Notification of a Proposal to issue a Certification Memorandum

SORA OSO#03 Medium robustness Airworthiness requirements

EASA CM No.: Proposed CM–ICA-002 Issue 01 issued 14 May 2024

Regulatory requirement(s): AMC 1 to Art. 11 of Regulation (EU) 2019/947

EASA Certification Memoranda clarify the European Union Aviation Safety Agency's general position on specific initial airworthiness, validation, continuing airworthiness or organisational items. They are intended to provide guidance on a particular subject and may provide complementary information for compliance demonstration, similar to AMC/GM even if not formally adopted through an ED Decision. Certification Memoranda are not intended to introduce new certification requirements or to modify existing certification requirements.

Log of issues

Issue	Issue date	Change description
1.0	14.05.2024	First issue.

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1. Identification of Issue

1.1. 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 for UAS to be utilized in SAIL III operations. The establishment of compliance and the declaration of compliance to this MoC are under the responsibility of the UAS designers / manufacturers, who are the target audience of this MoC.

Applicants who wish to propose the application of alternative standards to those referenced by the SAIL III MoCs/CMs should contact their 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 CM.

Members of the UAS TeB Airworthiness TF

- EASA
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2. Applicability

This CM is applicable to UAS operated in the specific category up to SAIL III, in order to demonstrate compliance with the airworthiness requirements of OSO#03.

3. EASA Certification Policy

3.1. Introduction

OSO#03 requires that the “UAS is maintained by competent and/or proven entity”, to be demonstrated at a medium level of robustness at SAIL III. The requirements included in this OSO are not limited to airworthiness, but encompass also procedural and staff training requirements. Those latter provisions are not addressed by this MoC.

This CM provides means to cover the airworthiness provisions of OSO#03 – medium robustness, therefore are addressed to the UAS designer. UAS designers should produce the instructions for continuing airworthiness (ICA), to be made available to UAS operators and 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.

The UAS operator should then prepare the maintenance programme based on the ICA provided by the UAS designer. An 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.

3.2. General means of compliance for OSO#03 – ICA

The UAS designer 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 have been provided. In addition, it should include the information related to those equipment, systems and installations of the UAS which failure may lead to a loss of control of the operation, as identified when showing compliance with the provisions of the EASA MoC to OSO#05 (SAIL III). This information should include the required replacement and inspection intervals (see section 3.2.2.2 for more information) for those equipment, systems and installations, defined as a strict maintenance boundary beyond which the UAS or the component thereof must not be further operated, unless the relevant maintenance task(s) and instruction(s) is (are) accomplished. The specific maintenance tasks related to parts and systems of the UAS which failure may lead to a loss of control of the operation should be clearly distinguishable from the other maintenance tasks inventoried.

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 purpose of this indication is not to require a list of events triggering unscheduled maintenance, but to provide informative material and examples instead. Examples of this 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. The tasks associated to the unscheduled maintenance may refer to tasks

already existing and associated to scheduled maintenance, or tasks specifically dedicated to unscheduled maintenance.

As part of the unscheduled maintenance, the UAS designer may include **trouble shooting information**, describing probable malfunctions, how to recognise those malfunctions, and the remedial action for those malfunctions. This kind 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 include a list of the types of tasks that may be defined by an applicant:

Description	***Definition***
Lubrication/Servicing	Any act of lubricating or servicing for the purpose of maintaining inherent design capabilities.
Operational Check	An operational check is a task to determine that an item is fulfilling its intended purpose and it is a failure-finding task.
Visual Check	A visual check is an observation to determine 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 Check	A quantitative check to determine if one or more functions of an item 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 return the item to a specific standard. Restoration may vary from cleaning or replacement of single parts up to a complete overhaul.
Discard	The removal from service of an item at a specified life limit.

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.

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, i.e. 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): hours during which the UAS has been airborne; and/or

- Flight cycles (FC): number of flights performed by the UAS, independently from their duration;

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 case the maintenance task will be associated to an unscheduled maintenance requirement.

- **Consumables**: list of consumables (e.g. oils) needed to perform the task, if any;
- **Staff**: amount of staff needed to perform the task safely and correctly;
- **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

5. Remarks

1. This EASA Proposed Certification Memorandum will be closed for public consultation on the **04 th of June 2024**. Comments received after the indicated closing date for consultation might not be taken into account.
2. Official comments to the proposed CM are to be filed through the EASA Comment Response Tool.
3. For any question concerning the technical content of this EASA Certification Memorandum, please contact:
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