

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).

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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 exercise⁴ consistent with the ERP training syllabus.

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