAA by Ofcom

so that the CAA can conduct the technical work, but Ofcom still remains the licencing authority.

There are no specific frequencies allocated for use by UAS in the UK. However, the most used frequencies are 35 MHz, 2.4 GHz and 5.8 GHz.

35 MHz is a frequency designated for model aircraft use only, with the assumption that clubs and individuals will be operating in a known environment to strict channel allocation rules. It is therefore not considered to be a suitable frequency for more general UAS operations (i.e. outside a club environment) where the whereabouts of other users is usually difficult to assess.

2.4 GHz is a licence free band used for car wireless keys, household internet and a wide range of other applications. Although this is considered to be far more robust to interference than 35 MHz, operators must act with appropriate caution in areas where it is expected that there will be a high degree of 2.4 GHz activity.

5.8 GHz is a licenced band which requires a minimum payment and registration with Ofcom. This band is in use with other services including amateur-satellite, weather and military radars. Details can be found on the Ofcom website.

For further UAS specific guidance on whether a licence is required for your UAS, more information can be found on the Ofcom website.

Operations close to any facility that could cause interference (such as a radar station) could potentially disrupt communications with the UAS, whatever the frequency in use. GNSS jamming activities may also disrupt communications as well as C2 signals. Information on scheduled GNSS jamming exercises can be found on the Ofcom website, and should be promulgated via NOTAM.

AMC1 UAS.OPEN.050(4)(c) Responsibilities of the UAS Operator

OBTAIN UPDATED INFORMATION ABOUT GEOGRAPHICAL ZONES

The UAS Operator must download the latest version of the geographical zone data and make this available to the RP such that they can upload it into the geo-awareness system, if such a system is available on the UA used for the operation. This information must be both an accurate, and complete, representation of the applicable airspace restrictions to the UAS Operation.

GM1 UAS.OPEN.060(1)(b)

UPDATED INFORMATION ON GEOGRAPHICAL ZONES

Although UAS.OPEN.060(1)(b) specifically refers to geographical zones established under Article 15, the primary means for restricting flight of aircraft (including UA) in the UK, is under the ANO article 239. The RP must be familiar with these restrictions, and obtain any necessary permissions required to fly within them. This information can be found within the AIP.

AMC1 UAS.OPEN.060(1)(c) Responsibilities of the Remote Pilot

OPERATING ENVIRONMENT

(a) The RP should observe the operating environment and check any conditions that might affect the UAS operation such as; the locations of people, property, vehicles, public roads,obstacles, aerodromes, critical infrastructure, and any other elements that may pose a risk to the safety of

the UAS operation.

(b) Familiarisation with the environment and obstacles should be conducted, when possible, by walking around the area where the operation is intended to be performed.

(c) It must be verified that the weather conditions at the time when the operation starts and those that are expected for the entire period of the operation are within limits defined as suitable for the UAS, which must not exceed any specified in the manufacturer's manual. Note that this may need to include an understanding of the effects of wind flow / air flow patterns and potential turbulence caused by obstacles and buildings in the location of operation at all operating heights.

(d) The RP must be familiar with the operating environment and the light conditions and make a reasonable effort to identify potential sources of electromagnetic energy, which may cause undesirable effects, such as electromagnetic interference (EMI) or physical damage to the operational equipment of the UAS.

AMC1 UAS.OPEN.060(1)(d) Responsibilities of the Remote Pilot

UAS IN A SAFE CONDITION TO COMPLETE THE INTENDED FLIGHT

The RP must:

- Update the UAS with data for the geo-awareness function if it is available on the UA, including relevant airspace restrictions;
- Ensure that the UAS is safe to be flown and complies with the instructions and limitations provided by the manufacturer, or the best practice in the case of a privately built UAS;
- Ensure that any payload carried is properly secured and installed and that it complies with the limits of the mass and Centre of Gravity (CG) of the UA;
- Ensure that the charge of the battery of the UA (and quantify of fuel, if applicable) is enough for the intended operation based on:
    - the planned operation; and
    - the need for extra energy in case of unpredictable events; and
    - For UAS equipped with a loss-of-data-link recovery function, ensure that the recovery function allows a safe recovery of the UAS for the envisaged operation; for programmable loss-of-data- link recovery functions, the RP may have to set up the parameters of this function toadapt it to the envisaged operation prior to flight.
- Ensure any lighting or remote identification systems (if applicable) are functioning correctly.

GM1 UAS.OPEN.060(2)(a) Responsibilities of the Remote Pilot

PSYCHOACTIVE SUBSTANCES OR ALCOHOL

It is the responsibility of the RP to ensure that they are fit to fly and are not under the influence of any psychoactive substance or alcohol. While the general message is *'don't drink and fly'*, additional information is provided below for reference and guidance.

While no actual limits are specified, the alcohol and drug consumption limitations that are prescribed

for driving a car may be considered as an appropriate limit when flying in the Open category (i.e., if you are fit to drive a car, then you should be considered fit to fly in the Open category).

INJURY, FATIGUE, MEDICATION OR SICKNESS

While there are no specific requirements or medical standards set out for operations in the Open category, RPs should apply the same considerations that they would before driving a motor vehicle or riding a pedal cycle on the road.

OTHER CAUSES

'Other causes' means any physical or mental disorder or any functional limitation of a sensory organ that would prevent the RP from performing the operation safely.

AMC1 UAS.OPEN.060(2)(b) Responsibilities of the Remote Pilot

VLOS RANGE

The maximum distance of the UA from the RP will depend on the size of the UA and on the environmental characteristics of the area (such as the visibility, presence of tall obstacles, etc.).

RPs must keep the UA at a distance such that they are always able to clearly see it and evaluate the distance of the UA from other obstacles.

If the operation takes place in an area where there are no obstacles and the RP has unobstructed visibility up to the horizon, the UA can be flown up to a distance such that the UA remains clearly visible, in order that it can be controlled, this includes being able to determine its orientation.

If there are obstacles in the operating area, then the distance should be reduced such that the RP is able to evaluate the relative distance of the UA from those obstacles.

The RP should also consider other factors that may affect the maximum range of the UA from the RP, including the C2 link range.

Ensure VLOS, as defined within GM1 Article 2(7), is maintained at all times during flight.

GM1 UAS.OPEN.060(2)(b) Responsibilities of the Remote Pilot

DISCONTINUATION OF THE FLIGHT IF THE OPERATION POSES A RISK TO OTHER AIRCRAFT

There is an obligation on the RP to maintain a thorough visual scan of the surrounding airspace to avoid any risk of a collision with manned aircraft. It is likely that the RP will identify other airspace users before they identify the UA, and therefore the RP will usually be the first to manoeuvre away from any conflicting aircraft.

RPs should be aware that their UA are generally difficult, if not impossible, to see from another aircraft until they are extremely close.

As soon as the RP sees another aircraft, parachute, or any other airspace user, they must immediately keep the UA at a safe distance from it and land if the RP is not confident the flight can continue without posing a risk to the other airspace user.

If the RP cannot ensure suitable separation from the other aircraft, the UA must be landed immediately.

Although many aerodromes are protected by FRZs, many unlicensed aerodrome sites also exist, including hospital helipads. Such aircraft may loiter at low-level or land and take off unexpectedly. All of these types of helicopter operations may therefore be affected by VLOS operations particularly when approaching to land or departing from a site; UAS Operators and RPs must take active precautionary measures to avoid affecting the safety of other airspace users, either by requiring them to take avoiding action, disrupting a mission or distraction (for example, aborting an air ambulance landing due to a UA sighting).

DISCONTINUE THE FLIGHT IF THE OPERATION POSES A RISK TO ANIMALS AND THE ENVIRONMENT

In order to help assess whether the flight may pose a risk to animals, or the environment, the RP should check whether or not the flight is to take place within a Site of Special Scientific Interest (SSSI). When a flight may take place in such an area, the RP should contact the appropriate public body (e.g., Natural England, Natural Wales, Nature Scotland, National Trust, Historic Scotland, etc.) for further advice.

DISCONTINUE THE FLIGHT IF THE OPERATION POSES A RISK TO PEOPLE OR PROPERTY

This requirement also includes people inside vehicles. A collision, or even a distraction, caused by a UA to a motor vehicle, or any other passenger carrying vehicle, is likely to lead to a risk to the occupants of the vehicle.

EMERGENCY LANDING

Planning is a crucial stage to a mission's success and RPs must consider all 'in-flight' emergency scenarios, particularly when operating at a range where a systems failure or external influence may remove the RTH option and potentially result in an unplanned landing outside of the VLOS criteria. RPs should continually identify and update suitable Emergency Landing Sites (ELSs) as part of their desk top analysis, when conducting on-site reconnaissance and throughout the flight phase.

If an UA Observer is not employed and an aircraft experiences a critical system failure, or is subject to unexpected external influences, precluding the aircraft from safely returning to the home point it may be necessary to conduct an unassisted emergency landing away from the RP. RPs are required to

maintain good situational awareness throughout all flights and must therefore adequately divide their attention between scanning the airspace for conflicting aircraft and achieving the mission. This should also involve exploiting the aircrafts sensor to scan the ground below for uninvolved persons infringing the safety minima and to identify suitable ELSs should an emergency landing be required. RPs should proactively scan and plan for new ELSs as the aircraft tracks away from the previous one. Whilst it is accepted that in such circumstances an RP may have little or no control over the aircrafts safe decent, they must make every effort to mitigate the risk to uninvolved persons.

GM1 UAS.OPEN.060(2)(c)

GEOGRAPHICAL ZONES

Although this requirement relates specifically to geographical zones established under Article 15, RPs should be aware of other airspace restrictions established under the ANO. These airspace restrictions must also be complied with. Details of these can be found within the AIP.

AMC1 UAS.OPEN.060(2)(d) Responsibilities of the Remote Pilot

ABILITY TO MAINTAIN CONTROL OF THE UA

In order to maintain control of the UA, the RP should:

(1) be focused on the operation of the UA, as appropriate; and

(2) not operate a UA while also operating a moving vehicle;

(3) Operate only one UA at a time

If, as a passenger, the RP operates a UA from a moving ground vehicle or boat, the speed of the vehicle must be slow enough for the RP to maintain a VLOS of the UA, maintain control of the UA at all times and maintain situational awareness and orientation.

Autonomous operations are not allowed in the Open category, and the RP must be able to take control of the UA at any time, except in the event of a free-flight UA. This includes when required to land the UA at any point during the flight, by maintaining VLOS.

In the event of a lost C2 Link the RP will no longer be able to take control of the UA, therefore the RP must take all reasonable steps to ensure that the UA is not flown into a situation where the C2 Link might be lost (e.g. due to excessive range from the command unit, or in an area where the potential for RF interference is increased).

In addition, RPs must always fly their UA in a manner that, should a lost C2 Link situation occur, the UA will not subsequently endanger persons or property (e.g. while flying its 'return to home' procedure.)

GM1 UAS.OPEN.060(2)(d) Responsibilities of the Remote Pilot

ABILITY TO MAINTAIN CONTROL OF THE UA

In order to help maintain control of the UA, the RP should fly cautiously, with the expectation that control of the UA may be lost without notice. The RP should avoid flying at excessive speeds when not necessary, especially near people.

The RP and UAS Operator should consider any environmental factors that may increase the potential for

loss of control of the aircraft, or loss of propulsion. These factors may include terrain, other nearby sources of RF interference or weather conditions that may degrade the performance of the C2 link, and systems on the UA including batteries.

Precipitation may lead to water ingress into various systems on the UA, low temperatures may affect battery performance, and high wind speeds will result in a faster battery drain than in nil-wind conditions.

It should be noted that a partial loss of control may also be experienced, for example, a loss of some automated functions of the UA. The RP should be familiar with how these failures may affect other systems on the UA, and what backup systems are available- if any. The RP should also be familiar with flying the UA without the use of automated flight functions, in manual modes.

GM2 UAS.OPEN.060(2)(d) Responsibilities of the Remote Pilot

FREE-FLIGHT UA

'Free flight' means performing flights with no external control, taking advantage of the ascending currents, dynamic winds and the performance of the model. Outdoor free flights are carried out with gliders or with models equipped with means of propulsion (e.g. rubber-bands or thermal engines) that raise them in altitude, before they freely glide and follow the air masses.

For the purpose of free-flight UA, the person who launches the UA is the RP, and must comply with the responsibilities of the RP.

GM1 UAS.OPEN.060(3) and GM1 UAS.SPEC.060(3)(e) Responsibilities of the Remote Pilot

EMERGENCY RESPONSE DEFINITION

The term 'emergency response effort' covers any activities by police, fire, ambulance, coastguard, Search and Rescue or other similar services where action is ongoing in order to preserve life, protect the public or respond to a crime in progress. This includes activities such as road traffic collisions, fires, flooding events, rescue operations and firearms incidents, although this list is not exhaustive.

'Emergency response' is an action taken in response to an unexpected and dangerous event in an attempt to mitigate its impact on people, property or the environment.

EMERGENCY RESPONSE EFFORT

When there is an emergency response effort taking place within the operational area of a UAS, the UAS operation must be safely and immediately discontinued unless it was explicitly authorised by the responsible emergency response services.

When an emergency response effort is taking place close to the operational area, a safe distance must be maintained between the UA and the emergency response site so that the UA does not interfere with, or endanger, the activities of the emergency response services. The UAS Operator should take particular care not to hinder any possible aerial support to the emergency services, and to protect the privacy rights of persons involved in the emergency event.

GM1 UAS.OPEN.060(4) Responsibilities of the Remote Pilot

ROLE OF THE UA OBSERVER AND FIRST-PERSON VIEW

RPs may be assisted by UA Observers in helping them to keep the UA away from other aircraft and obstacles. The UA Observer must be situated alongside the RP and observers may not use any form of aided vision (e.g. binoculars) other than corrective spectacles or contact lenses.

UA Observers may also be used when the RP conducts UAS operations in first-person view (FPV), which is the method of controlling the UA primarily by referencing the UA's video downlink, either via watching the UA controller's screen or via goggles. The UA Observer must be situated alongside the RP and may not use aided vision other than corrective spectacles or contact lenses.

In all cases, the RP is still fully responsible for the safety of the flight.

The UA Observer's purpose is not to extend the range of the UA beyond the VLOS distance from the RP. However, in emergency situations, such as the need to perform an emergency landing away from the RP's position, binoculars may be used to assist the RP in safely performing the landing.

The UA Observer needs to be briefed by the RP or UAS Operator, in regard to keeping the UA within VLOS, and the definition of VLOS set out in GM1 Article 2(7). Whilst no minimum age, or competence level, is set out in law for a UA Observer, in order to meet the regulatory requirements that do exist, it is recommended that the UA Observer completes the Flyer ID test and learning, as set out in section' *AMC1 UAS.OPEN.020(4)(b) and UAS.OPEN.030(2)(a) and UAS.OPEN.040(3)'.*

GM1 UAS.OPEN.070 Duration and Validity of Remote Pilot Competency

DURATION OF FLYER-ID VALIDITY

A Flyer ID that was obtained under national regulations, or before this regulation became applicable, holds a validity period of 3 years. On renewal, these Flyer IDs will hold a validity of 5 years.

AMC1 UAS.SPEC.030(2) Application for an Operational Authorisation

SIGNIFICANT CHANGES TO THE OPERATIONAL AUTHORISATION

Any non-editorial change that affects the OA, or affects any associated documentation that is submitted to demonstrate compliance with the requirements established for the authorisation, is considered a significant change.

With regard to the information and documentation associated with the authorisation, changes are considered to be significant when they involve, for example:

- changes in the operations that affect the assumptions of the risk assessment;
- changes that relate to the safety management system (if applicable), or safety processes and procedures of the UAS Operator (including changes of key personnel), its ownership or its principal place of business;
- non-editorial changes that affect the OM, including the operational risk assessment.;
- non-editorial changes that affect the policies and procedures of the UAS Operator; and
- technical changes to the UAS.

AMC1 UAS.SPEC.040(1)(b) Operational Authorisation

PROCEDURE FOR COORDINATION WITH SERVICE PROVIDER FOR OPERATION IN CONTROLLED AIRSPACE

Any application for operation in the Specific category must **consider** the need for involvement of the relevant Air Navigation Service Provider (ANSP), when operating within controlled airspace. This must be set out within a procedure, within the OM. This procedure must take into account the risk of the operation and provide any necessary coordination with the ATS unit.

For VLOS operations within controlled airspace, below 400ft AGL, no permission or notification to the ANSP is required, unless operating within an FRZ.

For VLOS operations within controlled airspace, above 400ft AGL, this must be coordinated via a notification process when required for that portion of airspace, as set out within the AIP. This is in addition to the FRZ permission process, if operating within an FRZ. The AIP may set out additional requirements for the notification, such as a notice period for notification, within the AIP.

Note:

ANSPs will be required to update the AIP with such requirements, as necessary, by means of an ACP, which is likely to be a 'Level 0 ACP'. Further information can be found in CAP 1616.

Any operation that has the potential to impact the operation of another airspace user within controlled airspace, must consider how coordination with the ANSP will be achieved.

ANSPs may choose to be notified about all, or some, or no UAS operations within controlled airspace above 400ft AGL.

For BVLOS operations, at any height, within controlled airspace, the ANSP responsible for the management of the controlled airspace must be notified.

Although there is not a requirement to notify the ANSP when flying within controlled airspace below 400ft AGL, outside the FRZ, and within visual line of sight, this may still be identified as a risk mitigation within the risk assessment (see Article 11). In such cases, if this is adopted as a procedure within the OM, then this must also be carried out.

When notifying an ANSP of a potential flight within controlled airspace, the ATS unit may advise that the

flight should not take place for safety, or other operational reasons. Although the ANSP may not specifically issue, or reject, a permission for entry to such airspace (unless an FRZ/Restricted area), this advice should be followed by the UAS Operator. Failure to follow this advice is likely to lead to a breach of a number of other regulatory requirements, such as ANO article 240, which sets out that a person must not recklessly or negligently act in a manner likely to endanger an aircraft. The ANSP may choose to provide advice to the UAS Operator, on notification, of an alternative course of action that may mitigate the safety risk associated with the planned operation notified to the ANSP.

GM1 UAS.SPEC.040(1)(b) Operational Authorisation

PROCEDURE FOR COORDINATION WITH SERVICE PROVIDER FOR OPERATION IN CONTROLLED AIRSPACE

The Specific category covers a wide range of operations, many of which pose only a low air risk to other airspace users. In such instances (subject to proper procedures and risk assessment), it is not proportionate to require permission from, or notification to, an ANSP to operate within controlled airspace, much of which extends down to the surface.

The requirements of controlled airspace do not automatically apply to operations in the Open and Specific categories.

These instructions may be found within AIP Part 3, section AD 2.17, of the respective aerodrome (for controlled airspace established around an aerodrome) or within Part 2, section ENR 2.1 for other controlled airspace. If there are no instructions set out for the controlled airspace the flight is planned within, then it may be assumed that notification is not required.

The UAS Operator of any BVLOS operation will be expected to liaise with the ANSP when within controlled airspace, at any altitude.

A NOTAM is not sufficient for the purpose of this requirement (although may also be required, to promulgate details of the operation to other airspace users).

The notification of a flight to the ANSP as part of a coordination activity, as set out in UAS.SPEC.040(1)(b), does not imply the provision of any service, or separation, to the UA. If such a service is required by the OA then it must be explicitly agreed with the ANSP in advance of the flight.

AMC1 UAS.SPEC.050(1)(a) Responsibilities of the UAS Operator

OPERATIONAL PROCEDURES

The UAS Operator is responsible for developing procedures as required by the OA and for ensuring that those procedures are complied with.

The UAS Operator must:

(1) develop procedures for its UAS operations within an OM, detailing the scope of the organisation and the procedures to be followed as a minimum. This manual should be expanded as necessary to cover any increased complexity in the types of UAS being flown (based on the manufacturer'srecommendations, if available), or of the types of operation being conducted; and

(2) compile and maintain a list of their personnel and their assigned duties.

The UAS Operator must allocate functions and responsibilities in accordance with the level of autonomy of the UAS during the operation.

These operational procedures must be set out within the OM as described in the AMC to Article 11.

GM1 UAS.SPEC.050(1)(a)(i) Responsibilities of the UAS Operator

OPERATIONAL PROCEDURES TO ENSURE THE SAFETY OF THE OPERATION- HIGH VOLTAGE STORAGE DEVICES

The safe handling of such devices is important, and must be considered within the risk assessment process, described in the AMC/GM to Article 11. Consideration should be given to any time that any person may come into contact with such devices, including:

- Payload handlers/loaders
- Ground staff
- The RP
- Any person discovering the UA following an accident

Procedures should be established to cover all such eventualities and should include the display of relevant warnings.

The use of such devices on a UA should be identified and listed within the risk assessment process, and the display of a suitable warning label should be used as part of a mitigation of injury to third parties following an accident.

GM1 UAS.SPEC.050(1)(a)(iv) Responsibilities of the UAS Operator

PROCEDURES TO ENSURE THAT ALL OPERATIONS ARE IN COMPLIANCE WITH *REGULATION (EU) 2016/679 AS RETAINED (AND AMENDED IN UK DOMESTIC LAW) UNDER THE EUROPEAN UNION (WITHDRAWAL) ACT 2018, HEREAFTER REFERRED TO AS UK REGULATION (EU) 2016/679* ON THE PROTECTION OF NATURAL PERSONS WITH REGARD TO THE PROCESSING OF PERSONAL DATA AND ON THE FREE MOVEMENT OF SUCH DATA

The UAS Operator is responsible for complying with UK law and regulations in particular, with regard to privacy, data protection, liability, insurance, security and environmental protection.

This GM helps the UAS Operator to identify and describe the procedures to ensure that the UAS operations are in compliance with UK Regulation (EU) 2016/679 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data.

For further information on data-protection responsibilities, see the ICO (Information Commissioner's Office) Website, here. The following table is included as an example of how an operator may ensure their data-protection responsibilities are complied with.

1. Identify the privacy risks that the intended operation may create
2. Define your role with respect to personal data collection and processing
☐ I am the (joint) data controller ☐ I am the (joint) data processor
3. Data protection impact assessment (DPIA)
Have you assessed the need to perform a DPIA: Yes ☐ No ☐ If yes, do you have to perform a DPIA? Yes ☐ No ☐ - If yes, did you perform a DPIA? Yes ☐ No ☐
4. Describe the measures you are taking to ensure data subjects are aware that their data may be collected
5. Describe the measures you are taking to minimise the personal data you are collecting or to avoid collecting personal data
6. Describe the procedure established to store the personal data and limit access to it
7. Describe the measures taken to ensure that data subjects can exercise their right to access, correction, objection and erasure
8. Additional information

GM1 UAS.SPEC.050(1)(b) Responsibilities of the UAS Operator

LEVEL OF AUTONOMY AND GUIDELINES FOR HUMAN-AUTONOMY INTERACTION

Autonomous UAS are not the same as 'highly automated' UAS. There are many highly automated UAS currently in use today, but an autonomous UAS is one which requires no input or control in order to commence, and carry out its flight, and that no intervention from a RP is possible. It will be able to follow the planned route, communicate with other airspace users, detect, diagnose and recover from faults and operate at least as safely as a system with continuous human involvement.

Nevertheless, the risk assessment of autonomous operations should ensure, as for any other operations, that the risks identified are mitigated to an acceptable level.

GM2 UAS.SPEC.050(1)(b) Responsibilities of the UAS Operator

DESIGNATE A REMOTE PILOT FOR EACH FLIGHT

In the case of UAS Operators that are organisations, the RP does not have to necessarily be an employee or part of the organisation, in order to be designated a RP for a specific flight by the UAS Operator. The UAS Operator, however, remains responsible for the safety of the operation and the RP must follow the procedures of the UAS Operator. The UAS Operator remains responsible for ensuring the competence of the RP and that the obligations of the RP are met, in the same way as it would be if the RP was an employee of the UAS Operator's organisation.

The RP remains responsible for adhering to the regulatory responsibilities of the RP, and the UAS Operator remains responsible for adhering to the regulatory Responsibilities of the Operator.

GM1 UAS.SPEC.050(1)(c) Responsibilities of the UAS Operator

EFFICIENT USE OF RADIO SPECTRUM

It is the responsibility of the UAS Operator to ensure that the radio spectrum used for the C2 Link and for any payload communications complies with the relevant Ofcom requirements and that any licences required for its operation have been obtained.

It is also the responsibility of the operator to ensure that the appropriate aircraft radio licence has been obtained for any transmitting radio equipment that is installed or carried on the aircraft, or that is used in connection with the conduct of the flight and that operates in an aeronautical band.

Licensing of frequency allocations is the responsibility of Ofcom and hence, where required, all applications for a frequency assignment should be directed in the first instance to Ofcom. In frequency bands where the CAA is the assigning authority, the application will be passed to the CAA by Ofcom so that the CAA can conduct the technical work however, Ofcom remains the licensing authority.

Where a frequency licence is required (e.g., in protected frequency bands or where powers exceed the current regulatory limits) the CAA will not be able to issue a permission or exemption.

There are no specific frequencies allocated for use by UAS in the UK. However, the most used frequencies are 35 MHz, 2.4 GHz and 5.8 GHz.

35 MHz is a frequency designated for model aircraft use only, with the assumption that clubs and individuals will be operating in a known environment to strict channel allocation rules. It is therefore not considered to be a suitable frequency for more general UAS operations (i.e., not in a club environment) where the whereabouts of other users is usually difficult to assess.

2.4 GHz is a licence free band used for car wireless keys, household internet and a wide range of other applications. Although this is considered to be far more robust to interference than 35 MHz, operators must act with appropriate caution in areas where it is expected that there will be a high degree of 2.4 GHz activity.

5.8 GHz is a licenced band which requires a minimum payment and registration with Ofcom. This band is in use with other services including amateur-satellite, weather and military radars. Details can be found on the Ofcom website.

For further UAS specific guidance on whether a licence is required for your UAS, more information can be found on the Ofcom website.

Operations close to any facility that could cause interference (such as a radar station) could potentially disrupt communications with the UAS, whatever the frequency in use. GNSS jamming activities may also

disrupt communications as well as C2 signals. Information on scheduled GNSS jamming exercises can be found on the Ofcom website.

The risk assessment process described in the AMC and GM to Article 11 is likely to involve a radio frequency survey, in order to meet UAS.SPEC.050(1)(c), which should also include a physical range check.

UAS Operators are advised to carry out such a survey, when assessing the suitability of a site for a proposed UAS Operation. In doing so, the operator should:

- **Explain** how C2 instructions, as well as telemetry data, are relayed between the command unit and the UA.
- **Describe** in detail Operational C2 link management, including frequency switchovers and C2 link contingency situations.
- **Provide** the Link Budget Calculation,[5] wherever possible

The following table may assist in this survey:

C2 Link	Radio Line Of Sight (RLOS) C2 link	
	Beyond Radio Line Of Sight (BRLOS) C2 link (*if applicable)*	
Transceivers / Modems	Power Levels	
	Transmission Schemes	
Operating Frequencies Used		
Third Party Link Service Provider		
Minimum and average assured data Rates		
Minimum and average assured latencies		
Means of protection against harmful interference		
Any other relevant information		

Providing a detailed control system architecture diagram that includes informational or data flows and subsystem performance may assist in explaining the requirements above.

C2 link could include, direct (RLOS) or relayed (BRLOS). BRLOS includes all satellite systems or relaying C2 link through UA in the air to extend the signal range.

The following examples of technical solutions may help make the C2 link secure: pairing, encryption or back up link. It is recommended to use licensed spectrum for BVLOS operations to minimise the chances

[5] A link budget calculation is the theoretical calculation of the end-to-end performance of a communications link

of external interference and to improve latency.

The UAS Operator should identify what alerts, such as warning, caution and advisory alerts, does the system provide to the operator and RP, to advise them of C2 link disruption.

The UAS Operator should consider what design characteristics or procedures are in place to maintain the availability, continuity, and integrity of the datalink. Factors to consider:

- RF or other interference
- Flight beyond communications range
- Antenna masking (during turns and/or at high attitude angles)
- Loss of command unit functionality
- Loss of UA functionality
- Atmospheric attenuation including precipitation
- RF wireless site survey to ensure reliable connectivity, it may include:
    - Survey for frequency coverage throughout the potential operating area.
    - Survey for frequency capacity to ensure sufficient bandwidth to support all predicted operations.

AMC1 UAS.SPEC.050(1)(d)(i), (ii) and (iii) Responsibilities of the UAS Operator

REMOTE PILOT COMPETENCE- CURRENCY

The UAS Operator should identify the appropriate amount of recent flying experience in order to be considered 'current'.

Currency requirements should include:

- Regular practise of manoeuvres relevant to the scope of the OA.
- Regular practise of abnormal conditions and in-flight failures, such as:
    - the ability to identify a deteriorating situation and react accordingly;
    - taking manual control after a failure of any automated system;
    - practice flight in 'manual' modes;
    - identification of the potential for GNSS and compass loss or degradation.

As a minimum, RPs are expected to have logged at least 2 hours of total flight time in the last 3 calendar months on the type of UA applicable to the OA. For VLOS operations, this should be 'live' flight time, and not carried out on a simulator.

For new and novel types of UA, which are being test flown by a RP, currency must be demonstrated using a similar aircraft type. It is expected that this will be detailed within the specific flight test plan, and set out within the OM.

The UAS Operator, however, will need to identify the suitable level of currency for their operation, which is likely to be greater than the 2 hour minimum described above, for more complex operations.

RPs are expected to maintain a log book of flying activity, which may be used to demonstrate currency. This should contain:

- Date
- Aircraft type
- Aircraft identification (registration, if applicable, or serial number)
- Take off and landing location
- Duration (including whether in daylight, or at night)
- Remote pilot name
- Description of the flight/remarks

This should be stored electronically, in order that it can be easily submitted to the CAA for oversight purposes.

This is separate to the UA technical logbook requirement set out in AMC1 UAS.SPEC.050(1)(g).

GM1 UAS.SPEC.050(1)(d)(i), (ii) and (iii) Responsibilities of the UAS Operator

THEORETICAL KNOWLEDGE SUBJECTS FOR REMOTE PILOT TRAINING FOR THE 'SPECIFIC' CATEGORY

Within the Specific category there exists a wide range of potential UAS operations, each with unique risk. It is the responsibility of the UAS Operator to identify the competency requirements of the RP (requirements in addition to the GVC), and all personnel involved in the UAS operation, that is commensurate with the risk assessment for the given operation.

See AMC1 to Article 8 for further information on these requirements.

AMC1 UAS.SPEC.050(1)(d)(vi) Responsibilities of the UAS Operator

OBTAIN UPDATED INFORMATION ABOUT GEOGRAPHICAL ZONES

The UAS Operator must download the latest version of the geographical zone data and make this available to the RP such that they can upload it into the geo-awareness system, if such a system is available on the UA used for the operation. This information must be both an accurate, and complete, representation of the applicable airspace restrictions to the UAS Operation.

AMC2 UAS.SPEC.050(1)(d)(vi) Responsibilities of the UAS Operator

UPDATED INFORMATION ON GEOGRAPHICAL ZONES

Although UAS.SPEC.050(1)(d)(vi) specifically refers to geographical zones established under Article 15, the primary means for restricting flight of aircraft (including UA) in the UK, is under the ANO article 239. The RP must be familiar with these restrictions, and obtain any necessary permissions required to fly within them. This information can be found within the AIP.

AMC1 UAS.SPEC.050(1)(e)(ii) Responsibilities of the UAS Operator

INFORMATION ABOUT THE UAS OPERATOR'S MANUAL

The UAS Operator must ensure that the personnel in charge of duties essential to the UAS operation, apply the procedures contained in the operator's OM.

AMC1 UAS.SPEC.050(1)(g) Responsibilities of the UAS Operator

LOGGING OF FLIGHT ACTIVITIES AND RECORD-KEEPING

Operations must be logged, using a technical logbook for each aircraft, which must be held on an electronic record. This is to assist with regulatory oversight.

NOTE:

This is separate to the RP log-book requirements, set out in AMC1 UAS.SPEC.050(1)(d).

The information to be recorded must include the following:

a. the identification of the UAS (manufacturer, model/variant (e.g. serial number));
    i. If the UAS itself is not subject to registration (i.e. not certified), the identification of the UAS may be achieved using the serial number of the UAS.
b. the date, time, and location of the take-off and landing;
c. the duration of each flight;
d. the total number of flight hours/cycles (take off and landings);
e. The name of the RP responsible for the flight;
f. the activity performed (including the OA number, and whether the flight was VLOS or BVLOS);
g. any significant incident or accident that occurred during the operation;
h. a completed pre-flight inspection
i. any site risk assessments and radio frequency surveys carried out;
j. any defects and rectifications;
k. any repairs and changes to the UAS configuration; and
l. the information required to comply with UAS.SPEC.100.

Records must be stored for 3 years in a manner that ensures their protection from unauthorised access, damage, alteration, and theft.

The logbook can be generated in either electronic or paper format. If the paper format is used, it must contain, in a single volume, all the pages needed to log the holder's flight time. When one volume is completed, a new one will be started based on the cumulative data from the previous one.

GM1 UAS.SPEC.050(1)(g)(iii) Responsibilities of the UAS Operator

UP TO DATE RECORD OF INFORMATION ON UAS OPERATIONS- FLIGHT DATA RECORDING

Although there is no legal requirement to make use of a flight data recording system (device, or service), it is recommended that UAS Operators make use of such systems to assist with the regulatory requirement set out in UAS.SPEC.050(1)(g)(iii). This would also assist with demonstration of regulatory compliance during the CAA audit process, to demonstrate that UAS Operations have been conducted within the conditions and limits of the OA, for example- providing a summary of the maximum height of all operations.

Such flight data recording systems are invaluable when investigating occurrences, insofar as providing a recording of the flight parameters, system status and control input.

This should also include the monitoring of high-voltage stored energy devices during the flight, for:

- The remaining charge left, i.e. the 'fuel' available for the remainder of the flight; and
- The health of the batteries (i.e. the temperature/ rate of discharge etc).

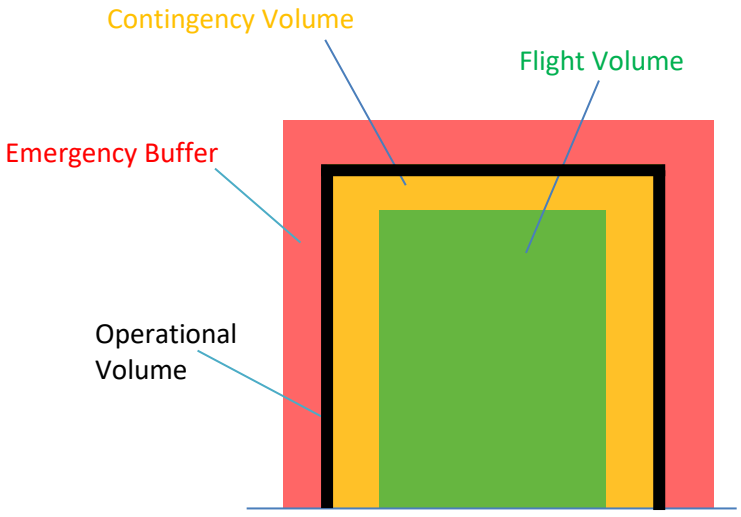
It should also be noted that equipment manufacturers are responsible for specifying the minimum requirements for the monitoring of UAS high-voltage stored energy devices. It is the responsibility of the UAS Operator to define procedures for satisfying these minimum requirements as part of their risk assessment process, as described in the AMC and GM to Article 11.

GM1 UAS.SPEC.050(1)(h) Responsibilities of the UAS Operator

A POSSIBLE FAILURE WILL NOT LEAD THE UAS TO FLY OUTSIDE THE OPERATIONAL VOLUME

In order to identify whether a possible failure may lead the UA to fly outside the operational volume, a detailed description of the volume is necessary for each flight.

- Applications for OAs covering only specific locations should include the following information within the application.
- Applications for OAs which are not limited to a specific location should include suitable procedures to identify and record the following information, within the application. The operational volume should be described in the following way:



The **Flight Volume** should encompass the entire operation, with sufficient buffer for any operational movement around the flight path, due to navigational errors, expected weather conditions and any other reason for deviating from the flight path.

The **Contingency Volume** provides a buffer around the Flight Volume. If the UA leaves the Flight Volume and enters the Contingency Volume, then the contingency procedures, documented in the OM, must be activated. The exact procedures will depend on the nature of the operation but should result in the UA re-entering the Flight Volume. Excursions from the Flight Volume may result from unexpected weather conditions, avoidance manoeuvres from weather, other airspace users or other such reasons. The Contingency Volume should be sufficiently large to accommodate any excursion due to weather, with enough room to manoeuvre the UA back into the Flight Volume. The Flight Volume and the Contingency Volume make up the **Operational Volume**.

Should the contingency mitigations fail, the UA might leave the Operational Volume and enter the

Emergency Buffer. Upon such an excursion, the Emergency Response Plan, detailed within the OM, should be executed. This may include terminating the operation safely, with the flight termination device and alerting ATC, the Police and reporting the accident to the CAA.

The UAS Operator should describe the proposed area(s) of operation, using relevant, up to date and suitable maps and diagrams, with photographs if necessary. This should also include details of any relevant airspace.

The accuracy of any maps used must be verified, and preferably from an authoritative cartographic source, such as Ordnance Survey.

Where appropriate, aeronautical charts must be sourced and used.

This may be a brief description and should include information such as:

(a) Type of area – congested (urban), building sites, open countryside (rural), road, marine environment (offshore), airport etc.;

(b) Geographic location;

(c) Population density;

(d) Features considered important to the operation(s) – roads, railways, tall obstacles and surrounding terrain;

(e) Any operation at an aerodrome can be supported with relevant aeronautical information and charts, sourced from the AIP;

(f) Any relevant airspace restrictions may be described using information from the AIP;

Simplistic descriptions such as, 'all of the UK' or 'as clients request', are not suitable operating area definitions, if not supported by suitable other conditions and limitations and information as described in points (a) to (f) above.

Individual sites do not necessarily need to be listed, if the description of the information above is adequate, and supporting procedures within the OM are provided.

The UAS Operator should, as part of the risk assessment process, identify how the **operational** and **technical** factors may lead to a delay between the RP commanding a control response, and the UA responding accordingly. This includes the following steps, that the UAS Operator should consider.

These steps are affected by multiple factors, such as HMI considerations, decision taking time, time taken to action a response, latency, and time taken to execute the command.

This time should be used to estimate the overall time taken between identifying the need to manoeuvre the aircraft, and the aircraft manoeuvring. This should be used when considering the operational volume, and the likelihood of the UA leaving it.

SAFETY SYSTEMS

Several modern commercially available UAS are fitted with safety systems as standard such as, GNSS

position monitoring systems, which can aid navigation but also enable electronic safety measures. These include geo-fencing or geo-caging, automated return to home, controlled descents, hovering and automatic landing. Other safety systems are available including propeller guards, flight termination functions, tethering systems, airbags and an automatic parachute recovery system which, on detecting a problem prevent the propellors from turning (by either switching the power off or blocking them) and deploys a recovery parachute.

The UAS Operator should consider the use of any safety systems on a UA that could substantially reduce the risk to other aircraft and the public. Whilst the incorporation of such safety systems is not mandated their inclusion may be a significant factor in assuring appropriate levels of safety in the event of an UAS malfunction.

A number of different safety systems may be used to help meet this requirement.

The UAS Operator should explain, within the OM, any systems fitted to the UA or command unit that contribute to safe handling or recovery of the UA in the event of loss of control or situational awareness.

If independent 'kill switches' are relied on as safety risk mitigations, these must be fully described.

Use of schematic diagrams may help describe the system layout and how this is constructed.

The UAS Operator should include any manufacturer supplied data relating to equipment or components included in the system i.e. data sheets, specification sheets, performance data etc.

GM1 UAS.SPEC.050(1)(L) Responsibilities of the UAS Operator

GREEN FLASHING LIGHT

Although this text remains in the regulation; the requirement to install, and use, a green flashing light on UAS within the Specific category has not been retained within the UK version of this regulation, because the applicability date of this requirement (set out in Article 23) was after the UK EU exit date, and as such was not retained.

REMOTE ID

Although this text remains in the regulation; the requirement to install an active remote identification system within the Specific category has not been retained within the UK version of this regulation, because the applicability date of this requirement (set out in article 23) was after the UK EU exit date, and as such was not retained.

GM1 UAS.SPEC.060(1)(a) Responsibilities of the Remote Pilot

THE REMOTE PILOT SHALL NOT PERFORM DUTIES UNDER THE INFLUENCE OF PSYCHOACTIVE SUBSTANCES OR ALCOHOL

UAS Operators should propose procedures, including alcohol limits, within their OM. Although no limits currently exist in law, it is advised that UAS Operators make use of the current Railways and Transport Safety Act 2003 Section 93 limits, which are:

Level of alcohol	All UK nations
Micrograms per 100 millilitres of breath	9
Micrograms per 100 millilitres of blood	20
Micrograms per 100 millilitres of urine	27

THE REMOTE PILOT SHALL NOT PERFORM DUTIES WHEN THEY ARE UNFIT TO PERFORM TASKS DUE TO INJURY, FATIGUE, MEDICATION, SICKNESS OR OTHER CAUSES

The medical requirements for operations within the Specific category will be set out in the OA. Normally, this will be achieved by reference to the medical requirements that have been set out by the UAS Operator in its OM, although in some cases, additional requirements may be expressed more precisely.

UAS Operators will be expected to propose details of their required medical standards through the risk assessment associated with the particular operation.

GM1 UAS.SPEC.060(2)(a) Responsibilities of the Remote Pilot

UPDATED INFORMATION ON GEOGRAPHICAL ZONES

Although UAS.SPEC.060(2)(a) specifically refers to geographical zones established under Article 15, the primary means for restricting flight of aircraft (including UA) in the UK, is under the ANO Article 239. The RP must be familiar with these restrictions, and obtain any necessary permissions required to fly within them. This information can be found within the AIP.

AMC1 UAS.SPEC.060(2)(b) Responsibilities of the Remote Pilot

OPERATING ENVIRONMENT

The RP, UAS Operator, must check any conditions that might affect the UAS operation, such as the locations of people, property, vehicles, public roads, obstacles, aerodromes, critical infrastructure, and any other elements that may pose a risk to the safety of the UAS operation.

Familiarisation with the environment and obstacles should be conducted through a survey of the area where the operation is intended to be performed.

It must be verified that the weather conditions at the time when the operation starts and those that are expected for the entire period of the operation are within limits defined in the manufacturer's manual, as well as with the OA or declaration, as applicable.

The RP must be familiar with the light conditions and make a reasonable effort to identify potential sources of electromagnetic energy, which may cause undesirable effects, such as EMI or physical damage to the operational equipment of the UAS.

AMC1 UAS.SPEC.060(2)(c) Responsibilities of the Remote Pilot

THE UAS IS IN A SAFE CONDITION TO COMPLETE THE INTENDED FLIGHT

The RP, or the UAS Operator in the case of an autonomous operation, must:

(a) update the UAS with data for the geo-awareness function if one is available on the UA;

(b) ensure that the UAS is safe to be flown and complies with the instructions and limitations provided by the manufacturer;

(c) ensure that any payload carried is properly secured and installed, respecting the limits for the mass and CG of the UA;

(d) ensure that the UA has enough available propulsion energy for the intended operation based on:

  i. the planned operation; and

  ii. the need for extra energy in case of unpredictable events;

(e) for a UAS equipped with a loss-of-data-link recovery function, ensure that the recovery function allows a safe recovery of the UAS for the envisaged operation; for programmable loss-of-data-link recovery functions, the RP may have to set up the parameters of this function toadapt it to the envisaged operation.

(f) Ensure that any lighting or remote ID systems (if applicable) are functioning correctly.

GM1 UAS.SPEC.060(2)(d) Responsibilities of the Remote Pilot

INFORMATION RELEVANT TO THE OPERATION MADE AVAILABLE TO THE ATS UNIT

For AMC on this requirement, in relation to controlled airspace, see AMC1 UAS.SPEC.040(1)(b).

INFORMATION PROVIDED TO OTHER AIRSPACE USERS WHEN INSIDE AN FRZ

The AIP (Section ENR 1.1 – 4.1.8) sets out when a NOTAM should be used to promulgate UAS operations, when operating within an FRZ, including inside/outside hours of operation of the aerodrome.

VHF RADIO COMMUNICATIONS TO PROVIDE INFORMATION TO THE ATS UNIT

The use of VHF RT to help meet this requirement should only be used when absolutely necessary. Such circumstances *may* include:

- Operations within the close vicinity of an aerodrome, where permission for entry into an FRZ/ATZ has been arranged and the use of VHF RT has been requested by the ATS Unit.
- BVLOS operations outside segregated airspace.
- Operations in close vicinity to other airspace users, such as air shows and flying displays.

It is not possible to give an exhaustive list of such circumstances when the use of VHF RT is appropriate, and it is the responsibility of the operator to apply such a mitigation appropriately. Acceptance of such a mitigation within the OM does not authorise its use. A number of requirements must also be met in order to legally make use of VHF RT, which are detailed below.

If the operation is approved with such a mitigation, then the following requirements must be met and detailed within the OM, and may also be set out within the conditions of the OA:

- Suitable VHF radio must be installed on the UA, and a relay to the ground station provided to enable RP communication. The equipment and installation must be approved by the CAA. A ground-based VHF radio must not be used. This is due to regulatory requirements set out by Ofcom. Any queries on this requirement should be directed to Ofcom.
- Appropriate licence held by the RP; this will normally be a Flight Radio Telephony Operator's Licence (FRTOL), which must be issued by the CAA following recommendation from an examiner.
- Appropriate radio licence: the radio must either be licenced, or have an exemption from the wireless telegraphy act, to operate. Ofcom issue these licences.

Further information on radio requirements can be found in AIP GEN 1.5 section 5.

The use of RT on aeronautical band radios within the Specific category for contact with ATC should be limited to exceptional circumstances and be carried out as directed by the ATS unit with which the RP needs to communicate. In the majority of circumstances VHF RT is not required, and other methods of communication and/or procedural mitigations are sufficient.

AMC1 UAS.SPEC.060(3)(b) Responsibilities of the Remote Pilot

AVOID RISK OF COLLISION WITH ANY MANNED AIRCRAFT - WHEN BEYOND VISUAL LINE OF SIGHT

When operating BVLOS, the risk of collision with a manned aircraft must be mitigated sufficiently. This is achieved using either:

- A **technical** capability which shall reduce the overall risk of a mid-air collision, to an acceptable level (as set out in the AMC to article 11) based on the environment in which the aircraft is operating; or
- An **operational** mitigation, which reduces the likelihood of encountering another aircraft to an acceptable level.

The use of a probabilistic safety argument, to assess the likelihood of encountering other aircraft, is not an operational mitigation if used as the sole component of a safety argument.

AVOID RISK OF COLLISION WITH ANY MANNED AIRCRAFT - WHEN OPERATING IN CLOSE PROXIMITY TO HELICOPTER LANDING SITES

When preparing a risk assessment for an operation, UAS Operators should consider the risk of interaction with un-notified aerial activity such as Air Ambulance arrivals and departures.

RPs and UAS Operators are reminded of the difficulty in visually observing UA, and the impact this is likely to have on the ability of other airspace users to avoid a collision with a UA.

Therefore, when operating in the vicinity of a Helicopter Landing Site, the UAS Operator should submit a NOTAM request to the Airspace Regulation Unit using the online application form, in order to increase helicopter crew awareness of planned UAS activity.

It should be noted, that a NOTAM may not be issued, following such a request. This does not indicate that the UAS Operation should not take place, but that it does not require a NOTAM.

Similarly, if a NOTAM is generated, this does not constitute 'permission' for the operation, or mean that the UAS Operator may disregard other restrictions, requirements or regulations that may otherwise apply.

GM1 UAS.SPEC.060(3)(b) Responsibilities of the Remote Pilot

AVOID RISK OF COLLISION WITH ANY MANNED AIRCRAFT- WHEN BEYOND VISUAL LINE OF SIGHT

An operational mitigation to reduce the likelihood of encountering other aircraft, may include airspace segregation.

AVOID RISK OF COLLISION WITH ANY MANNED AIRCRAFT- WHEN OPERATING IN CLOSE PROXIMITY TO HELICOPTER LANDING SITES

The issuing of a NOTAM when operating in close proximity to a HLS is one way of alerting the air crew to the UAS operation, so that they are aware of it. It is the responsibility of the operator to determine:

- Whether there is a HLS nearby;
  - The UAS Operator should determine whether there is an HLS in close proximity to their operation, although it should be expected that helicopters may take off and land anywhere. Although there is no authoritative source of all HLSs in the UK, the following list includes common examples of HLS;
    - Hospitals, air ambulance and police helicopter bases, HLS on office blocks and temporary HLS at large events such as horse racing events (these are normally subject to NOTAM).
  - The following list contains examples of ways of checking whether an operation is likely to be in proximity to an HLS:
    - Military AIP, VFR charts, online GA mapping software, and satellite-based imagery analysis.
- Whether the UAS operation is likely to affect the helicopter operation.
  - Factors to consider include the planned height of the operation, the distance from the HLS and the planned flight path of the UA.

GM2 UAS.SPEC.060(3)(b) Responsibilities of the Remote Pilot

AVOID RISK OF COLLISION WITH ANY MANNED AIRCRAFT

There is an obligation on the RP to maintain a thorough visual scan of the surrounding airspace to avoid any risk of a collision with manned aircraft. It is likely that the RP will identify other airspace users before they identify the UA, and therefore the RP will usually be the first to manoeuvre away from any conflicting aircraft.

RPs are reminded of the applicable requirements of SERA, as set out in AMC1 Article 7(2).

RPs should be aware that their UA are generally difficult, if not impossible, to see from another aircraft until they are extremely close.

As soon as the RP sees another aircraft, or parachute, or any other airspace user, they must immediately keep the UA at a safe distance from it and land if the UA is on a trajectory towards the other object.

If the RP cannot ensure suitable separation from the other aircraft such that there is no risk of a collision, then the UA must be landed immediately *(see AMC1 Article 7(2)).*

Although many aerodromes are protected by FRZs, many unlicensed helicopter landing sites also exist, including hospital helipads. Such aircraft may loiter at low-level or land and take off unexpectedly. All of these types of helicopter operations may therefore be affected by UAS operations particularly when approaching to land or departing from a site; UAS Operators and RPs must take active precautionary measures to avoid affecting the safety of other airspace users, either by requiring them to take avoiding action, disrupting a mission or distraction (for example, aborting an air ambulance landing due to a UAS sighting.

GM1 UAS.SPEC.060(3)(c) Responsibilities of the Remote Pilot

GEOGRAPHICAL ZONES

Although this requirement relates specifically to geographical zones established under Article 15, RPs should be aware of other airspace restrictions established under the ANO. These airspace restrictions must also be complied with. Details of these can be found within the AIP.

GM1 UAS.SPEC.060(3)(e) Responsibilities of the Remote Pilot

EMERGENCY RESPONSE EFFORT

See section: *GM1 UAS.OPEN.060(3)* for further information.

GM1 UAS.SPEC.100 The Use of Certified Equipment and Certified Unmanned Aircraft

GENERAL

For the purposes of UAS.SPEC.100, 'certified equipment' is considered to be any equipment for which the relevant design organisation has demonstrated compliance with the applicable certification specifications and received a form of recognition from the CAA that attests such compliance (e.g., a TSO approval).

The use of certified equipment or certified UA in the Specific category does not imply an automatic transfer of the flight activities into the Certified category. However, the use of certified equipment or certified UA in the Specific category should be considered as a risk reduction and/or mitigation measure in the risk assessment. If the certification of those products is relied upon within the risk assessment, then all aspects/conditions related to that certification (such as performance limitations, routine maintenance, scheduled servicing and the qualifications/ approvals of the organisations and personnel

carrying out those duties) must also be complied with.

An ETSO/ TSO approval approves the equipment, and not the installation of it on an aircraft. Therefore, the applicant needs to demonstrate via their risk assessment how this equipment does not impact on other aircraft systems or airspace users, an example is the electrical power requirements, i.e. this should not draw more power than the electrical distribution system can provide. This equipment should also not induce any electromagnetic interference on other equipment installed on the platform.

Due to the size of the AMC and GM for Article 16, it has been included as an Appendix to this document.

GM1 Article 16

DEFINITION OF A MODEL AIRCRAFT

The CAA has adopted the following two definitions:

Model Aircraft – An UA used for sporting and recreational purposes, flown by direct control inputs made by the RP without any autonomous capability other than for flight stabilisation purposes.

> **Note**:
>
> *The definition of a model aircraft may include multi-rotor type 'drones'. Any UA being flown in accordance with the definition above is considered a model aircraft. The use of any automation, such as automatic flight modes which alter the position of the aircraft, places the operation outside the definition of a model aircraft, and therefore outside the scope of Article 16. The aircraft must be flown with direct control inputs from the RP.*

It is acknowledged that many UA have built in failsafe modes, which may be activated in some instances, for example- loss of control link. Activation of such a mode, although possibly automatic in nature, does not necessarily place the aircraft outside the scope of the definition of a model aircraft.

Large Model Aircraft – A model aircraft with a maximum take-off mass greater than 25kg.

GM2 Article 16 UAS Operations in the Framework of Model Aircraft Clubs and Associations

GENERAL

A model aircraft club or association may obtain an authorisation from the CAA that is valid for all their members to operate UA according to conditions and limitations tailored for the club or association.

The model aircraft club or association will submit the procedures that all members are required to follow to the CAA. When the CAA is satisfied with the procedures, organisational structure and management system of the model aircraft club or association, it may provide an authorisation that defines different limitations and conditions from those in the Open category. The authorisation will be limited to the operations conducted within the authorised club or association and within the United Kingdom.

The authorisation cannot exempt members of the club or association from the requirement to register in accordance with Article 14 of the UAS Regulation; however, the CAA may allow a model club or association to register their members on their behalf.

The authorisation may also include operations by persons who temporarily join in with the activities of the club or association (e.g., for leisure during holidays or for a contest), as long as the procedures provided by the club or association define conditions acceptable to the CAA.

An application from an association for an Article 16 authorisation must contain a suitable safety case, detailing each requested 'exclusion' from the Open category requirements, and why those exclusions are safe. The association must be able to demonstrate how it maintains oversight of its membership, and clubs, and must provide details of any competency scheme, safety reporting scheme, handbooks and guidelines and any other appropriate documentation.

GM3 Article 16 UAS Operations in the Framework of Model Aircraft Clubs and Associations

OPTIONS TO OPERATE A MODEL AIRCRAFT

Model flyers have the following options to conduct their operations:

- They may operate as members of a model club or association that has received an authorisation from the CAA, as defined in Article 16. In this case, they must comply with the procedures of the model club or association in accordance with the authorisation.
- In accordance with Article 15(2) the UK may define zones where UAS are exempted from certain technical requirements, and/or where the operational limitations are extended, including mass or height limitations.
- The UAS may be operated in Subcategory A3, in which the following categories of UAS are allowed to fly according to the limitations and conditions defined in UAS.OPEN.040:
    - UAS that meet the requirements defined in Article 20(b) ; and
    - privately built UAS with MTOM of less than 25 kg.
- An Article 16 authorisation will set out conditions and limitations of any agreement between the association and the CAA, including any Operator registration data transfer, and the issuing of Open category pilot competence certificates on behalf of the CAA, where appropriate.
- Where necessary, a permission or exemption to the ANO necessary for the purpose of an Article 16 authorisation will be included as an annex to the Authorisation.

AMC1 Article 16(1) UAS Operations in the Framework of Model Aircraft Clubs and Associations

REQUEST BY A MODEL AIRCRAFT CLUB OR ASSOCIATION

An article 16 authorisation will be issued following application from a model aircraft club or association. The application needs to demonstrate to the CAA which parts of the regulation the association wishes to be excluded from, and the proposed scope of the model aircraft operations.

An application should be submitted via the UAS online form, and include a safety case, which outlines why each area of regulatory exclusion is safe, and what mitigations are applied.

An Article 16 authorisation will be issued for a period of 12 months, at which point the association may renew it.

REGISTRATION

An Article 16 authorisation may not exclude UAS Operators from the need to register with the CAA. AMC1 Article 16 (4) sets out the AMC for using the provision within the regulation to register members on their behalf, into the CAA registration system.

LARGE MODEL AIRCRAFT

The operation of large model aircraft is not normally automatically included within the scope of an Article 16 authorisation, and should be requested by the association on application.

An association may permit the operation of a large model aircraft, within the terms of the authorisation,

if this has been included within the Article 16 authorisation, however the risk assessment within the Article 16 application will need to identify suitable mitigations. These need to include assessment of the design and construction of the aircraft, and assessment of pilot competence to fly it.

Once the UAS Operator of the large model aircraft holds a suitable certificate confirming the design and construction, and completion of a flight test programme, they may apply to their association for a permit to operate the large model aircraft.

The relevant pilot competence requirement shall be set out within the application for an Article 16 Authorisation, which will need to demonstrate the following:

- Basic flying competence;
- Theoretical knowledge, including regulatory requirements;
- Flying competence on the specific large model aircraft that the RP intends to fly. This should be assessed by the Association.

MODEL AIRCRAFT ASSOCIATION PERMITS

A system of permits may be included within the Article 16 authorisation, to enable the association to permit certain activity, by the association within the scope of the authorisation. The CAA will use this system of permits to allow certain activity to take place, following specific conditions set out within the authorisation, that requires additional oversight from the association.

Examples of such permits include a large model aircraft permit, model aircraft display permit and flight above 400ft permit. Associations should consider implementation of such a scheme, as part of a mitigation within their risk assessment for higher risk activities.

A description of the association procedures that would support such a scheme should be provided to the CAA on application for an Article 16 authorisation. These include:

- Process to assess an application from a club or individual within the association, for a permit
- Process to issue and revoke permits where safe, necessary and appropriate to do so
- Process to carry out suitable and sufficient oversight of activity permitted

FLIGHT ABOVE 400FT

If the association requests an exclusion from the 120m height limit applied in the Open category, then the operation of model aircraft may take place above 120m, either using:

- A ‘standing’ authorisation within the Article 16 authorisation, which allows regular flight above 400ft, within certain conditions. One such condition of this is a mass limit, set out within the article 16 authorisation. This mass limit is usually 7.5kg.
- A permit issued by the association for the routine operation of model aircraft above 400ft at a designated flying club. The association may issue a permit for routine flight above 400ft, to any suitable club which requests it, following successful completion of the association’s process.
- A model aircraft display permit, which may permit flight above 400ft for the purpose of a display event.

MODEL AIRCRAFT FLYING DISPLAYS

A model aircraft flying display is defined as: ‘Any flying activity deliberately performed, by model aircraft, for the purpose of providing an exhibition or entertainment at an advertised event’.

One condition of an Article 16 authorisation, is that a model aircraft flying display being organised within

the limits of such an authorisation, is permitted by the association.

Model aircraft flying displays often involve flight of model aircraft above 400ft. There are mechanisms built into the Article 16 process, which may adjust the maximum height of 400ft, specifically for the purpose of a model aircraft flying display:

- For **large model aircraft,** within the large model aircraft permit; or
- For **model aircraft less than 25kg,** within the maximum height section of the Article 16 authorisation.

Both of these mechanisms are activated within the model aircraft flying display permit issued by the relevant association.

Operators of model aircraft being flown as part of a full-sized aircraft flying display, should read CAP 403, Chapter 17. These displays are subject to regulatory requirements, and the model aircraft elements of the display must be flown safely, in accordance with the display authorisation and CAP 403, and in accordance with the Article 16 authorisation and any necessary requirement to obtain a permit for the display.

Model aircraft operating in the Open or Specific category are excluded from the scope of ANO Article 86 (Flying Display) regulations, by the provisions of ANO Article 23, however any model aircraft operating as part of a display which is outside the limits of a suitable Article 16 Authorisation, or the Open category limits, must be authorised to do so within the Specific category.

Anyone wishing to undertake a model aircraft flying display should contact their relevant association for further advice. Only an association that is permitted to do so within their Article 16 Authorisation, may issue a permit for a model aircraft flying display.

Operators of any model aircraft operating **outside** an Article 16 Authorisation, and outside the limits of the Open category, must obtain an OA from the CAA for operating in the Specific category.

An Article 16 application will include within it any requirements relating to model aircraft displays, including the need for suitable risk assessments and the need to obtain any relevant airspace permission (such as FRZ permission from an aerodrome).

Model aircraft associations wishing to establish a risk assessment format for clubs to use as part of a model aircraft display plan, are encouraged to make reference to CAP 403, and SRG1303T.

THIRD COUNTRY OPERATORS WITHIN THE UK

Provisions for issuing an Article 16 Authorisation are made within this regulation, which (*in its European form*) has been implemented in all EU member states on 31 December 2020. As such, model aircraft operators from overseas may be able to operate in accordance with an Article 16 Authorisation issued by **their own authority**, within **their own member state**. Regulation EU 2019/947 (*the current European Commission version)* sets out within Article 16, paragraph 3, that such an authorisation is limited to the territory of the Member State in which it is issued.

RPs must meet the UK requirement for pilot competence, which is to hold a valid Flyer ID, in addition to any other competence requirement set out within the Article 16 authorisation.

The UK does not recognise UAS Operator registrations in third countries, and so the UAS Operator must comply with the UK registration requirements, set out in Article 14.

Third country model aircraft RPs and operators may operate within the limits of a UK CAA issued Article 16 Authorisation, with agreement from the relevant association. Any such operation must adhere to applicable UK regulations. Advice should be sought from the relevant association in the first instance.

UK OPERATORS IN THIRD COUNTRIES

Any UK RP and operator wishing to operate overseas must comply with the local regulations in place within the destination country. Any UK issued Article 16 Authorisation is only valid for use within the UK, and may not be used in any third country.

Currently no other countries recognise UK issued operator registrations, or pilot competence certificates.

GM1 Article 16(1) UAS Operations in the Framework of Model Aircraft Clubs and Associations

APPLICATION GUIDANCE

An application for an Article 16 authorisation will need to include a risk assessment. It is advised to use the risk assessment guidance described in GM1 Article 11, as a basis for the risk assessment. This should include the following (this list is not exhaustive):

- Description of the Association and its membership, including current total number of members;
- Description of flying activity, including locations and type of flying carried out;
- Description of competence and achievement schemes;
- Organisational structure, including organogram;
- Relevant procedures and processes within the association- including occurrence reporting and membership oversight;
- Description of which parts of the regulatory framework the association wishes to be excluded from. This should be included in a suitable tabular format, for example:

Article of Regulation	**Requirement**	**Requested change**	**Reason**	**Supporting Evidence**
Article 4 (1)(e)	*During flight, the UA is maintained within 120m from the closest point on the surface of the Earth.*	*During flight, the UA is maintained within 450m from the closest point on the surface of the Earth, for model aircraft with a mass less than 7.5kg.*	*Requirement to regularly fly above 120m for flight training and displays.*	*Risk assessment Volume 3*

- A safety case to provide evidence supporting the application. This should support any requests made in the table above.

Before submitting the application, the association should engage with the CAA RPAS and GA Unit to establish whether the Article 16 Authorisation is likely to be granted, and to answer any initial queries. Some basic feedback may be given at this stage, but a full review and feedback will not be given until the application is submitted.

Following submission of the application, an initial meeting will be arranged to discuss the application

with the association, and once issued, regular meetings will be held with the association.

NOTIFICATION OF MODEL AIRCRAFT ACTIVITY TO OTHER AIRSPACE USERS

Consideration should be given to the need to notify other airspace users of model aircraft activity, when operating within the terms of an Article 16 authorisation. This should be identified at the time of application, during the risk assessment process.

Generally, this includes when operating above 400ft AGL as part of a display, or when operating a large model aircraft above 400ft.

Model aircraft operating within an aerodrome FRZ may be notified to other airspace users, via a NOTAM. This is at the discretion of the aerodrome ATS unit, and the recommendations set out in AIP section ENR 1.1 – 4.1.8.13.

Generally, a VLOS operation of a model aircraft does not require notification when above 400ft, when stated within the terms of the Article 16 authorisation and when outside controlled airspace.

The primary means of notification is via a NOTAM. A NOTAM highlights important operational information to pilots, which is checked as part of the brief before departure. NOTAMs are issued by the NOTAM office at NATS, and can be arranged by the CAA, individual operators, aerodromes or other agencies as necessary.

A NOTAM should be used to highlight unusual model aircraft activity to other pilots for awareness. This includes displays above 400ft, large model aircraft operating above 400ft and in some cases, when operating within an aerodrome FRZ. A NOTAM may be requested via the online form, available from the CAA website here , or for an aerodrome ATZ, by the aerodrome contacting the NOTAM office.

In general, a NOTAM should not be raised for an activity which is also notified within the AIP (section 5.5 (aerial sporting and recreational activities). However, it is acknowledged that some sites in some instances (large display events for example) may need additional notification, in order to improve their visibility to airspace users, particularly the VFR GA community. In this case, a NOTAM *in addition* to the AIP entry **may** be requested for '*an intense area of model aircraft activity*'. These should be requested when necessary via the online form, available here.

NOTIFICATION OF MODEL AIRCRAFT ACTIVITY TO THE ANSP

Model aircraft operations within controlled airspace, above 400ft, are expected to be considered within the Article 16 risk assessment. Compliance with procedures set out within the AIP is expected, and may form part of the air risk mitigations.

In this case, when a model aircraft operates above 400ft within controlled airspace, the UAS Operator should identify whether the portion of airspace requires a notification to the ATS unit responsible. This will be set out within the AIP, section ENR 2.1. This process is set out in GM1 UAS.SPEC.040(1)(b), and should be followed.

MILITARY LOW FLYING SYSTEM

The military operate a system of low flying routes throughout the UK, and frequently fly below 500ft, often to heights as low as 100ft. The vast majority of military low flying takes place between 250ft and 500ft, and usually on weekdays between 0700-2300 (GMT).

In order to assist deconfliction between low flying military aircraft and other civil airspace users, the low-level Civil Aircraft Notification Procedure (CANP) has been established to provide a means of notification to the low flying cell.

Model aircraft displays and any other intense model aircraft activity should be notified through the CANP process, by emailing the low flying booking cell. Contact details for the cell are published in the AIP, in section ENR 1.10 - 5.1.

Charts of the low flying system are available from the AIP (ENR 6-20 and 6-21), which show the tactical training areas, boundaries and areas of avoidance.

AMC1 Article 16(2)(b)(ii) Remote Pilot Competence

MINIMUM COMPETENCE REQUIRED TO OPERATE THE UAS SAFELY

There is no exclusion from the need to demonstrate basic Open category pilot competence, when operating under an Article 16 authorisation. As such, every RP is expected to hold (as a minimum) a 'Flyer ID'. This may either be obtained through the CAA, or issued on the CAA's behalf by the association.

The association shall identify additional pilot competence requirements, based on the scope of their application for an Article 16 authorisation. This pilot competence scheme shall be set out within the Article 16 application, including the syllabus, assessment criteria, currency requirements and how the scheme is administered.

The level of pilot competence required will be dependent on the risk of the operation, but will always be at a level that is equal to, or greater than the Open category pilot competence requirement set out in UAS.OPEN.020(4)(b), and members will demonstrate this by holding a 'Flyer ID'.

In order to meet the equivalent standard of the CAA Flyer ID test, the association pilot competence test must be comprised of at least 40 questions, which may be multiple choice. A verbal assessment of a selection of questions is not considered sufficient.

The pass mark shall be set by the association, but must be greater than 75%. The test may be 'open book', such that the candidate can make reference to copies of information material to support them during the exam, if the association decides that this is appropriate.

The subject areas to assess include:

- Aviation Safety
- Airspace restrictions
- Aviation regulation
- Human performance limitations
- Operational procedures
- Model aircraft general and technical knowledge
- Privacy and data protection
- Insurance
- Security

Some of these subjects may be of more relevance to some associations than others. The association should decide on the appropriate distribution of questions across these subject areas. If an association wishes to miss out an entire subject area, the reason for this must be detailed within the Article 16 application.

An association may wish to expand the selection of questions within the assessment, to cover a wider range of topics than is covered by the CAA DMARES test.

MODEL AIRCRAFT FLYING DISPLAY - PILOT COMPETENCE

Within the risk assessment for an Article 16 authorisation, if requesting the ability to permit model aircraft displays, the association should identify additional pilot competence and currency requirements.

In general, these include for the operation of large model aircraft within a display, or jet turbine powered model aircraft within a display. This is due to the large amount of kinetic energy carried by such aircraft, that may be transferred following a collision.

It is recommended that this includes additional training, and demonstration of currency – such as the flying of three complete display routines within the preceding 90 days of the event, one of which should have been flown within the preceding 30 days of the event- on an aircraft which is reasonably representative of the aircraft to be flown within the display- preferably on the same aircraft.

'Reasonably representative', in this context, refers to an aircraft of a similar mass, flying characteristics and type.

FLYER ID ISSUED ON BEHALF OF THE CAA

An association may apply for the scope of their Article 16 authorisation to enable them to issue a Flyer ID on behalf of the CAA, to their members. This means that their members do not need to read the CAA Drone Code and sit the CAA Flyer ID test, but that they may demonstrate competence through the association pilot competence scheme instead.

This Flyer ID is proof of competence to operate within the Open category, as well as forming part of the competence requirement to fly under the terms of the Article 16 authorisation.

A Flyer ID issued by the CAA following completion of a model aircraft association competence scheme, will last for 5 years, and may be renewed at any time during that period (after the first 11 months of validity).

The association will need to demonstrate that the training material and pilot competence test meets the requirements set out in UAS.OPEN.020(4)(b), and therefore is at least equivalent to the CAA Drone Code and Flyer ID test.

On application for an Article 16 Authorisation, the association will need to provide:

- A copy of all questions used in their pilot competence assessment;
- The procedures relating to the administration of the competence assessment;
    - Exam conditions
    - Pass mark
    - Time limit
    - Number of re-sits available
- The details of any practical assessment, if required;
- A copy of the training material used to support the competence scheme;

Upon request from the Association, the CAA will provide the Flyer ID to the Remote Pilot, and to the association, for each member who participates in the scheme.

The format of the Flyer ID will be identical to the format issued directly by the CAA to RPs, set out in section *'AMC2 UAS.OPEN.020(4)(b) and UAS.OPEN.030(2)(a) and UAS.OPEN.040(3)'* and the association may not alter the ID or the format of the ID.

AMC1 Article 16(2)(b)(iii) UAS Operations in the Framework of Model Aircraft Clubs and Associations

ACTION IN CASES OF OPERATIONS/FLIGHTS THAT EXCEED THE CONDITIONS AND LIMITATIONS DEFINED IN THE OPERATIONAL AUTHORISATION

When a model club or association is informed that a member has exceeded the conditions and limitations defined in the OA, appropriate measures will be taken, proportionate to the risk posed, and in line with the agreed association/club procedures. Considering the level of risk of harm, the model club or association decides whether the competent authority should be informed. In any case, occurrences that cause an injury to persons or where the safety of other aircraft was compromised, must be reported by the model club or association to the CAA.

AMC1 Article 16(4) Registration

REGISTER MEMBERS INTO THE CAA REGISTRATION SYSTEM ON THEIR BEHALF

A facility to register model aircraft member into the CAA Operator registration system may be provided, if this is requested by the model aircraft association in the application for an Article 16 authorisation.

The terms of use of this facility shall be set out within the Article 16 authorisation, and data exchange requirements will be agreed between the association and the CAA prior to issuing the Article 16 authorisation.

The CAA will provide the Operator ID to the UAS Operator, and to the association, for each member who participates in the scheme.

The format of the Operator ID will be identical to the format issued directly by the CAA to UAS Operators, set out in section AMC1 Article 14(6) and the association may not alter the ID or the format of the ID.