	Means of Compliance with OSO#3 (design requirements - SAIL III) and Light-UAS.2625	Doc. No. : MOC OSO #03 and SC-LUAS2625 Issue : 1 Date : 19 December 2024 Proposed ☐ Final ☒

SUBJECT	:	Maintenance of UAS
REQUIREMENTS incl. Amdt.	:	Operational Safety Objectives #03 as per Annex E to AMC1 to Article 11 of Regulation (EU) 2019/947 and Light-UAS.2625
ASSOCIATED IM/MoC	:	Yes☐ / No ☒
ADVISORY MATERIAL	:	N/A

Log of issues

Issue	Issue date	Change description
1.0	19.December.2024	First issue.

Table of Content

1. Background

This MoC has been developed by the airworthiness task force (AW TF) established under the UAS Technical Body (TeB) and provides prescriptions to UAS designers to show compliance with OSO#3 (design requirements - SAIL III) and Light-UAS.2625. The establishment of compliance and the declaration of compliance to this MoC are under the responsibility of the UAS designers, who are the target audience of this MoC. A designer may or may not be operator of the UAS. "Applicant" throughout this document designates the UAS designer who assesses and establishes compliance applying this MoC for a specific UAS model and configuration. The applicant also keeps recording of the evidence of compliance and issues a declaration of compliance utilizing the form associated to this MoC. Producing the form is a provision of this MoC, and the applicant should provide it, compiled and signed, to the UAS operators applying for operational authorisations with the UAS model subject of the declaration.

Applicants who wish to propose the application of alternative standards to those referenced by this MoC should contact the Competent Authority. The proposal may need to be assessed by the AW TF and, if found appropriate, may be reflected in further revisions of the MoC.

Members of the UAS TeB Airworthiness TF
- EASA
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- HCAA
- Irish Aviation Authority
- LBA
- CAA Latvia
- CAA Norway
- CAA Romania
- CAA Estonia
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2. Applicability

This MoC is applicable to UAS operated in the specific category up to SAIL IV, in order to demonstrate compliance with the design requirements of OSO#03 and Light-UAS.2625.

Designers of separate kits (e.g. parachutes to be used as M2 mitigation, etc.) may also utilize this MoC when developing the ICA of their products.

3. Means of compliance for OSO#03 and SC-LUAS.2625 – ICA

3.1. Introduction

The requirements of OSO#03 - "Maintenance of UAS" are not limited to airworthiness, but also encompass procedural and staff training requirements, to be demonstrated at a medium level of robustness at SAIL III. Those latter provisions are not addressed by this MoC.

This MoC provides means to cover the design-related provisions of OSO#03 and Light-UAS.2625, therefore are addressed to the UAS designer. The design-related provisions of OSO#03 and Light-UAS.2625 require applicants to produce the instructions for continuing airworthiness (ICA). The ICA should be made available to UAS operators and should be constituted by:

1 - **Maintenance requirements**: covering the needs for maintenance tasks which are required on the UAS and/or are conditional to specific events when happening (e.g. hard landing, lighting strike, etc.);
2 - **Maintenance instructions**: covering how to carry out the required maintenance tasks.

NOTE: the UAS operator should prepare the maintenance programme in compliance with the ICA provided by the UAS designer. The maintenance programme applicable to the UAS could consist of the ICA issued by the UAS designer if the following conditions are met:
- all the ICA issued by the UAS designer are followed without any deviations;
- there are no additional maintenance tasks to be performed resulting from:
    - UAS configuration;
    - Specificities of the UAS operations.

A UAS operator may also develop further maintenance tasks, considering the operational conditions of the UAS and additional factors to meet its operational needs. If developed, those additional tasks should not impair the effectiveness of the maintenance requirements set by the UAS designer.

Out of the scope of this MoC are all the tasks which are part of the procedures developed by the UAS operator to comply with the provisions of OSO#08 (e.g. pre-/post-flight inspections).

3.2. Maintenance requirements and instructions

The applicant should produce and make available to UAS operators maintenance instructions and requirements in a format which allows a clear presentation of the information included in the following sections.

3.2.1. Maintenance requirements

The applicant should develop maintenance requirements being exhaustive inventory of specific maintenance requirements aimed to cover scheduled and unscheduled maintenance on the UAS. Each maintenance requirement should be associated with an individual maintenance task developed as described in section 3.2.2.2 of this document.

3.2.1.1. Scheduled maintenance

The scheduled maintenance should include all the maintenance tasks for which periodic scheduling information has been provided. In addition, the ICA should contain a section titled "Airworthiness limitations" that is segregated and clearly distinguishable from the rest of the document.

An airworthiness limitation is a boundary beyond which the UAS or a component thereof must not be operated, unless the instruction(s) associated to this airworthiness limitation is (are) complied with. Failing to comply with the airworthiness limitations may compromise the airworthiness, and therefore the safety, of the UAS. Typical items that may be subject to airworthiness limitations are:
- Life-limited parts (e.g. batteries) inspections, removals and installations;
- Inspections of ageable parts;
- Wiring visual checks and inspections.

3.2.1.2. Unscheduled maintenance

Unscheduled maintenance takes place as a reaction to undesired events which may compromise the functionalities of the UAS. Unscheduled maintenance may be triggered in the event of suspected malfunction of parts or components that require further investigation. The applicant should include in its maintenance requirements an indication on the conditions which would trigger unscheduled maintenance and the respective tasks to be performed.

The aim of this indication is not to require the provision of a list of events triggering unscheduled maintenance, but to provide informative material and first set of examples instead. Examples of these events may be hard landings, the encounter of temperatures which are outside the nominal operational boundaries and which may then damage some components of the UAS or, more in general, when the UAS has been operated outside of the envelope for which it is qualified. These examples may have been identified during the design process or the operational life of the aircraft. The tasks associated with the unscheduled maintenance may refer to tasks already existing and associated with scheduled maintenance, or tasks specifically dedicated to unscheduled maintenance.

As part of the unscheduled maintenance, the applicant should include **trouble shooting information**, describing probable malfunctions, how to recognise those malfunctions, and the remedial action for those malfunctions. These kinds of malfunctions may have been identified during the design process or the operational life of the aircraft as the ones that may occur with more frequency.

NOTE: the methodologies to address recurrent malfunctions/design-related occurrences and their associated risks should be defined when showing compliance with OSO#01.

3.2.2. Maintenance instructions

The maintenance instructions should be composed by:

1. Introduction information: a description of the UA and its systems, including an explanation of their functions and features, as well as easily readable schematics allowing to locate systems and parts in the UAS, should be produced by the applicant and included in its maintenance instructions;

2. Servicing information: in addition, if applicable, the applicant should include in its maintenance instructions information covering details regarding servicing points, capacities of tanks, reservoirs, types of fluids to be used, pressures applicable to the various systems, location of access panels for inspection and servicing, locations of lubrication points, lubricants to be used, equipment required for servicing, tow instructions and limitations, mooring, jacking, and levelling information;

3. Maintenance tasks information: all individual maintenance tasks required to be performed on the UAS in accordance with the maintenance requirements should be provided. This information should be developed to the extent necessary for scheduled and unscheduled maintenance.

3.2.2.1. Types of maintenance tasks

The required maintenance to be performed on the UAS should be organised in maintenance tasks. The following table includes a list of the types of tasks that may be defined by an applicant:

Description	Definition
Removal and installation	Removal and installation of parts on the aircraft (e.g. replacement of batteries/propellers).

Lubrication/Servicing	Any act of lubricating or servicing for the purpose of maintaining inherent design capabilities.
Operational test	It is a task to verify that an item is fulfilling its intended purpose and it is a failure-finding task.
Visual Check	A visual check is an observation to verify that an item is in its intended state. It does not require quantitative tolerances. This is a failure-finding task with obvious pass/fail criteria.
Functional test	A quantitative check to verify if one or more functions of a system or component performs within specified limits.
Inspection	An examination of an interior or exterior area, installation or assembly to detect obvious damage, failure or irregularity. This level of inspection is made from within touching distance unless otherwise specified.
Restoration	That work necessary to restore the item to a serviceable condition. Restoration may vary from cleaning, repairs or up to a complete overhaul.
Discard	The removal from service of an item at a specified life limit.
Software update	An action related to software updates.

Depending on the UAS design and its operational purpose, different types of activities may be deemed necessary by the applicant and may therefore be included among the maintenance tasks.

These types of tasks may be developed by the applicant for the different technical areas of the UAS, which basing on its design may include and not be limited to:
- Structures;
- UA flight control systems;
- Landing gear systems;
- On-board equipment;
- Electrical and electronic systems;
- Propulsion systems;
- UA navigation systems;
- Command, control and communication systems (including ground control system).

3.2.2.2. Maintenance tasks content

The individual maintenance tasks should include the following information:

- **Task identifier**: all maintenance tasks should be associated to an identifier which allows for a better traceability in the maintenance requirements. This identifier may be an alphanumerical code to be created at the applicant's discretion. Here below is shown an example of a maintenance task associated to its identifier.

Example

The applicant may use the following identifier, TSK-XX999, where:

TSK: general identifier of a maintenance task, common for all the identifiers;
XX: this letters indicates to which type of task we are referring to (e.g. inspection, check, etc…);
999: numerical code associated to a specific task.

 In the following table is included an example of the application of the identifier to a maintenance task

TASK IDENTIFIER	MAINTENANCE TASK TITLE
TSK-UD006	Replacement of the UA rotors.

- **Title of the task**;

- **General description**: overview of the purpose of the task;

- **Task instructions**: procedures describing the order and method of checking, inspecting, removing and installing parts, including the precautions to be taken, if any;

- **Scheduling**: information providing the period at which the UAS and its parts should be maintained (checked, inspected, restored, tested, lubricated, refer to the list of maintenance task types) and the acceptable tolerances, if applicable. The maximum interval of time between two maintenance tasks may be expressed using the following units of measure:
  - Calendar time, e.g. Hours (HRS) or Days (D) or Years (Y): amount of time between the performance of two tasks. This way of expressing the intervals may be particularly suitable in case the parts to be maintained are subject to degradation due to factors not related to the amount of operating hours (e.g. storage conditions); and/or
  - Flight hours (FH) as defined by the applicant (e.g. hours during which the UAS has been airborne, hours during which the engines have been on, etc.); and/or
  - Cycles (FC) as defined by the applicant (e.g. flight cycles, charge cycles, etc.);

A task threshold, which is the interval between the start of service-life and the first maintenance task accomplishment, may also be defined by the applicant. In the case a task is triggered only in case of a specific event, the scheduling information may be omitted. In such a case the maintenance task will be associated with an unscheduled maintenance requirement.

- **Consumables**: list of consumables (e.g. cleaners, sealants, oils, disposable gloves, etc.) needed to perform the task, if any;

- **Tooling**: a list of the tools needed to perform the maintenance tasks should be included as part of the maintenance instructions;

- **Testing procedures**: in the case system tests are foreseen after completing maintenance tasks, instructions for carrying out those tests/checks should be included.

4. Supporting Data

4.1. Abbreviations

MoC	Means of Compliance
OSO	operational safety objective
UAS	unmanned aircraft system
SAIL	specific assurance and integrity level
ICA	instructions for continuing airworthiness
SC-LUAS	Special conditions – light UAS