European Union Aviation Safety Agency

Acceptable Means of Compliance (AMC)

and

Guidance Material (GM)

to Part-UAS

UAS operations in the 'open' and 'specific' categories

Issue 1

9 October 2019[1]

[1] For the date of entry into force of this issue, kindly refer to Decision 2019/021/R in the **Official Publication** of the Agency.

Table of contents

LIST OF ABBREVIATIONS

ARC	air risk class
BVLOS	beyond visual line of sight
C2	command and control
C3	command, control and communication
ConOps	concept of operations
EASA	European Union Aviation Safety Agency
ERP	emergency response plan
EU	European Union
GNSS	Global Navigation Satellite System
METAR	aviation routine weather report (in (aeronautical) meteorological code)
MCC	multi-crew cooperation
NAA	national aviation authority
OM	operations manual
OSO	operational safety objective
PDRA	predefined risk assessment
RF	radio frequency
RP	remote pilot
RPS	remote pilot station
SMM	safety management manual
SORA	specific operations risk assessment
SPECI	aviation selected special weather code in (aeronautical) meteorological code)
STS	standard scenario
TAF	terminal area forecast
UA	unmanned aircraft
UAS	unmanned aircraft system
UAS Regulation	Commission Implementing Regulation (EU) 2019/947 of 24 May 2019 on the rules and procedures for the operation of unmanned aircraft
VLOS	visual line of sight
VO	visual observer

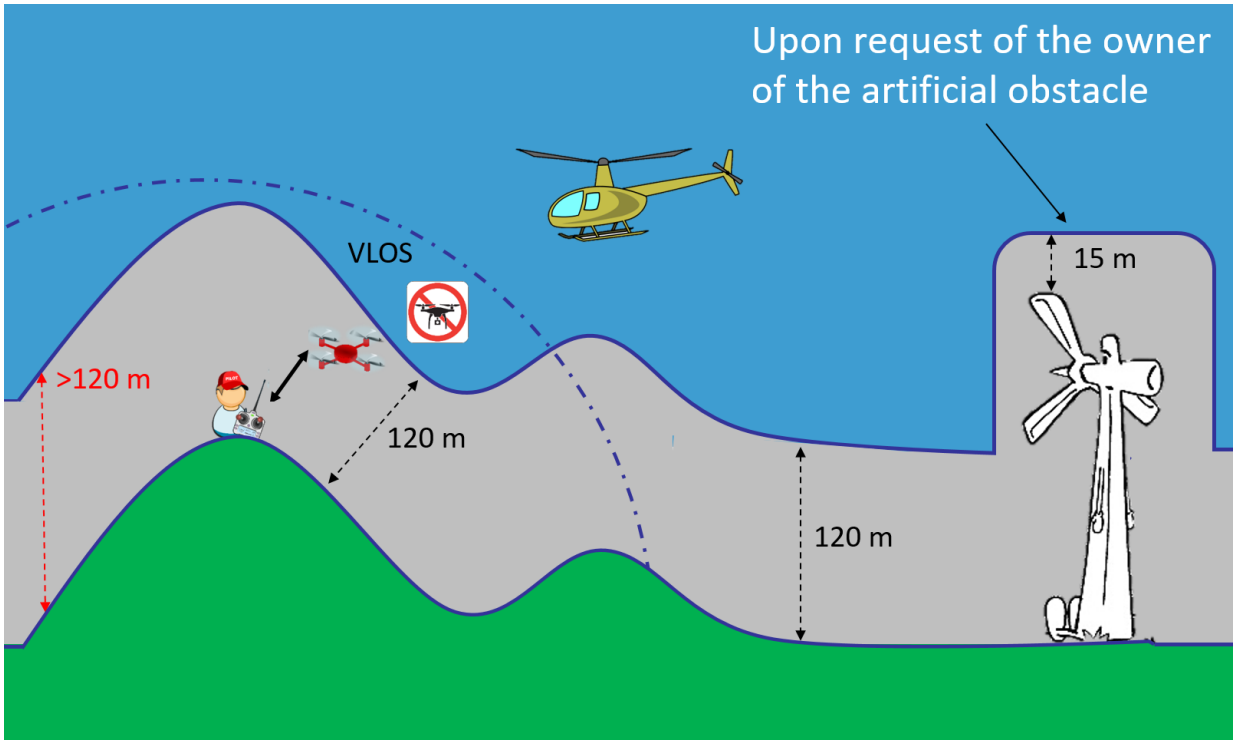
PART A — The 'open' category

GM1 UAS.OPEN.010 General provisions

MAXIMUM HEIGHT

The remote pilot must ensure that he or she keeps the unmanned aircraft (UA) at a distance less than 120 m (400 ft) from the terrain, and the picture below shows how the maximum height that the UA may reach changes according to the topography of the terrain. In addition, when the Member State (MS) has defined a geographical zone with a lower maximum height, the remote pilot must ensure that the UA always complies with the requirements of the geographical zone.

The entity responsible for the artificial obstacle referred to in point UAS.OPEN.010(3) needs to explicitly grant the unmanned aircraft system (UAS) operator permission to conduct an operation close to a tall man-made obstacle, e.g. a building, or antenna. No UAS operator should conduct an operation close to such an obstacle without permission from the entity responsible for the obstacle.



GM1 UAS.OPEN.010(4) General provisions

OPERATIONS WITH UNMANNED SAILPLANES

This derogation was included to allow model gliders to continue to operate along slopes. Strictly applying the 120-metre distance from the closest point of the surface of the earth would have had disproportionate consequences. These operations have been conducted successfully for decades and have generated a micro-economy in certain countries. Two measures have been put in place to reduce the risk:

(a) A maximum takeoff mass (MTOM), including the payload, limited to 10 kg to reduce the consequences of an impact. 10 kg should cover the vast majority of gliders in operation.

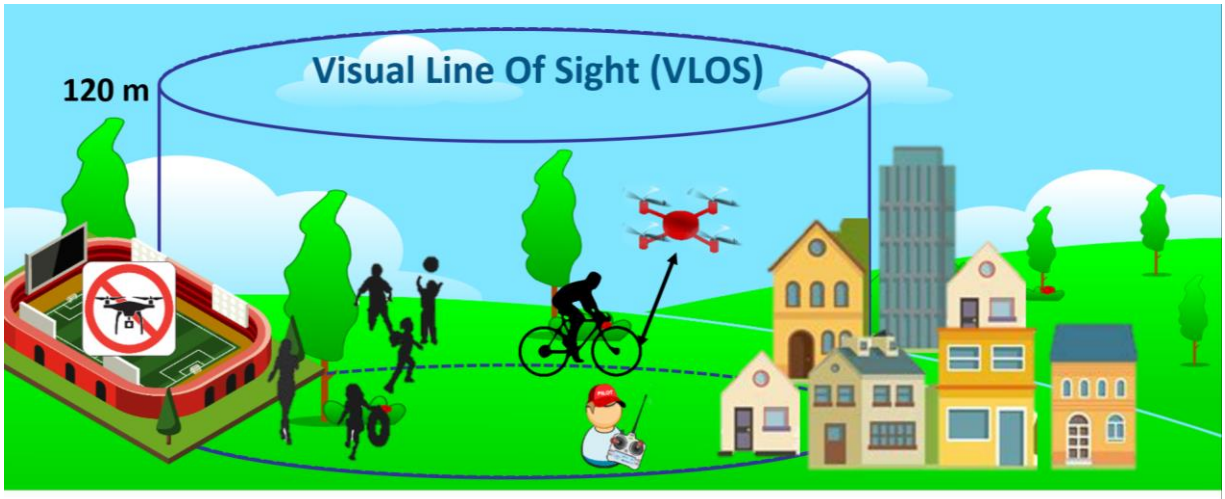
(b) The maximum height above the remote pilot is limited to 120 m, which reduces the air risk.

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. Overflying isolated people is possible, but there is a distinction between class C1 and class C0 UAS or privately built UAS with MTOMs of less than 250 g.

(a) For UAS in class C1, before starting the UAS operation, the remote pilot should assess the area and should reasonably expect that no uninvolved person will be overflown. This evaluation should be made taking into account the configuration of the site of operation (e.g. the existence of roads, streets, pedestrian or bicycle paths), and the possibility to secure the site and the time of the day. In case of an unexpected overflight, the remote pilot should 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.



CE C1
MTOM<900g

- **No flying over assemblies of people**
- reasonably expect that no uninvolved person is overflown. In case of unexpected overflight over uninvolved persons, the remote pilot shall reduce as much as possible the time during which the unmanned aircraft overflies those persons

(b) It is accepted that UAS in class C0 or privately built UAS with MTOMs less than 250 g may fly over uninvolved people; however, this should be avoided whenever possible, and where it is unavoidable, extreme caution should be used.

AMC1 UAS.OPEN.020(4)(b) and UAS.OPEN.040(3) UAS operations in subcategories A1 and A3

THEORETICAL KNOWLEDGE SUBJECTS FOR BASIC ONLINE TRAINING COURSES AND EXAMINATIONS FOR SUBCATEGORIES A1 AND A3

The acquisition of theoretical knowledge by each remote pilot should cover the following elements:

(a) Air safety:

(1) non-reckless behaviour, safety precautions for UAS operations and basic requirements regarding dangerous goods;

(2) starting or stopping the operations taking into account environmental factors, UAS conditions and limitations, remote pilot limitations and human factors;

(3) operation in visual line of sight (VLOS), which entails:

(i) keeping a safe distance from people, animals, property, vehicles, and other airspace users;

(ii) the identification of assemblies of people;

(iii) a code of conduct in case the UA encounters other traffic;

(iv) respecting the height limitation; and

(v) when using a UA observer, the responsibilities and communication between the UA observer and the remote pilot; and

(4) familiarisation with the operating environment, in particular:

(i) how to perform the evaluations of the presence of uninvolved person in the overflown area as required in UAS.OPEN.020(1) and UAS.OPEN.040(1); and

(ii) informing the people involved;

(b) Airspace restrictions: obtain and observe updated information about any flight restrictions or conditions published by the MS according to Article 15 of the UAS Regulation[2].

(c) Aviation regulations:

(1) Introduction to EASA and the aviation system;

(2) Regulation (EU) 2019/945 and Regulation (EU) 2019/947:

(i) their applicability to EU MSs;

(ii) subcategories in the 'open' category and the associated classes of UAS;

(iii) registration of UAS operators;

(iv) the responsibilities of the UAS operator;

(v) the responsibilities of the remote pilot; and

(vi) incident – accident reporting;

(d) Human performance limitations:

(1) the influence of psychoactive substances or alcohol or when the remote pilot is unfit to perform their tasks due to injury, fatigue, medication, sickness or other causes;

[2] Commission Implementing Regulation (EU) 2019/947 of 24 May 2019 on the rules and procedures for the operation of unmanned aircraft

(2) human perception:

(i) factors influencing VLOS;

(ii) the distance of obstacles and the distance between the UA and obstacles;

(iii) evaluation of the speed of the UA;

(iv) evaluation of the height of the UA;

(v) situational awareness; and

(vi) night operations.

(e) Operational procedures:

(1) pre-flight:

(i) assessment of the area of operation and the surrounding area, including the terrain and potential obstacles and obstructions for keeping VLOS of the UA, potential overflight of uninvolved persons, and the potential overflight of critical infrastructure;

(ii) identification of a safe area where the remote pilot can perform a practice flight;

(iii) environmental and weather conditions (e.g. factors that can affect the performance of the UAS such as electromagnetic interference, wind, temperature, etc.); methods of obtaining weather forecasts; and

(iv) checking the conditions of the UAS;

(2) in-flight:

(i) normal procedures; and

(ii) procedures for abnormal situations (e.g. for lost-data-link connections);

(3) post-flight:

(i) maintenance; and

(ii) logging of flight details;

(f) UAS general knowledge:

(1) basic principles of flight;

(2) the effect of environmental conditions on the performance of the UAS;

(3) principles of command and control:

(i) overview;

(ii) data link frequencies and spectrums; and

(iii) automatic flight modes, override and manual intervention;

(4) familiarisation with the instructions provided by the user's manual of a UAS, and in particular with regard to:

(i) overview of the main elements of the UAS;

(ii) limitations (e.g. mass, speed, environmental, duration of battery, etc.);

(iii) controlling the UAS in all phases of flights (e.g. the take-off, hovering in mid-air, when applicable, flying basic patterns and landing);

(iv) features that affect the safety of flight;

(v) setting the parameters of the lost link procedures;

(vi) setting the maximum height;

(vii) procedures to load geographical zone data into the geo-awareness system;

(viii) procedures to load the UAS operator registration number into the direct remote identification system;

(ix) safety considerations:

(A) instructions to secure the payload;

(B) precautions to avoid injuries from rotors and sharp edges; and

(C) the safe handling of batteries;

(x) Maintenance instructions:

(g) Privacy and data protection:

(1) understanding the risk posed to privacy and data protection; and

(2) the guiding principles for data protection under the GDPR[3];

(h) Insurance:

(1) liability in case of an accident or incident;

(2) general knowledge of the EU regulations; and

(3) awareness of the possible different national requirements for insurance in the MSs.

(i) Security:

(1) an understanding of the security risk;

(2) an overview of the EU regulations;

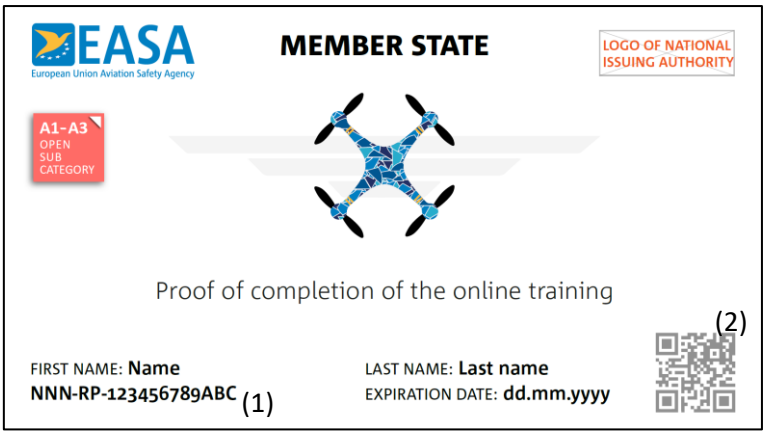
(3) awareness of the possible different national requirements for security in the MSs.

[3] Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation) (OJ L 119, 4.5.2016, p. 1).

AMC2 UAS.OPEN.020(4)(b) and UAS.OPEN.040(3) UAS operations in subcategories A1 and A3

PROOF OF COMPLETION OF THE ONLINE TRAINING

Upon receipt of proof of a remote pilot passing the online theoretical examination, the MS should provide the following proof of completion to the remote pilot. The proof may be provided in electronic form.



(1) Insert the identifier provided by the authority releasing the proof of completion. The reference should have the following format:

NNN-RP-xxxxxxxxx

Where:

— NNN is the ISO 3166 Alpha-3 code of the MS releasing the proof of completion;

— RP is a fixed field meaning: remote pilot; and

— Xxxxxxxxx are 12 alphanumeric characters (lower-case only) defined by the MS releasing the proof of completion.

As an example: (FIN-RP-123456789abc)

(2) QR code providing a link to the national database where the information related to the remote pilot is stored. Through the 'remote pilot identifier', number (1) all information related to the training of the remote pilot can be retrieved.

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 CE CLASS MARK

UAS operators should not make any modifications to a UAS in class C0, C1, C2, C3 or C4 that breach compliance with the product requirements. If the UAS operator carries out such a modification on a UAS, that UAS is no longer considered to have a CE Class mark and it may only be operated in Subcategory A3, or in the 'specific' category in accordance with Subpart B of Annex I to the UAS Regulation.

GM1 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 CE CLASS MARK

Modifications to UAS that breach compliance with the requirements for the CE marking are those that affect the weight or performance so that they are outside the specifications or the instructions provided by the manufacturer in the user manual. A replacement of a part with another that has the same physical and functional characteristics is not considered to be a breach of the requirements for the CE marking (e.g. a replacement of a propeller with another of the same design). The UA user manual should define instructions for performing maintenance and applying changes that do not breach compliance with the CE marking requirements.

AMC1 UAS.OPEN.30(1) UAS operations in subcategory A2

SAFE DISTANCE FROM UNINVOLVED PERSONS

(a) The minimum horizontal distance of the UA from uninvolved persons should be 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.

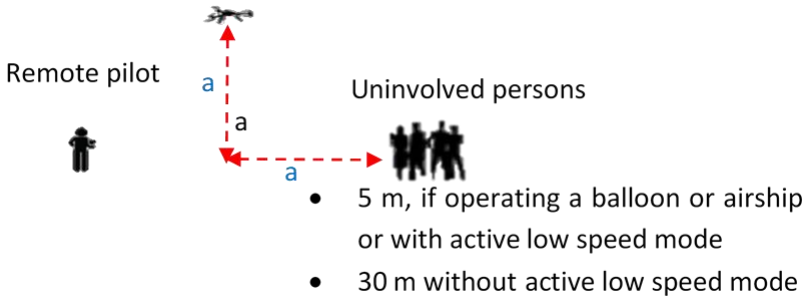
(b) As a reference, when the UA is operating in close proximity to people, the remote pilot should keep the UA at a lateral distance from any uninvolved person that is not shorter than the height ('1:1 rule', i.e. if the UA is flying at a height of 30 m, the distance from any uninvolved person should be at least 30 m).

(c) In any case, the distance from uninvolved persons should always be greater than:

(1) 5 m, when the low-speed mode function on the UA is activated and set to 3 m per second;

(2) 5 m, when operating a UAS balloon or airship; or

(3) 30 m in all other cases.



GM1 UAS.OPEN.30(1) UAS operations in subcategory A2

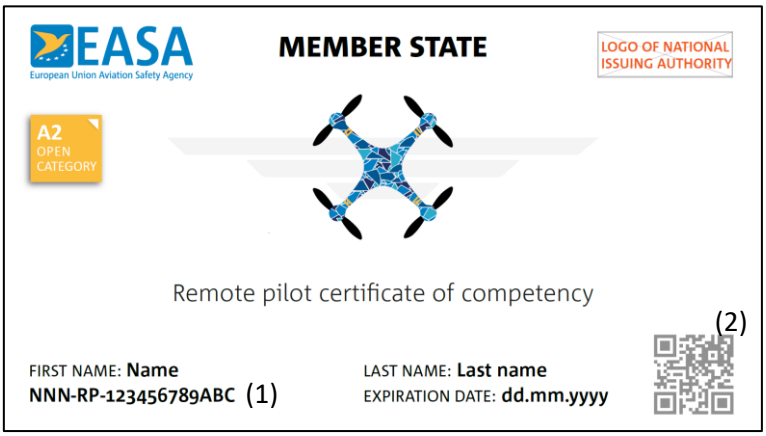
SAFE DISTANCE FROM UNINVOLVED PERSONS

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 remote pilot is ultimately responsible for the determination of this distance.

AMC1 UAS.OPEN.030(2) UAS operations in subcategory A2

REMOTE PILOT CERTIFICATE OF COMPETENCY

After the verification that the applicant has passed the online theoretical knowledge examination, 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 MS should provide the following certificate of competency to the remote pilot. The certificate may be provided in electronic form.



(1) Insert the identifier provided by the authority releasing the remote pilot certificate of competency. The reference should have the following format:

NNN-RP-xxxxxxxxx

Where:

— NNN is the ISO 3166 Alpha-3 code of the MS releasing the proof of completion;

— RP is a fixed field meaning: remote pilot; and

— Xxxxxxxxx are 12 alphanumeric characters (lower-case only) defined by the MS releasing the proof of completion.

As an example: (ESP-RP-123456789abc)

(2) QR code providing a link to the national database where the information related to the remote pilot is stored. Through the 'remote pilot identifier', number (1) all information related to the training of the remote pilot can be retrieved.

AMC1 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 remote pilot should be able to demonstrate at all times the ability to:

(1) operate a class C2 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 of a procedure or manoeuvre is never seriously in doubt.

(b) The remote pilot should complete the practical self-training with a UAS that features the same flight characteristics (e.g. fixed wing, rotorcraft), control scheme (manual or automated, human machine 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 CE marking after the transition period relative to CE marking is closed.

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

(d) The practical self-training should contain at least flying exercises regarding 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 remote pilot should 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.

AMC2 UAS.OPEN.030(2)(b) UAS operations in subcategory A2

PRACTICAL COMPETENCIES FOR PRACTICAL SELF-TRAINING

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

The following list of practical competencies should be considered:

(a) Preparation of the UAS operation:

(1) make sure that the:

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

(ii) zone of UAS operation is suitable for the intended operation; and

(iii) UAS meets the technical requirements of the geographical zone;

(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 by the MS for the geographical zone (e.g. no-fly zones, restricted zones and zones with specific conditions near the operation zone), and if needed, seek authorisation by the entity responsible for such zones;

(5) identify the goals of the UAS operation;

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

(7) 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 on the remote pilot station (RPS) is the latest published by the UAS manufacturer;

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

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

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

(7) update the geo-awareness system; and

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

(c) Flight under normal conditions:

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

(i) take off (or launch);

(ii) make a stable flight:

(A) hover in case of multirotor UA;

(B) perform coordinated large turns;

(C) perform coordinated tight turns;

(D) perform straight flight at constant altitude;

(E) change direction, height and speed;

(F) follow a path;

(G) return of the UA towards the remote pilot after the UA has been placed at a distance that no longer allows its orientation to be distinguished, in case of multirotor UA;

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

(iii) keep the UA outside no-fly zones or restricted zones, unless holding an authorisation;

(iv) use some external references to assess the distance and height of the UA;

(v) perform return to home procedure — automatic or manual;

(vi) land (or recovery); and

(vii) 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:

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

(ii) manage a situation when the UAS positioning equipment is impaired;

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

(iv) manage the exit from the operation zone as defined during the flight preparation;

(v) manage the incursion of a manned aircraft nearby the area of operation;

(vi) manage the incursion of another UAS in the area of operation;

(vii) select the safeguard mechanism relevant to a situation;

(viii) deal with a situation of a loss of attitude or position control generated by external phenomena;

(ix) resume manual control of the UAS when automatic systems render the situation dangerous; and

(x) carry out the loss of link procedure.

(e) Briefing, debriefing and feedback:

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

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

AMC1 UAS.OPEN.030(2)(c) UAS operations in subcategory A2

ADDITIONAL THEORETICAL KNOWLEDGE OF SUBJECTS FOR THE EXAMINATION FOR SUBCATEGORY A2

(a) By passing the additional theoretical knowledge examination, the remote pilot should demonstrate that they:

(1) understand the safety risks linked with a UAS operation in close proximity to uninvolved people or with a heavier UA;

(2) are able to assess the ground risk related to the environment where the operation takes place, as well as to flying in close proximity to uninvolved people;

(3) have a basic knowledge of how to plan a flight and define contingency procedures; and

(4) understand how weather conditions may affect the performance of the UA.

(b) The theoretical knowledge examination should cover aspects from the following subjects:

(1) meteorology:

(i) the effect of weather on the UA:

(A) wind (e.g. urban effects, turbulence);

(B) temperature;

(C) visibility; and

(D) the density of the air;

(ii) obtaining weather forecasts;

(2) UAS flight performance:

(i) the typical operational envelope of a rotorcraft, for fixed wing and hybrid configurations;

(ii) mass and balance, and centre of gravity (CG):

(A) consider the overall balance when attaching gimbals, payloads;

(B) understand that payloads can have different characteristics, thus making a difference to the stability of a flight; and

(C) understand that each different type of UA has a different CG;

(iii) secure the payload;

(iv) batteries:

(A) understand the power source to help prevent potential unsafe conditions;

(B) familiarise with the existing different kinds of battery types;

(C) understand the terminology used for batteries (e.g. memory effect, capacity, c-rate); and

(D) understand how a battery functions (e.g. charging, usage, danger, storage); and

(3) technical and operational mitigations for ground risk:

(i) low-speed mode functions;

(ii) evaluating the distance from people; and

(iii) the 1:1 rule.

GM1 UAS.OPEN.030(2)(c) UAS operations in subcategory A2

REMOTE PILOT COMPETENCIES REQUIRED TO OBTAIN A CERTIFICATE OF REMOTE PILOT COMPETENCY

A remote pilot may obtain the knowledge needed to pass the exam for a certificate of remote pilot competency in one of the following two ways:

(a) Competency-based training

(1) Competency-based training covers aspects related to non-technical skills in an integrated manner, taking into account the particular risks associated with UAS operations.

(2) Competency-based training should be developed using the analysis, design, development, implementation, evaluation (ADDIE) principles.

(b) Self-study

(1) A remote pilot may undertake self-study in many ways in order to obtain a certificate of competency. The purpose of this self-study is to acquire some basic competency and

familiarise themselves with the UA, as well as with the UAS operations they want to conduct.

(2) Examples of self-study:

(i) reading the manual or leaflet provided by the UA manufacturer;

(ii) reading related information or watching instructional films; and

(iii) obtaining information from others who have already experience in flying a UA.

The remote pilot may also undertake this study as classroom training, e-learning or similar training at a training facility. Since this training is not mandated by the MSs, the national aviation authorities (NAAs) are not required to approve the training syllabuses.

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

AREAS WHERE UAS OPERATIONS IN A3 MAY BE CONDUCTED

(a) If an uninvolved person enters the range of the UAS operation, the remote pilot should, where necessary, adjust the operation to ensure the safety of the uninvolved person and discontinue the operation if the safety of the UAS operation is not ensured.

(b) A minimum horizontal distance from the person that is passing the area could be estimated as follows:

(1) no less than 30 m;

(2) no less than the height ('1:1 rule', i.e. if the UA is flying at a height of 30 m, the distance of the UA from the uninvolved person should be at least 30 m), and

(3) no less than the distance that the UA would cover in 2 seconds at the maximum speed (this assumes a reaction time of 2 seconds).

This minimum horizontal distance is intended to protect people on the ground, but can be extended to property and animals.

GM1 UAS.OPEN.030(1) and UAS.OPEN.040(1) UAS operations in subcategories A1 and A3

DIFFERENCE BETWEEN SUB-CATEGORIES A2 AND A3

Subcategory A2 addresses operations during which flying close to people is intended for a significant portion of the flight. The minimum distance ranges from 30 m to 5 m from uninvolved people. 5 m is only allowed when there is an active low-speed mode function on the UA, and the remote pilot has conducted an evaluation of the situation regarding the weather, the performance of the UA and the segregation of the overflown area.

Sub-category A3 addresses operations that are conducted in an area (hereafter referred to as 'the area') where the remote pilot reasonably expects that no uninvolved people will be endangered within the range of the unmanned aircraft where it is flown during the mission. In addition, the operation must be conducted at a safe horizontal distance of at least 150 m from residential, commercial, industrial or recreational areas.

AMC1 UAS.OPEN.050(1) Responsibilities of the UAS operator

OPERATIONAL PROCEDURES

The UAS operator should develop procedures adapted to the type of operations and to the risks involved. Therefore, written procedures should not be necessary if the UAS operator is also the remote pilot, and the remote pilot may use the procedures defined by the manufacturer in the operations manual (OM).

If a UAS operator employs more than one remote pilot, the UAS operator should:

(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.

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

OBTAIN UPDATED INFORMATION ABOUT THE GEOGRAPHICAL ZONE

The UAS operator should download the latest version of the geographical data and make available to the remote pilot such that they can upload it onto the geo-awareness system, if such a system is available on the UA used for the operation.

GM1 UAS.OPEN.060(1)(b) Responsibilities of the remote pilot

OBTAINING UPDATED INFORMATION ABOUT ANY FLIGHT RESTRICTIONS OR CONDITIONS PUBLISHED BY THE MEMBER STATE

Information on airspace structure and limitations, including limited zones for UA or no-UA zones, will be provided by the MSs in accordance with Article 15 of the UAS Regulation.

AMC1 UAS.OPEN.060(1)(c) Responsibilities of the remote pilot

OPERATING ENVIRONMENT

(a) The remote pilot 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 should 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 compatible with those defined in the manufacturer's manual.

(d) The remote pilot should 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 remote pilot should:

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

(b) ensure that the UAS is fit to fly and complies with the instructions and limitations provided by the manufacturer, or the best practice in the case of a privately built UAS;

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

(d) ensure that the charge of the battery of the UA is enough for the intended operation based on:

(1) the planned operation; and

(2) the need for extra energy in case of unpredictable events; and

(e) 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 remote pilot may have to set up the parameters of this function to adapt it to the envisaged operation.

GM UAS.OPEN.060(2)(a) and UAS.SPEC.060(1)(a) Responsibilities of the remote pilot

OTHER CAUSES

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

AMC1 UAS.OPEN.060(2)(b) Responsibilities of the remote pilot

VLOS RANGE

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

(b) The remote pilot should 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 remote pilot has unobstructed visibility up to the horizon, the UA can be flown up to a distance such that the UA remain clearly visible. If there are obstacles, the distance should be reduced such that the remote pilot is able to evaluate the relative distance of the UA from that obstacle. Moreover, the UA should be kept low enough so that it is essentially 'shielded' by the obstacle, since manned aircraft normally fly higher than obstacles.

GM1 UAS.OPEN.060(2)(b) Responsibilities of the remote pilot

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

The rules put an obligation on the remote pilot to maintain a thorough visual scan of the airspace to avoid any risk of a collision with manned aircraft. This means that the remote pilot is primarily responsible for avoiding collisions. The reason is that the manned aircraft pilot(s) may not be able to see the UA due to its small size. Therefore, the remote pilot should make an evaluation of the risk of collision and take appropriate action.

As soon as the remote pilot sees another aircraft or a 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.

For example, if the remote pilot sees a manned aircraft flying at very high altitude (i.e. an en route flight at a height of 1 km or more), since the pilot will always keep the UA below 120 m, they can continue the operation.

If the remote pilot observes an aircraft passing through the sky at a low altitude, at which it may interact with the UA, they need to immediately reduce the height of the UA (e.g. to less than 10 m above the ground) and keep the UA in an area that is far (not less than 500 m) from the other aircraft. If they cannot ensure such a distance, the UA needs to be immediately landed.

AMC1 UAS.OPEN.060(2)(d) Responsibilities of the remote pilot

ABILITY TO MAINTAIN CONTROL OF THE UA

(a) The remote pilot should:

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

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

(3) operate only one UA at a time.

(b) If the remote pilot operates a UA from a moving ground vehicle or boat, the speed of the vehicle should be slow enough for the remote pilot to maintain a VLOS of the UA, maintain control of the UA at all times and maintain situational awareness and orientation.

GM1 UAS.OPEN.060(2)(d) Responsibilities of the remote pilot

ABILITY TO MAINTAIN CONTROL OF THE UA

Autonomous operations are not allowed in the ‘open’ category, and the remote pilot must be able to take control of the UA at any time, except in the event of a lost-link condition or a free-flight UA.

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, thermal engines) that raise them in altitude, before they freely glide and follow the air masses.

GM2 UAS.OPEN.060(3) and UAS.SPEC.060(3)(c) Responsibilities of the remote pilot

EMERGENCY RESPONSE DEFINITION

'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.

GM1 UAS.OPEN.060(3) and UAS.SPEC.060(3)(e) Responsibilities of the remote pilot

EMERGENCY RESPONSE EFFORT

When there is an emergency response effort taking place in the operational area of a UAS, the UAS operation should be immediately discontinued unless it was explicitly authorised by the responsible emergency response services. Otherwise, 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 to not hinder possible aerial support 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

The remote pilot may be assisted by a UA observer helping them to keep the UA away from obstacles. The UA observer must be situated alongside the remote pilot in order to provide warnings to the remote pilot by supporting them in maintaining the required separation between the UA and any obstacle, including other air traffic.

UA observers may also be used when the remote pilot conducts UAS operations in first-person view (FPV), which is a method used to control the UA with the aid of a visual system connected to the camera of the UA. In any case, including during FPV operations, the remote pilot is still responsible for the safety of the flight.

As the UA observer is situated alongside the remote pilot and they must not use aided vision (e.g. binoculars), their purpose is not to extend the range of the UA beyond the VLOS distance from the remote pilot. Exceptions are emergency situations, for instance, if the pilot must perform an emergency landing far from the pilot's position, and binoculars can assist the pilot in safely performing such a landing.

PART B — 'Specific' category

AMC1 UAS.SPEC.030(2) Application for an operational authorisation

APPLICATION FORM FOR THE OPERATIONAL AUTHORISATION

The UAS operator should submit an application according to the following form. The application and all the documentation referred to or attached should be stored for two years in a manner that ensures their protection from unauthorised access, damage, alteration, and theft. The declaration may be complemented by the description of the procedures to ensure that all operations are in compliance with 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, as required by UAS.SPEC.050(1)(a)(iv).

Application for operational authorisation

Data protection: Personal data included in this application is processed by the competent authority pursuant to Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation). It will be processed for the purposes of the performance, management and follow-up of the application by the competent authority in accordance with Article 12 of Regulation (EU) 2019/947.

If you require further information concerning the processing of your personal data or exercising your rights (e.g. to access or rectify any inaccurate or incomplete data), please refer to the contact point of the competent authority.

The applicant has the right to make a complaint regarding the processing of the personal data at any time to the national Data Protection Supervisor Authority.

UAS operator data					
1.1 UAS operator registration number					
1.2 UAS operator name					
UAS data					
2.1 Manufacturer		**2.2 Model**			
2.3 Serial number or UA registration mark if applicable					
2.4 Configuration:	☐ **Aeroplane** ☐ **Helicopter** ☐ **Multirotor** ☐ **Hybrid/VTOL** ☐ **Lighter than air/other**				
2.5 MTOM		**2.6 Maximum airspeed**		**2.7 Maximum characteristic dimensions**	
Operation					

3.1 ConOps	
3.2 Operation manual available	☐ **yes** ☐ **no**
3.3 Predefined risk assessment (PDRA) (if applicable)	
3.4 If the operation complies with a PDRA published by EASA, provide all the information and documentation identified in it.	
3.5 If the operation does not comply with a PDRA published by EASA, provide the operational risk assessment in accordance with Article 11 of Regulation (EU) 2019/947	
3.6 Mitigations and operational safety objectives (OSOs)	
3.7 Insurance cover will be in place at the start of the UAS operations	☐ yes ☐ no

I, the undersigned, hereby declare that the UAS operation will comply with:

— *any applicable Union and national rules related to privacy, data protection, liability, insurance, security and environmental protection;*
— *the applicable requirement of Regulation (EU) 2019/947; and*
— *the limitations and conditions defined in the authorisation provided by the competent authority.*

Date	**Signature**

Instructions for filling in the form

1.1 The UAS operator registration number in accordance with Article 14 of the UAS Regulation

1.2 The name of the accountable manager or the name of the UAS operator in the case of a natural person

2.1 The name of the manufacturer of the UAS

2.2 The model of the UAS as defined by the manufacturer

2.3 The serial number of the UA defined by the manufacturer, or the registration mark for the UA requiring registration according to Article 14 of the UAS Regulation

2.4 The configuration of the UA

2.5 The maximum take-off mass for which the UA is designed, expressed in kg

2.6 The maximum cruise air speed expressed in m/s and knots in parenthesis

2.7 State the maximum dimensions of the UA in metres (e.g. for aeroplanes: the length of the wingspan; for helicopters: the diameter of the propellers; for multirotors: the maximum distance between the tips of 2 opposite propellers).

NOTE: Section 2 may include more than one UAS. In that case, it should be filled with the data of all the UAS intended to be operated.

3.1 The description of the intended operation characterising the area where it will take place (i.e. urban, sparsely populated, industrial, etc.) and the airspace.

3.3 The number of the PDRA, if applicable.

3.6 A list of the mitigation measures and the OSOs put in place, as required by the PDRA or proposed by the UAS operator if no PDRA is available. Sufficient information should be provided to the competent authority to assess the robustness of the measures.

3.8 A short description of the procedures established by the UAS operator to ensure that all operations are in compliance with Regulation (EU) 2016/679 on the protection on personal data as required by point UAS.SPEC.050(1)(a)iv.

Note: The signature and stamp may be provided in electronic form.

AMC2 UAS.SPEC.030(2) Application for an operational authorisation

SIGNIFICANT CHANGES TO THE OPERATIONAL AUTHORISATION

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

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

(1) changes in the operations that affect the assumptions of the risk assessment;

(2) changes that relate to the management system of the UAS operator (including changes of key personnel), its ownership or its principal place of business;

(3) non-editorial changes that affect the operational risk assessment report;

(4) non-editorial changes that affect the policies and procedures of the UAS operator; and

(5) non-editorial changes that affect the OM (when required).

GM1 UAS.SPEC.030(2) Application for an operational authorisation

APPLICATION FORM FOR THE OPERATIONAL AUTHORISATION

Depending on the level of the risk of the operation, the technical characteristics of the UAS may play an important role in mitigating the risk. In that case, the UAS operator may provide additional information to the NAA on the characteristics of the UAS to be operated. The NAA will, in any case, ask for additional data when needed.

As an example regarding how to structure the additional information, the UAS operator may supplement the application for the authorisation with the additional elements shown below. Elements from the example may be added or removed as required.

LANDING GEAR	☐ yes ☐ no	
Type	☐ **Fixed** ☐ **Retractable** ☐ **Other**	
Characteristics	☐ **Wheels** ☐ **Skids** ☐ **Legs** ☐ **Other**	
CONSPICUITY CHARACTERISTICS (2)		
Paint (1):		
Lights (2)	☐ yes ☐ no	**Intensity:**
Aircraft visibility lights:		
Control lights (*flight mode or alert indicators, etc.*):		
PROPULSION (3)		
☐ **Electrical** ☐ **Combustion** ☐ **Hybrid** ☐ **Other**		
Description:		
Note: ***Provide a brief description*** *(for example, push/pull systems, coaxial systems in the case of multirotors, combined systems, etc.).*		
SYSTEMS		
☐ **Propellers** ☐ **Turbines** ☐ **Other**		
Description:		
Control and/or positioning system (4)		
FLIGHT CONTROLLER (5)		
Manufacturer:	**Model:**	
Description:		
FLIGHT TERMINATION SYSTEM (6)		
Description:		

FLIGHT MODES (7)	
Description:	
GROUND CONTROL STATION (8)	
Radio emitter: **Manufacturer:**	**Model:**
Mobile/computer application: **Manufacturer:**	**Model:**
Other: **Manufacturer:**	**Model:**
CONTROL COMMUNICATION LINK	
Description (frequency):	
TELEMETRY COMMUNICATION LINK	☐ yes ☐ no
Description (frequency):	
VIDEO SYSTEM COMMUNICATION LINK (FPV)	☐ yes ☐ no
Description (frequency):	
PAYLOAD COMMUNICATION LINK	☐ yes ☐ no
Description (frequency):	
PAYLOAD (9)	☐ yes ☐ no
TYPE	
☐ **Fixed** ☐ **Interchangeable** **Description:**	
OPERATION LIMITS (10)	
Maximum operating height:	
Max airspeed:	
Weather conditions:	
SAFETY SYSTEMS/SAFETY NETS AND AWARENESS (11)	
DETECT AND AVOID ☐ yes ☐ no **Description:**	

GEO-FENCING OR GEO-CAGING **Description:**	☐ yes	☐ no
TRANSPONDER **Description:**	☐ yes	☐ no
SYSTEMS FOR LIMITING IMPACT ENERGY **Description:**	☐ yes	☐ no
OTHER **Description:**		

(1) PAINT

Describe any painted elements that are visible (marks) and significant (colour, shape, etc.).

(2) LIGHTS

Describe the lights, including their colours and locations.

(3) PROPULSION

Mark the type of propulsion used, indicating (in the space provided) the manufacturer and model, and detailing relevant information such as the number of motors/engines, the configuration, etc. Powerplant design diagrams may be attached if necessary.

(4) CONTROL AND/OR POSITIONING SYSTEM

As a general instruction for this section, in addition to the description and information deemed necessary to define these systems, provide any certification and rating for the systems, such as those related to electromagnetic compatibility or any other European Directive satisfied by the equipment installed on the aircraft, for consideration during the specific risk assessment conducted using the specific operations risk assessment (SORA) or any other SMS methodology to evaluate and authorise operations.

(5) FLIGHT CONTROLLER

Indicate the manufacturer and model of the flight controller. Describe the relevant aspects affecting flight safety.

(6) FLIGHT TERMINATION SYSTEM

Describe and include the technical characteristics of the system, its modes of operation, system activation and any certification and rating for the components, as well as proof of its electromagnetic compatibility for consideration during the SORA or any other SMS methodology that is followed to evaluate and authorise operations.

(7) FLIGHT MODES

Describe the flight modes (i.e. manual, artificial stability with controller, automatic, autonomous). For each flight mode, describe the variable that controls the aircraft: increments in position, speed control, attitude control, type of altitude control (which sensor is used for this purpose), etc.

(8) GROUND CONTROL STATION

For 'encrypted' links, describe the encryption system used, if any.

(9) PAYLOAD

Describe each of the different payload configurations that affect the mission or that, without changing it, impact the weight and balance, the electrical charge or the flight dynamics. Include all relevant technical details. If needed, you may use other documents that provide the specified details.

(10) OPERATION LIMITS

Describe in this section the maximum operating height, the maximum airspeed (including Vmax ascent, Vmax descent and Vmax horizontal), and, in addition, the meteorological limit conditions in which the UAS can operate (e.g. rain, maximum wind, etc.)

(11) SAFETY SYSTEMS/SAFETY NETS AND AWARENESS

Describe the systems or equipment installed on the aircraft to mitigate potential operational safety risks, whether included in the form or not.

AMC1 UAS.SPEC.030(3)(e) Application for an operational authorisation

OPERATIONS MANUAL — TEMPLATE

When required in accordance with UAS.SPEC.030(3)(e), the OM should contain at least the information listed below, if applicable, customised for the area and type of operation.

0. Cover and contact.

0.1 Cover identifying the UAS operator with the title 'Operations Manual', contact information and OM revision number.

0.2 Table of contents.

1. Introduction

1.1 Definitions, acronyms and abbreviations.

1.2 System for amendment and revision of the OM *(list the changes that require prior approval and the changes to be notified to the competent authority)*.

1.3 Record of revisions with effectivity dates.

1.4 List of effective pages *(list of effective pages unless the entire manual is re-issued and the manual has an effective date on it)*.

1.5 Purpose and scope of the OM with a brief description of the different parts of the documents.

1.6 Safety statement *(include a statement that the OM complies with the relevant requirements of Regulation (EU) 2019/947 and with the authorisation or the terms of approval of the light UAS operator certificate (LUC), in the case of a LUC holder, and contains instructions that are to be complied with by the personnel involved in flight operations)*.

1.7 Approval signature *(the accountable manager must sign this statement)*.

2. Description of the UAS operator's organisation (*include the organigram and a brief description thereof)*.

3. Concept of operations (ConOps)

For each operation, please describe the following:

3.1 Nature of the operation and associated risks *(describe the nature of the activities performed and the associated risks)*.

3.2 Operational environment and geographical area for the intended operations *(in general terms, describe the characteristics of the area to be overflown, its topography, obstacles etc., and the characteristics of the airspace to be used, and the environmental conditions (i.e. the weather and electromagnetic environment); the definition of the required operation volume and risk buffers to address the ground and air risks)*.

3.3 Technical means used *(in general terms, describe their main characteristics, performance and limitations, including UAS, external systems supporting the UAS operation, facilities, etc.)*

3.4 Competency, duties and responsibilities of personnel involved in the operations such as the remote pilot, UA observer, visual observer (VO), supervisor, controller, operations manager, etc. *(initial qualifications; experience in operating UAS; experience in the particular operation; training and checking; compliance with the applicable regulations and guidance to crew members concerning health, fitness for duty and fatigue; guidance to staff on how to facilitate inspections by competent authority personnel)*.

3.5 Risk analysis and methods for reduction of identified risks *(description of methodology used; bow-tie presentation or other)*.

3.6 Maintenance *(provide maintenance instructions required to keep the UAS in a safe condition, covering the UAS manufacturer's maintenance instructions and requirements when applicable)*.

4. Normal procedures;

(The UAS operator should complete the following paragraphs considering the elements listed below. The procedures applicable to all UAS operations may be listed in paragraph 4.1).

4.1 General procedures valid for all operations

4.2 Procedures peculiar to a single operation

5. Contingency procedures

(The UAS operator should complete the following paragraphs considering the elements listed below. The procedures applicable to all UAS operations may be listed in paragraph 5.1).

5.1 General procedures valid for all operations

5.2 Procedures peculiar to a single operation

6. Emergency procedures

(The UAS operator should define procedures to cope with emergency situations.)

7. Emergency response plan (ERP) (optional)

8. **Security** ***(security procedures referred to in UAS.SPEC.050 (a)(ii) and (iii); instructions, guidance, procedures, and responsibilities on how to implement security requirements and protect the UAS from unauthorised modification, interference, etc.***]

9. **Guidelines to minimise nuisance and environmental impact referred to in UAS.SPEC.050 (a)(v);**

10. **Occurrence reporting procedures according to Regulation (EU) No 376/2014.**

11. **Record-keeping procedures** (instructions on logs and records of pilots and other data considered useful for the tracking and monitoring of the activity).

GM1 UAS.SPEC.030(3)(e) Application for an operational authorisation

OPERATIONS MANUAL — TEMPLATE

A non-exhaustive list of topics to be considered by the UAS operator when compiling some chapters of the OM is provided below:

'1.2 System for amendment and revision of the OM'

(a) A description of the system for indicating changes and of the methodology for recording effective pages and effectivity dates; and

(b) Details of the person(s) responsible for the revisions and their publication.

'2 Description of the UAS operator's organisation'

(a) The organisational structure and designated individuals. Description of the operator's organisational structure, including an organisational chart showing the different departments, if any (e.g. flight/ground operations, operational safety, maintenance, training, etc.) and the head of each department;

(b) Duties and responsibilities of the management personnel; and

(c) Duties and responsibilities of remote pilots and other members of the organisation involved in the operations (e.g. payload operator, ground assistant, maintenance technician, etc.).

'3.4 Competency, duties and responsibilities of personnel involved in the operations such as the remote pilot, UA observer, VO, supervisor, controller, operations manager etc.'

(a) Theoretical, practical (and medical) requirements for operating UAS in compliance with the applicable regulation;

(b) Training and check programme for the personnel in charge of the preparation and/or performance of the UAS operations, as well as for the VOs, when applicable;

(c) Training and refresher training records; and

(d) Precautions and guidelines involving the health of the personnel, including precautions pertaining to environmental conditions in the area of operation (policy on consumption of alcohol, narcotics and drugs, sleep aids and anti-depressants, medication and vaccination, fatigue, flight and duty period limitations, stress and rest, etc.).

'5.1 General procedures valid for all operations':

(a) Consideration of the following to minimise human errors:

(1) a clear distribution and assignment of tasks; and

(2) an internal checklist to check that staff are properly performing their assigned tasks.

(b) Consideration of the deterioration of external systems supporting the UAS operation; in order to assist in the identification of procedures related to the deterioration of external systems supporting the UAS operation, it is recommended to:

(1) identify the external systems supporting the operation;

(2) describe the deterioration modes of these external systems which would prevent the operator maintaining a safe operation of the UAS (e.g. complete loss of GNSS, drift of the GNSS, latency issues, etc.);

(3) describe the means put in place to detect the deterioration modes of the external systems; and

(4) describe the procedure(s) in place once a deterioration mode of one of the external systems is detected (e.g. activation of the emergency recovery capability, switch to manual control, etc.).

(c) Coordination between the remote pilot(s) and other personnel;

(d) Methods to exercise operational control; and

(e) Pre-flight preparation and checklists. These include, but are not limited to, the following points:

(1) The site of the operation:

(i) the assessment of the area of operation and the surrounding area, including, for example, the terrain and potential obstacles and obstructions for keeping a VLOS of the UA, potential overflight of uninvolved persons, potential overflight of critical infrastructure (a risk assessment of the critical infrastructure should be performed in cooperation with the responsible organisation for the infrastructure, as they are most knowledgeable of the threats);

(ii) the assessment of the surrounding environment and airspace, including, for example, the proximity of restricted zones and potential activities by other airspace users;

(iii) when UA VOs are used, the assessment of the compliance between visibility and planned range, the potential terrain obstruction, and the potential gaps between the zones covered by each of the UA VOs; and

(iv) the class of airspace and other aircraft operations (local aerodromes or operating sites, restrictions, permissions).

(2) Environmental and weather conditions:

(i) environmental and weather conditions adequate to conduct the UAS operation; and

(ii) methods of obtaining weather forecasts.

(3) Coordination with third parties, if applicable (e.g. requests for additional permits from various agencies and the military when operating, for example, in environmentally protected areas, areas restricted to photographic flights, near critical infrastructure, in urban areas, emergency situations, etc.);

(4) the minimum number of crew members required to perform the operation, and their responsibilities;

(5) the required communication procedures between the personnel in charge of duties essential to the UAS operation, and with external parties when needed;

(6) compliance with any specific requirement from the relevant authorities in the intended area of operations, including those related to security, privacy, data and environmental protection, use of the RF spectrum; also considering cross-border operations (specific local requirements) when applicable;

(7) the required risk mitigations put in place to ensure the operation is safely conducted (e.g. a controlled ground area, securing the controlled ground area to avoid third parties entering the area during the operation, and ensuring coordination with the local authorities when needed, etc.); and

(8) procedures to verify that the UAS is in a condition to safely conduct the intended operation (e.g. update of geographical zones data for geo-awareness or geo-fencing systems; definition and upload of lost link contingency automatic procedures; battery status, loading and securing the payload;).

(f) Launch and recovery procedures;

(g) In-flight procedures (operating instructions for the UA (reference to or duplication of information from the manufacturer's manual); instructions on how to keep the UA within the flight geography, how to determine the best flight route; obstacles in the area, height; congested environments, keeping the UA in the planned volume);

(h) Post-flight procedures, including the inspections to verify the condition of the UAS;

(i) Procedures for the detection of potentially conflicting aircraft by the remote pilot and, when required by the UAS operator, UA VOs; and

(j) Dangerous goods (limitations on their nature, quantity and packaging; acceptance prior to loading, inspecting packages for any evidence of leakage or damage).

'5.2 Procedures peculiar to a single operation'

(a) Procedures to cope with the UA leaving the desired 'flight geography';

(b) Procedures to cope with the UA entering the 'containment' volume;

(c) Procedures to cope with uninvolved persons entering the controlled ground area, if applicable;

(d) Procedures to cope with adverse operating conditions (e.g. in case icing is encountered during the operation, if the operation is not approved for icing conditions);

(e) Procedures to cope with the deterioration of external systems supporting the operation. In order to help properly identify the procedures related to the deterioration of external systems supporting the UAS operation, it is recommended to:

(1) identify the external systems supporting the operation;

(2) describe the deterioration modes of these external systems which would prevent the operator maintaining a safe operation of the UAS (e.g. complete loss of GNSS, drift of the GNSS, latency issues, etc.);

(3) describe the means put in place to detect the deterioration modes of the external systems; and

(4) describe the procedure(s) in place once a deterioration mode of one of the external systems is detected (e.g. activation of the emergency recovery capability, switch to manual control, etc.).

(f) De-confliction scheme (i.e. the criteria that will be applied for the decision to avoid incoming traffic). In cases where the detection is performed by UA VOs, the phraseology to be used.

'6 Emergency procedures'

(a) Procedures to avoid or, at least minimise, harm to third parties in the air or on the ground. With regard to the air risk, an avoidance strategy to minimise the collision risk with another airspace user (in particular, an aircraft with people on board); and

(b) Procedures for the emergency recovery of the UA (e.g. landing immediately, termination of the flight with FTS or a controlled crash/splash, etc.).

'7. Emergency response plan (ERP)'

When the UAS operator develops an ERP, the following should be considered:

(a) it is expected to cover:

(1) the plan to limit crash-escalating effects (e.g. notify the emergency services and other relevant authorities); and

(2) the conditions to alert ATM.

(b) it is suitable for the situation;

(c) it limits the escalating effects;

(d) it defines criteria to identify an emergency situation;

(e) it is practical to use;

(f) it clearly delineates the responsibilities of the personnel in charge of duties essential to the UAS operation;

(g) it is developed to standards considered adequate by the competent authority and/or in accordance with means of compliance acceptable to that authority; and

(h) when considered appropriate by the competent authority, to be validated through a representative tabletop exercise[4] consistent with the ERP training syllabus.

[4] The tabletop exercise may or may not involve all third parties identified in the ERP.

AMC1 UAS.SPEC.040(1) Operational authorisation

OPERATIONAL AUTHORISATION TEMPLATE

The competent authority should produce the operational authorisation according to the following form:

Operational authorisation

NAA Logo

1. AUTHORITY RELEASING THE AUTHORISATION			
1.1 State of the UAS operator			
1.2 Issuing authority			
1.3 Contact person Name Telephone Email			
2. UAS operator data			
2.1 UAS operator registration number			
2.2 UAS operator name			
2.3 Operational point of contact Name Telephone Fax Email			
2.4 Authorisation number			
3. Data of authorised UAS			
3.1 Brand		**3.2 Model**	
3.3 Serial number or UA registration mark (if applicable)			
4. Limitations and conditions for the UAS operation			
4.1 Authorised location(s)			
4.2 Authorised airspace risk level			

4.3 Operational limitations	
4.4 Mitigation measures	
4.5 Remote pilot competency	
4.6 Competency of other staff essential for the safety of the operation	
4.7 Records to be kept	
4.8 Type of events to be reported to the competent authority according to Regulation (EU) No 376/2014	
4.9 Duration of the authorisation	
The……. (2.2) is authorised to conduct UAS operations with the UAs defined in Section 3 and according to the conditions and limitations defined in Section 4, as long as it complies with this authorisation, Annex IX to Regulation (EU) 2018/1139 and its implementing rules.	
Date, signature and stamp	

Instructions for filling in the form

1.1 Name of the State of the UAS operator.

1.2 Identification of the issuing competent authority.

1.3 Contact data of the person responsible for issuing the authorisation.

2.1 Registration information of the UAS operator in accordance with Article 14 of the UAS Regulation.

2.2 UAS operator's registered name and last name or, in the case of a legal entity, the business name.

2.3 The contact details include the telephone and fax numbers, including the country code, and the email address at which the accountable manager and the safety manager can be contacted without undue delay.

2.4 Reference number, as issued by the competent authority.

3.1 Name of the manufacturer of the UAS.

3.2 Model of the UAS as defined by the manufacturer.

3.3 Serial number of the UA defined by the manufacturer or registration mark for the UA requiring registration according to Article 14 of the UAS Regulation

4.1 Locations where the operation has been authorised, based on the adaptation of mitigation measures.

4.2 Characterisation of the authorised airspace (i.e. low risk — ARC A, medium risk — ARC b, high risk — ARC C).

4.3 List the operational limitation including at least:

— the maximum height;

— limitations on the payload;

— limitations on the operations (i.e. the possibility to handover during the flight);

— the minimum contents of the OM;

— the methodology to verify the operational procedures;

— the need for an emergency response plan;

— the maintenance requirements; and

— the record-keeping requirements.

4.4 List the mitigation measures including[5] at least protection of a third party on the ground (including the definition of a specific authorised flight path, if applicable).

4.5 The minimum competency required for the remote pilot and the methodology to assess it.

4.6 The minimum competency required for the staff essential for the operation (i.e. maintenance staff, the launch and recovery assistant, UA VO, etc.) and the methodology to assess it.

Note: The signature and stamp may be provided in electronic form.

GM1 UAS.SPEC.040(1) Operational authorisation

OPERATIONAL AUTHORISATION TEMPLATE

In order to facilitate mutual recognition in cases of cross-border operations, the competent authority should produce an English version of the operational authorisation.

[5] In case of cross-border operations, this information will be revised by the NAA of the MS of operation.

AMC1 UAS.SPEC.050(1) Responsibilities of the UAS operator

OPERATIONAL PROCEDURES

(a) The UAS operator should develop procedures as required by the standard scenario (STS) or by the operational authorisation.

(b) If a UAS operator employs more than one remote pilot, the UAS operator should:

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

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

(c) The UAS operator should allocate functions and responsibilities in accordance with the level of autonomy of the UAS during the operation.

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

OPERATIONAL POCEDURES

The UAS operator should develop operational procedures based on the manufacturer's recommendations, if available.

When the UAS operator is required to develop an OM in accordance with point UAS.SPEC.030(3)(e), the procedures should be included in that manual.

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 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 any applicable European Union and national rules, in particular, with regard to privacy, data protection, liability, insurance, security and environmental protection.

This GM has the purpose of providing guidance to the UAS operator to help them to identify and describe the procedures to ensure that the UAS operations are in compliance with 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.

Description of the procedures established by the UAS operator to ensure that the UAS operation is in compliance with Regulation (EU) 2016/679

1. Identify the privacy risks[1] 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) according to Article 35 of Regulation (EU) 2016/679
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 perfom a DPIA? Yes ☐ No ☐
4. Describe the measures you are taking to ensure data subjects are aware that their data may be collected[6]
5. Describe the measures you are taking to minimise the personal data you are collecting or to avoid collecting personal data[7]
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

Notes:

1. For guidance regarding the identification of the **privacy risks** of your operation, please check:
   - The DR PRO online training course: Module 1 — Privacy risks in context; and
   - The DR PRO Privacy-by-Design Guide: Privacy risks and safeguards in drone manufacturing (page 10).
2. For more information about **definitions of personal data**, please check:
   - The DR PRO online training course: Module 2 – What is personal data? and
   - The DR PRO Privacy Code of Conduct: 3. Glossary.

   'Data controller' means that you make decisions about what personal data is collected and how it is collected, processed and stored.

   'Data processor' means that you follow instructions from another entity on collecting, processing and storing personal data.

   For more information about your potential role as **data controller or data processor**, you can check:

   - The DR PRO online training course: Module 2 – Data protection Rolesand

— The DR PRO Privacy Code of Conduct for the responsibilities of data controllers.

— For more information about when and how to conduct **data protection impact assessments** please check:

— The DR PRO Data Protection Impact Assessment template

3. For more information about how to **inform data subjects** about your activities you can check:

— The DR PRO Privacy Code of Conduct: 4.3.2 Act visibly and transparently;

— The DR PRO online training course: Module 3 – Carry out your operation; and

— The DR PRO Pre-flight checklist

4. For more information about the **data minimisation principle**, please check:

— The DR PRO Privacy Code of Conduct: 4.3.1 Minimise the impact on people's privacy and data protection;

— The DR PRO Privacy-by-Design Guide: Drone Privacy Enhancing Software Features; and

— The DR PRO online training course: Module 3 – Risk mitigation strategies.

5. For guidance on the **secure storage and access** to personal data, please check:

— The DR PRO Privacy Code of Conduct: 4.4.2 Handle data securely;

— The DR PRO online training course: Module 2 – How should personal data be handled? and

— The DR PRO Privacy-by-Design Guide: Drone Privacy Enhancing Software Features.

6. For more information about the **rights of data subjects**, please check:

— The DR PRO Privacy Code of Conduct: 4.3.3 Respect the rights of individuals; and

— The DR PRO online training course: Module 2 – How should individuals be treated?

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

LEVEL OF AUTONOMY AND GUIDELINES FOR HUMAN-AUTONOMY INTERACTION

The concept of autonomy, its levels and human-autonomous system interactions are currently being discussed in various domains (not only in aviation), and no common understanding has yet been reached. Guidance will therefore be provided once this concept is mature and globally accepted.

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

Besides, it is expected that autonomous operations or operations with a high level of autonomy will be subject to authorisation and will not be covered by STSs until enough experience is gained.

GM1 UAS.SPEC.050(1)(d) Responsibilities of the UAS operator

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

(a) The 'specific' category may cover a wide range of UAS operations with different levels of risk. The UAS operator is therefore required to identify the competency required for the remote pilot

and all the personnel in charge of duties essential to the UAS operation, according to the outcome of the risk assessment.

(b) When the UAS operation is conducted according to a STS listed in Appendix 1 to the UAS Regulation, the UAS operator must ensure that the remote pilot has the competency defined in the STS. In all other cases, the UAS operator may propose to the NAA, as part of the application, a theoretical knowledge training course for the remote pilot based on the elements listed in AMC1 UAS.OPEN.020(4)(b) and in UAS.OPEN.030(2), complemented by the following subjects:

(1) air safety:

(i) remote pilot records;

(ii) logbooks and associated documentation;

(iii) good airmanship principles;

(iv) aeronautical decision-making;

(v) aviation safety;

(vi) air proximity reporting; and

(vii) advanced airmanship:

(A) manoeuvres and emergency procedures; and

(B) general information on unusual conditions (e.g. stalls, spins, vertical lift limitations, autorotation, vortex ring states);

(2) aviation regulations:

(i) introduction to the 'specific' category;

(ii) risk assessment, introduction to SORA; and

(iii) overview of STSs and PDRA;

(3) navigation:

(i) navigational aids and their limitations (e.g. GNSS);

(ii) reading maps and aeronautical charts (e.g. 1:500 000 and 1:250 000, interpretation, specialised charts, helicopter routes, U-space service areas, and understanding of basic terms); and

(iii) vertical navigation (e.g. reference altitudes and heights, altimetry);

(4) human performance limitations:

(i) perception (situational awareness in BVLOS operations); and

(ii) fatigue:

(A) flight durations within work hours;

(B) circadian rhythms;

(C) work stress; and

(D) commercial pressures;

(iii) attentiveness:

(A) eliminating distractions; and

(B) scan techniques;

(iv) medical fitness (health precautions, alcohol, drugs, medication etc.); and

(v) environmental factors such as vision changes from orientation to the sun;

(5) operational procedures:

(i) airspace classifications;

(ii) procedures for airspace reservation;

(iii) aeronautical information publications;

(iv) NOTAMs; and

(v) mission planning, airspace considerations and site risk-assessment:

(A) measures to comply with the limitations and conditions applicable to the operational volume and the ground risk buffer for the intended operation; and

(B) BVLOS operations . Use of UA VOs;

(6) UAS general knowledge:

(i) loss of signal and system failure protocols — understanding the condition and planning for programmed responses such as returning to home, loiter, landing immediately;

(ii) flight termination systems; and

(iii) flight control modes;

(7) meteorology:

(i) obtaining and interpreting advanced weather information:

(A) weather reporting resources;

(B) reports;

(C) forecasts and meteorological conventions appropriate for typical UAS flight operations;

(D) local weather assessments;

(E) low-level charts; and

(F) METAR, SPECI, TAF;

(ii) regional weather effects — standard weather patterns in coastal, mountain or desert terrains; and

(iii) weather effects on the UA (wind, storms, mist, variation of wind with altitude, wind shear etc.); and

(8) emergency response plan (ERP) — the UAS operator should provide competency-based theoretical and practical training covering the ERP that includes the related proficiency requirements and recurrent training.

(c) The UAS operator may define additional aspects from the subjects mentioned in point (b) based on the UAS operations intended to be conducted:

(1) operational procedures;

(i) mission planning, airspace considerations and site risk-assessment — operations over a controlled ground area;

(ii) multi crew cooperation (MCC):

(A) coordination between the remote pilot and other personnel in charge of duties essential to the UAS operation (i.e. VO);

(B) crew resource management (CRM):

(a) effective leadership; and

(b) working with others;

(2) UAS general knowledge — the means supporting BVLOS operations:

(i) the means to monitor the UA (its position, height, speed, C2 Link, systems status, etc.);

(ii) the means of communication with VOs; and

(iii) the means to support air traffic awareness.

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

INFORMATION ABOUT THE UAS OPERATOR'S MANUAL

The UAS operator should ensure that the personnel in charge of duties essential to the UAS operation apply the procedures contained in the operator's manual.

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

LOGGING OF FLIGHT ACTIVITIES AND RECORD-KEEPING

(a) An acceptable means to log and record the flight activities is to use a logbook, which may be electronic.

(b) The information to be recorded should be indicated in the declaration or in the operational authorisation, which may include the following:

(1) the identification of the UAS (manufacturer, model/variant (e.g. serial number);

NOTE: if the UAS is not subject to registration, the identification of the UAS may be done using the serial number of the UAS.

(2) the date, time, and location of the take-off and landing;

(3) the duration of each flight;

(4) the total number of flight hours/cycles;

(5) in the case of a remotely piloted operation, the name of the remote pilot responsible for the flight;

(6) the activity performed (add the reference to the STS or the authorisation number, as applicable);

(7) any significant incident or accident[6] that occurred during the operation;

(8) a completed pre-flight inspection;

(9) any defects and rectifications;

(10) any repairs and changes to the UAS configuration; and

(11) the information required to comply with UAS.SPEC.100.

(c) Records should be stored for 2 years in a manner that ensures their protection from unauthorised access, damage, alteration, and theft.

(d) The logbook can be generated in one of the following formats: electronic or paper. If the paper format is used, it should 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.

AMC1 UAS.SPEC.060(2)(b) Responsibilities of the remote pilot

OPERATING ENVIRONMENT

(a) The remote pilot, or the UAS operator in the case of an autonomous operation, should 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 through a survey of the area where the operation is intended to be performed.

(c) It should 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 compatible with those defined in the manufacturer's manual, as well as with the operational authorisation or declaration, as applicable.

(d) The remote pilot should 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 remote pilot, or the operator in the case of an autonomous operation, should:

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

[6] As defined by Regulation (EU) No 376/2014.

(b) ensure that the UAS is fit to fly 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 propulsion energy for the intended operation based on:

(i) the planned operation; and

(ii) the need for extra energy in case of unpredictable events; and

(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 remote pilot may have to set up the parameters of this function to adapt it to the envisaged operation.

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 EASA that attests such compliance (e.g. an ETSO authorisation). This process is independent from the CE marking process.

The use of certified equipment or certified UA in the 'specific' category of operation does not imply a transfer of the flight activities into the 'certified' category of operation. 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 SORA.

PART C — Light UAS operator certificate (LUC)

GM1 UAS.LUC.010 General requirements for an LUC

GENERAL

UAS operators may decide to apply for authorisations or issue declarations, as applicable, for their operations, or apply for an LUC.

An LUC holder is considered to be a UAS operator; therefore, they must register according to Article 14 and can do it in parallel to the LUC application.

AMC1 UAS.LUC.010(2) General requirements for an LUC

APPLICATION FOR AN LUC

The application should include at least the following information:

(a) Name and address of the applicant's principal place of business.

(b) Statement that the application serves as a formal application for a LUC.

(c) Statement that all the documentation submitted to the competent authority has been verified by the applicant and found to comply with the applicable requirements.

(d) Desired date for the operation to commence.

(e) Signature of the applicant's accountable manager.

(f) List of attachments that accompany the formal application *(the following is not an exhaustive list)*:

  (i) name(s) of the responsible UAS operator's personnel, including the accountable manager, operations, maintenance and training managers, the safety manager and security manager, the person responsible for authorising operations with UASs;

  (ii) list of UASs to be operated;

  (iii) details of the method of control and supervision of operations to be used;

  (iv) identification of the operation specifications sought;

  (v) OM and safety management manual (SMM). (Note: the OM and SMM may be combined under the LUC Manual);

  (vi) schedule of events in the process to gain the LUC certificate with appropriate events addressed and target dates;

  (vii) documents of purchase, leases, contracts or letters of intent;

  (viii) arrangements for the facilities and equipment required and available; and

  (ix) arrangements for crew and ground personnel training and qualification.

AMC1 UAS.LUC.020(3) Responsibilities of the LUC holder

OPERATIONAL CONTROL

The organisation and methods established by the LUC holder to exercise operational control within its organisation should be included in the OM as an additional chapter in relation to the template provided in GM1 UAS.SPEC.030(3)(e).

GM1 UAS.LUC.020(3) Responsibilities of the LUC holder

OPERATIONAL CONTROL

'Operational control' should be understood as the responsibility for the initiation, continuation, termination or diversion of a flight in the interest of safety.

'System' in relation to operational control should be understood as the organisation, methods, documentation, personnel and training of those personnel for the initiation, continuation, termination or diversion of a flight in the interest of safety.

AMC1 UAS.LUC.020(5) Responsibilities of the LUC holder

RECORD-KEEPING — GENERAL

The record-keeping system should ensure that all records are stored in a manner that ensures their protection from damage, alteration and theft. They should be accessible on request of the NAA, whenever needed within a reasonable time. These records should be organised in a way that ensures traceability, availability and retrievability throughout the required retention period. The retention period starts when the record was created or last amended. Adequate backups should be ensured.

AMC1 UAS.LUC.030(2) Safety management system

PERSONNEL REQUIREMENTS — GENERAL

(a) The accountable manager should have the authority to ensure that all activities are carried out in accordance with the requirements of the UAS Regulation.

(b) The safety manager should:

(1) facilitate hazard identification, risk analysis, and risk management;

(2) monitor the implementation of risk mitigation measures;

(3) provide periodic reports on safety performance;

(4) ensure maintenance of the safety management documentation;

(5) ensure that there is safety management training available and that it meets acceptable standards;

(6) provide all the personnel involved with advice on safety matters; and

(7) ensure the initiation and follow-up of internal occurrence investigations.

(c) Management and other personnel of the LUC holder should be qualified for the planned operations in order to meet the relevant requirements of the UAS Regulation.

(d) The LUC holder should ensure that its personnel receive appropriate training to remain in compliance with the relevant requirements of the UAS Regulation.

GM1 UAS.LUC.030(2)(a) Safety management system

ACCOUNTABLE MANAGER

The accountable manager is a single, identifiable person who has the responsibility for the effective and efficient performance of the LUC holder's safety management system.

AMC1 UAS.LUC.030(2)(c) Safety management system

SAFETY POLICY

(a) The safety policy should:

(1) be endorsed by the accountable manager;

(2) reflect organisational commitments regarding safety, and its proactive and systematic management;

(3) be communicated, with visible endorsement, throughout the organisation;

(4) include internal reporting principles, and encourage personnel to report errors related to UAS operations, incidents and hazards; and

(5) recognise the need for all personnel to cooperate with compliance monitoring and safety investigations.

(b) The safety policy should include a commitment to:

(1) improve towards the highest safety standards;

(2) comply with all applicable legislation, meet all applicable standards, and consider best practices;

(3) provide appropriate resources;

(4) apply the human factors principles;

(5) enforce safety as a primary responsibility of all managers; and

(6) apply 'just culture' principles and, in particular, not to make available or use the information on occurrences:

(i) to attribute blame or liability to someone for reporting something which would not have been otherwise detected; or

(ii) for any purpose other than the improvement of safety.

(c) The senior management of the UAS operator should:

(1) continually promote the UAS operator's safety policy to all personnel, and demonstrate their commitment to it;

(2) provide the necessary human and financial resources for the implementation of the safety policy; and

(3) establish safety objectives and associated performance standards.

GM1 UAS.LUC.030(2)(c) Safety management system

SAFETY POLICY

The safety policy is the means whereby an organisation states its intention to maintain and, where practicable, improve safety levels in all its activities and to minimise its contribution to the risk of an accident or serious incident as far as is reasonably practicable. It reflects the management's commitment to safety, and should reflect the organisation's philosophy of safety management, as well as be the foundation on which the organisation's safety management system is built. It serves as a reminder of 'how we do business here'. The creation of a positive safety culture begins with the issuance of a clear, unequivocal direction.

The commitment to apply 'just culture' principles forms the basis for the organisation's internal rules that describe how 'just culture' principles are guaranteed and implemented.

For organisations that have their principal place of business in a MS, Regulation (EU) No 376/2014 defines the 'just culture' principles to be applied (refer in particular to Article 16(11) thereof).

GM1 UAS.LUC.030(2)(d) Safety management system

PERSONNEL REQUIREMENTS

The functions of the safety manager may be fulfilled by the accountable manager or another person charged by the UAS operator with the responsibility of ensuring that the UAS operator remains in compliance with the requirements of the UAS Regulation.

Where the safety manager already fulfils the functions of the compliance monitoring manager, the accountable manager cannot be the safety manager.

Depending on the size of the organisation and the nature and complexity of its activities, the safety manager may be assisted by additional safety personnel for the performance of all the safety management tasks.

Regardless of the organisational set-up, it is important that the safety manager remains the unique focal point as regards the development, administration, and maintenance of the organisation's management system.

GM2 UAS.LUC.030(2)(d) Safety management system

PERSONNEL REQUIREMENTS

A UAS operator may include a safety committee in the organisational structure of its safety management system and, if needed, one or more safety action groups.

(a) Safety committee

A safety committee may be established to support the accountable manager in their safety responsibilities. The safety committee should monitor:

(1) the UAS operator's performance against safety objectives and performance standards;

(2) whether safety action is taken in a timely manner; and

(3) the effectiveness of the UAS operator's safety management processes.

(b) Safety action group

(1) Depending on the scope of the task and the specific expertise required, one or more safety action groups should be established to assist the safety manager in their functions.

(2) The safety action group should be comprised of managers, supervisors and personnel from operational areas, depending on the scope of the task and the specific expertise required.

(3) The safety action group should at least perform the following:

(i) monitor operational safety and assess the impact of operational changes on safety;

(ii) define actions to mitigate the identified safety risks; and

(iii) ensure that safety measures are implemented within agreed timescales.

GM3 UAS.LUC.030(2)(d) Safety management system

KEY SAFETY PERSONNEL

The UAS operator should appoint personnel to manage key fields of activity such as operations, maintenance, training, etc.

AMC1 UAS.LUC.030(2)(g) Safety management system

DOCUMENTATION

The safety management system documentation of the LUC holder should be included in an SMM or in the LUC manual. If that documentation is contained in more than one operator's manual and is not duplicated, cross references should be provided.

GM1 UAS.LUC.030(2)(g)(i) Safety management system

SAFETY REPORTING AND INTERNAL INVESTIGATIONS

The purpose of safety reporting and internal investigations is to use reported information to improve the level of safety performance of the UAS operator. The purpose is not to attribute blame or liability.

The specific objectives of safety reporting and internal investigations are to:

(a) enable assessments of the safety implications of each relevant incident and accident, including previous similar occurrences, so that any necessary action can be initiated; and

(b) ensure that knowledge of relevant incidents and accidents is disseminated so that other persons and UAS operators may learn from them.

All occurrence reports that are considered to be reportable by the person who submits the report should be retained, as the significance of such reports may only become obvious at a later date.

AMC1 UAS.LUC.030(g)(iii) Safety management system

COMMUNICATION ON SAFETY

(a) The organisation should establish communication about safety matters that:

(1) ensures that all personnel are aware of the safety management activities as appropriate for their safety responsibilities;

(2) conveys safety-critical information, especially information related to assessed risks and analysed hazards;

(3) explains why particular actions are taken; and

(4) explains why safety procedures are introduced or changed.

(b) Regular meetings with personnel, where information, actions, and procedures are discussed, may be used to communicate safety matters.

GM1 UAS.LUC.030(2)(g)(iv) Safety management system

TRAINING AND SAFETY PROMOTION

Training, combined with safety communication and information sharing form part of safety promotion and supplement the organisation's policies, encouraging a positive safety culture and creating an environment that is favourable to the achievement of the organisation's safety objectives.

Safety promotion can also be the instrument for the development of a just culture.

Depending on the particular risk, safety promotion may constitute or complement a risk mitigation action and an effective reporting system.

AMC1 UAS.LUC.030(2)(g)(v) Safety management system

COMPLIANCE MONITORING

(a) The accountable manager should designate a manager to monitor the compliance of the LUC holder with:

(1) the terms of approval, the privileges, the risk assessment and the resulting mitigation measures;

(2) all operator's manuals and procedures; and

(3) training standards.

(b) The compliance monitoring manager should:

(1) have knowledge of, and experience in, compliance monitoring;

(2) have direct access to the accountable manager to ensure that findings are addressed, as necessary; and

(3) not be one of the other persons referred to in UAS.LUC.030(2)(c).

(c) The tasks of the compliance monitoring manager may be performed by the safety manager, provided that the latter has knowledge of, and experience in, compliance monitoring.

(d) The compliance monitoring function should include audits and inspections of the LUC holder. The audits and inspections should be carried out by personnel who are not responsible for the function, procedure or products being audited.

(e) An organisation should establish an audit plan to show when and how often the activities as required by the UAS Regulation will be audited.

(f) The independent audit should ensure that all aspects of compliance, including all the subcontracted activities, are checked within a period defined in the scheduled plan, and agreed by the competent authority.

(g) Where the organisation has more than one approved location, the compliance monitoring function should describe how these locations are integrated into the system and include a plan to audit each location in a risk-based programme as agreed by the competent authority.

(h) A report should be raised each time an audit is carried out, describing what was checked and the resulting findings against applicable requirements and procedures.

(i) The feedback part of the compliance monitoring function should address who is required to rectify any non-compliance in each particular case, and the procedure to be followed if rectification is not completed within appropriate timescales. The procedure should lead to the accountable manager.

(j) The LUC holder should be responsible for the effectiveness of the compliance monitoring function, in particular for the effective implementation and follow-up of all corrective measures.

GM1 UAS.LUC.030(2)(g)(v) Safety management system

COMPLIANCE MONITORING

The primary objective of the compliance monitoring function is to enable the UAS operator to ensure a safe operation and to remain in compliance with the UAS Regulation.

An external organisation may be contracted to perform compliance monitoring functions. In such cases, that organisation should designate the compliance monitoring manager.

The compliance monitoring manager may use one or more auditors to carry out compliance audits and inspections of the LUC holder under their own responsibility.

AMC1 UAS.LUC.030(2)(g)(vi) Safety management system

SAFETY RISK MANAGEMENT

The LUC holder should have a safety management system that is able to perform at least the following:

(a) identify hazards through reactive, proactive, and predictive methodologies, using various data sources, including safety reporting and internal investigations;

(b) collect, record, analyse, act on and generate feedback about hazards and the associated risks that affect the safety of the operational activities of the UAS operator;

(c) develop an operational risk assessment as required by Article 11;

(d) carry out internal safety investigations;

(e) monitor and measure safety performance through safety reports, safety reviews, in particular during the introduction and deployment of new technologies, safety audits, including periodically assessing the status of safety risk controls, and safety surveys;

(f) manage the safety risks related to a change, using a documented process to identify any external and internal change that may have an adverse effect on safety; the management of

change should make use of the UAS operator's existing hazard identification, risk assessment, and mitigation processes;

(g) manage the safety risks that stem from products or services delivered through subcontractors, by using its existing hazard identification, risk assessment, and mitigation processes, or by requiring that the subcontractors have an equivalent process for hazard identification and risk management; and

(h) respond to emergencies using an ERP that reflects the size, nature, and complexity of the activities performed by the organisation. The ERP should:

(1) contain the action to be taken by the UAS operator or specified individuals in an emergency;

(2) provide for a safe transition from normal to emergency operations and vice versa;

(3) ensure coordination with the ERPs of other organisations, where appropriate; and

(4) describe emergency training/drills, as appropriate.

GM2 UAS.LUC.030(g)(vi) Safety management system

SAFETY RISK MANAGEMENT

In very broad terms, the objective of safety risk management is to eliminate risk, where practical, or reduce the risk (likelihood/severity) to acceptable levels, and to manage the remaining risk to avoid or mitigate any possible undesirable outcome. Safety risk management is, therefore, integral to the development and application of effective safety management.

Safety risk management can be applied at many levels in an organisation. It can be applied at the strategic level and at operational levels. The potential for human error, its influences and sources, should be identified and managed through the safety risk management process. Human factors risk management should allow the organisation to determine where it is vulnerable to human performance limitations.

GM1 UAS.LUC.030(2)(g)(vii) Safety management system

MANAGEMENT OF CHANGE

Unless properly managed, changes in organisational structures, facilities, the scope of work, personnel, documentation, policies and procedures, etc. can result in the inadvertent introduction of new hazards, which expose the organisation to new, or increased risk. Effective organisations seek to improve their processes, with conscious recognition that changes can expose the organisations to potentially latent hazards and risks if the changes are not properly and effectively managed.

Regardless of the magnitude of a change, large or small, proactive consideration should always be given to the safety implications. This is primarily the responsibility of the team that proposes and/or implements the change. However, change can only be successful if all the personnel affected by the change are engaged and involved, and they participate in the process. The magnitude of a change, its safety criticality, and its potential impact on human performance should be assessed in any change management process.

The process for the management of change typically provides principles and a structured framework for managing all aspects of the change. Disciplined application of change management can maximise the effectiveness of the change, engage staff, and minimise the risks inherent in change.

Change is the catalyst for an organisation to perform the hazard identification and risk management processes.

Some examples of change include, but are not limited to:

(a) changes to the organisational structure;

(b) a new type of UAS being employed;

(c) additional UASs of the same or similar type being acquired;

(d) significant changes in personnel (affecting key personnel and/or large numbers of personnel, high turn-over);

(e) new or amended regulations;

(f) changes in financial status;

(g) new location(s), equipment, and/or operational procedures; and

(h) new subcontractors.

A change may have the potential to introduce new human factors issues, or exacerbate pre-existing issues. For example, changes in computer systems, equipment, technology, personnel (including the management), procedures, the work organisation, or work processes are likely to affect performance.

The purpose of integrating human factors into the management of change is to minimise potential risks by specifically considering the impact of the change on the people within a system.

Special consideration, including any human factors issues, should be given to the 'transition period'. In addition, the activities utilised to manage these issues should be integrated into the change management plan.

Effective management of change should be supported by the following:

(a) implementation of a process for formal hazard analyses/risk assessment for major operational changes, major organisational changes, changes in key personnel, and changes that may affect the way a UAS operation is carried out;

(b) identification of changes likely to occur in business which would have a noticeable impact on:

  (1) resources — material and human;

  (2) management guidance — processes, procedures, training; and

  (3) management control;

(c) safety case/risk assessments that are focused on aviation safety; and

(d) involvement of key stakeholders in the change management process as appropriate.

During the change management process, previous risk assessments and existing hazards are reviewed for possible effects.

GM2 UAS.LUC.030(g)(viii) Safety management system

SAFETY RISK MANAGEMENT — INTERFACES BETWEEN ORGANISATIONS

Safety risk management processes should specifically address the planned implementation of, or participation in, any complex arrangements (such as when multiple organisations are contracted, or when multiple levels of contracting/subcontracting are included).

Hazard identification and risk assessment start with the identification of all parties involved in the arrangement, including independent experts and non-approved organisations. This extends to the overall control structure, and assesses in particular the following elements across all subcontract levels and all parties within such arrangements:

(a) coordination and interfaces between the different parties;

(b) applicable procedures;

(c) communication between all the parties involved, including reporting and feedback channels;

(d) task allocation, responsibilities and authorities; and

(e) the qualifications and competency of key personnel.

Safety risk management should focus on the following aspects:

(a) clear assignment of accountability and allocation of responsibilities;

(b) only one party is responsible for a specific aspect of the arrangement — there should be no overlapping or conflicting responsibilities, in order to eliminate coordination errors;

(c) the existence of clear reporting lines, both for occurrence reporting and progress reporting; and

(d) the possibility for staff to directly notify the organisation of any hazard by suggesting an obviously unacceptable safety risk as a result of the potential consequences of this hazard.

Regular communication between all parties to discuss work progress, risk mitigation actions, changes to the arrangement, as well as any other significant issues, should be ensured.

AMC1 UAS.LUC.030(2)(g)(ix) Safety management system

USE OF SUBCONTRACTORS

(a) When an LUC holder uses products or services delivered through a subcontractor that is not itself approved in accordance with this Subpart, the subcontractor should work under the terms of the LUC.

(b) Regardless of the certification status of the subcontractor, the LUC holder is responsible for ensuring that all subcontracted products or services are subject to the hazard identification, risk management, and compliance monitoring of the LUC holder.

AMC1 UAS.LUC.040 LUC manual

GENERAL

(a) The LUC holder should ensure that all personnel are able to understand the language in which those parts of the LUC manual which pertain to their duties and responsibilities are written.

(b) The LUC manual should contain a statement signed by the accountable manager that confirms that the organisation will at all times work in accordance with the UAS Regulation, as applicable, and with the approved LUC manual. When the accountable manager is not the chief executive officer of the organisation, then the chief executive officer shall countersign the statement.

AMC1 UAS.LUC.040 LUC manual

GENERAL

The LUC manual may contain references to the OM, where an OM is compiled in accordance with GM1 UAS.SPEC.030(3)(e).

The LUC manual should contain at least the following information, customised according to the complexity of the UAS operator.

LUC MANUAL TEMPLATE

Operator's name

Table of contents

1. Introduction *(the information under Chapter O, points 1-6 of the OM may be duplicated here or simply referenced to the OM)*

2. SMM

   2.1. Safety policy *(provide details of the UAS operator's safety policy, safety targets)*

   2.2. Organisational structure *(include the organogram and brief description thereof)*

   2.3. Duties and responsibilities of the accountable manager and key management personnel; *(in addition, clearly identify the person who authorises operations)*

   2.4. Safety management system *(provide a description of the safety management system, including the lines of responsibilities with regard to safety matters)*

   2.5. Operational control system *(provide a description of the procedures and responsibilities necessary to exercise operational control with respect to flight safety)*

   2.6. Compliance monitoring *(provide a description of the compliance monitoring function)*

   2.7. Safety risk management *(the information about hazard identification, safety risk assessment and mitigation under Chapter A of the OM may be duplicated here or simply referenced to the OM)*

   2.8. Management of change *(description of the process to identify safety-critical changes within the organisation and its operation and to eliminate or modify safety risk controls that are no longer needed or effective due to such changes)*

   2.9. Development and approval of an operational scenario *(provide a description of the process)*

   2.10. Interface with subcontractors and partners *(describe the relationship with any subcontractor delivering products or services to the UAS operator as well as with partners, if available)*

   2.11. Documentation of key management system processes

3. OM *(the information under Chapters 2-11 of the OM may be duplicated here or references to the OM may be provided)*

4. Handling, notifying and reporting accidents, incidents and occurrences

5. Handling of dangerous goods *(specify the relevant regulations and instructions to crew members concerning the transport of dangerous goods such as pesticides and chemicals, etc. and the use of dangerous goods during operations such as batteries and fuel cells, engines, magnetising materials, pyrotechnics, flares and firearms)*

AMC1 UAS.LUC.040(3) LUC manual

PROCEDURES FOR SUBCONTRACTORS

If any activity is carried out by partner organisations or subcontractors, the LUC manual should include a relevant statement of how the LUC holder is able to ensure compliance with UAS.LUC.30(2)(i), and should contain, directly or by cross reference, descriptions of, and information on, the activities of those organisations or subcontractors, as necessary to substantiate this statement.

AMC1 UAS.LUC.050 Terms of approval of an LUC holder

FORM FOR THE TERMS OF APPROVAL OF AN LUC HOLDER

<table>
<tr><td colspan="3">LIGHT UAS OPERATOR CERTIFICATE (LUC)
(Terms of approval of an LUC holder)</td></tr>
<tr><td rowspan="2">(3)</td><td>State of the operator (1):</td><td rowspan="2">(3)</td></tr>
<tr><td>Issuing competent authority(2):</td></tr>
<tr><td>LUC # (4):</td><td rowspan="2">Operator name (5):
Registration number of the UAS operator (6):
Operator address (8):
Telephone (9):
Email (10):</td><td rowspan="2">Contact details, at which operational management can be contacted without undue delay (7):</td></tr>
<tr><td></td></tr>
<tr><td colspan="3">This certificate certifies that .....(5) is authorised to perform UAS operations, as defined in the attached UAS operations specifications, in accordance with the LUC manual, with the Annex to Regulation (EU) No 2019/947 and with Annex IX to Regulation (EU) 2018/1139.</td></tr>
<tr><td>Date of issue (11):____</td><td colspan="2">Name and signature (12):_____
Title: _____</td></tr>
</table>

1. Enter the name of the State of the operator.

2. Enter the identification of the issuing competent authority.

3. Reserved for use of the competent authority.

4. Enter the approval reference (digital and/or letter code) of the LUC, as issued by the competent authority.

5. Enter the name of the legal entity of the UAS operator and UAS operator's trading name, if different from the name of the legal entity.

6. Enter the registration number of the UAS operator, provided according to Article 14 of the UAS Regulation.

7. Enter contact details such as the telephone numbers, including the country code, and the email address at which operational management can be contacted without undue delay for issues related to UAS operations, the airworthiness of UAS, remote crew competency and other matters as appropriate.

8. Enter the UAS operator's principal place of business address.

9. Enter the UAS operator's principal place of business telephone details, including the country code.

10. Enter the UAS operator's email.

11. Enter the issue date of the LUC (dd-mm-yyyy).

12. Enter the title, name and signature of the competent authority representative. In addition, an official stamp may be applied on the LUC.

UAS OPERATIONS SPECIFICATIONS			
LUC ([1]):			
Operator name ([2]):			
The UAS operator ([2])_____ has the privilege to _____([3]), subject to the following:			
UAS model ([4]): _____; UAS serial number or registration mark ([5]): _____			
Type(s) of UAS operation ([6]) or :	Specifications ([7]):	Special limitations ([8]):	Remarks([9])
_____; _____;			
Issuing competent authority ([10]): Telephone([11]): Email([12]):			
Date ([13]):			
Signature([14]):			

1. Enter the approval reference (digital and/or letter code) of the LUC, as issued by the competent authority.

2. Enter the name of the legal entity of the UAS operator and UAS operator's trading name, if different from the name of the legal entity.

3. Enter any privilege listed in AMC1 UAS.LUC.060 that has been granted.

4. Enter the UAS model.

5. Enter the UAS serial number or the UAS registration mark if applicable.

6. Specify the type(s) of UAS operation (e.g. STS, PDRA when applicable, or type of UAS operations in case the operation is not covered by an STS or a PDRA; the type of UAS operation may be: survey, linear inspection, urban delivery; agricultural, photography, advertising, calibration, construction work, stringing power line, aerial mapping, pollution control, news media, television and movie, flying display, competition, etc.).

7. Enter the relevant specifications describing where the operation is allowed to take place (area of operation or class of airspace for operations; maximum height, BVLOS/VLOS; range; etc.).

8. Enter the limitations related to: restriction of the ground area (i.e. controlled ground area, population density; ground risk buffer); the UAS performance and equipment (i.e. maximum speed; maximum weight etc.); data link or communications; external systems or loads; carriage of dangerous goods, possibility of handover, etc.

9. Enter remarks such as the remote pilot's competency; normal, contingency and emergency procedures.

10. Enter the identification of the issuing competent authority.

11. Enter the telephone number of the competent authority, including the country code.

12. Enter the email address of the competent authority.

13. Issue date of the operations specifications (dd-mm-yyyy).

14. Signature of the competent authority representative.

AMC1 UAS.LUC.060 Privileges of an LUC holder

SCOPE OF PRIVILEGES

Within the terms of its approval, the LUC holder should be able:

(a) without prior declaration to the competent authority, to authorise its own operations based on an STS;

(b) without prior approval of the competent authority, to authorise one or more of the following types of own operations:

(1) one based on a PDRA that requires an authorisation;

(2) one based on one or more modifications of an STS (variants), which does not involve changes in the ConOps, the category of UAS used or the competencies of the remote pilots; or

(3) one that does not correspond to a PDRA, but falls within a type of activity already performed by the UAS operator.

GM1 UAS.LUC.060 Privileges of an LUC holder

GENERAL

For the purpose of granting privileges to LUC applicants, the competent authority may apply a gradual approach. Depending on the UAS operator's past safety performance and safety record over a defined

period of time (e.g. the previous 6 months), the competent authority may expand the scope of the UAS operator's privileges.

The gradual approach should not be understood as preventing the competent authority from granting privileges with a greater scope to a first-time LUC applicant who has an adequate structure and competent personnel, an effective safety management system and has demonstrated a good compliance disposition.

AMC1 UAS.LUC.070(2) Changes in the LUC management system

CHANGES REQUIRING PRIOR APPROVAL

A change of the accountable manager is considered a significant change that requires a prior approval.