

 European Union Aviation Safety Agency	SAIL III Means of Compliance with OSO#2 “Specification of materials and configuration control”	Doc. No.: MOC to OSO#2-01
		Issue : 1 Date : 22 July 2025 Proposed ☒ Final ☐

SUBJECT: UAS designed and produced by a competent and/or proven entity

REQUIREMENTS incl. Amdt.: Annex E to AMC to Article 11 of Regulation 2019/947

ASSOCIATED IM/MoC: Yes ☐ / No ☒

ADVISORY MATERIAL: N/A

Log of issues

Issue	Issue date	Change description
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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#02 for UAS to be utilized in SAIL III operations. The establishment of compliance and the statement of compliance 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 and for the configuration control system implemented by the design organization. The applicant also keeps recording of the evidence of compliance and issues a statement of compliance utilizing the form associated to this MoC. Producing the form is a provision of this MoC. The applicant should provide it, compiled and signed, to the UAS operators applying for operational authorisations with the UAS model subject of the statement of compliance.

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
- AESA
- Austro Control
- DAC Luxembourg
- DGAC
- ENAC
- FOCA
- HCAA
- Irish Aviation Authority
- LBA
- CAA Latvia
- CAA Norway
- CAA Romania
- CAA Estonia
- CAA Slovenia
- CAA Netherlands

2. Applicability

This MoC is applicable to UAS operated in the specific category up to SAIL III, in order to demonstrate compliance with the requirements of OSO#02.

3. Means of compliance to OSO#02

As per AMC to Article 11 of Regulation 2019/947, OSO#2 at low level of robustness indicates that as a minimum the design documentation should cover:

- (a) the specification of the materials; and
- (b) the suitability and durability of the materials used
- (c) Configuration control

For production, as a minimum, procedures should cover:

- (a) configuration control;
- (b) the processes necessary to allow for repeatability in manufacturing, and
- (c) conformity within acceptable tolerances

In order to meet the above prescriptions, the organization's processes and procedures and the competences of the staff should first be addressed. Following compliance with this general organization aspects as per chapter 4, the applicant should follow the more specific indications provided in the following chapters.

4. General recommendations regarding design and production processes and competence of staff

The design and production processes and procedures should be documented, and include tests, tests report, inspection and inspection reports where applicable. They should be adequate to show compliance to drawings and design requirements. Traceability and retrievability of design data should be ensured, with particular regard to the possibility to exercise a proper control of the configuration. Traceability and retrievability of production data should as well be ensured in order to allow for repeatability in manufacturing processes and procedures and to establish that the production organization is in the condition to issue a valid and final statement of conformity.

The competence of the design and production staff in terms of education, training and professional experience should be sufficient to deal with the intended projects.

5. Specification, suitability and durability of materials

- (a) The suitability and durability of materials used for parts the failure of which could, due to structural failure, result in loss of control of the operation should:
 - (1) Be established by experience or tests;
 - (2) Meet specifications that ensure their having the strength and other properties assumed in the design data; and
 - (3) Take into account the effects of environmental conditions, such as temperature and humidity, expected in service.

Guidance for Materials (a)(3):

Consideration of Environmental Conditions.

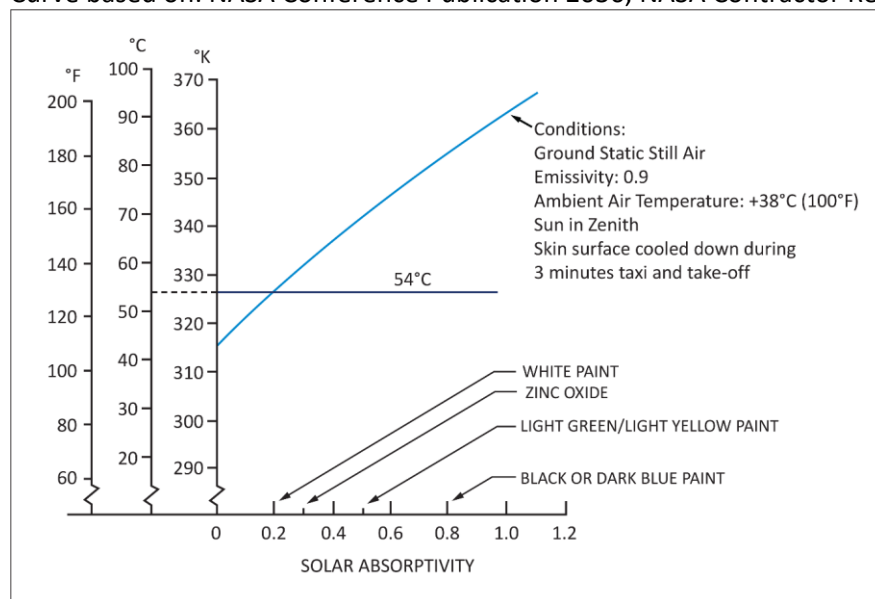
The material strength properties of a number of materials, such as non-metallic composites and adhesives, can be significantly affected by temperature as well as moisture absorption. For these materials, the effects of temperature and moisture should be accounted for in the determination and use of material design values. This determination should include the extremes of conditions encountered within the operating envelope. For example, the maximum temperature of a control surface may include effects of direct and reflected solar radiation, convection and radiation from a black runway surface and the maximum ambient temperature.

Environmental conditions other than those mentioned may also have significant effects on material design values for some materials and should be considered.

For structural testing, the following applies to the test temperature -

- (a) For white painted surface and vertical sunlight: 54°C. If the test cannot be performed at this temperature an additional factor of 1.25 should be used.
- (b) For other coloured surfaces the curve below may be used to determine the test temperature.

Curve based on: NASA Conference Publication 2036, NASA Contractor Report 3290



6. Fabrication Method

- (a) The methods of fabrication used must produce consistently sound structures. If a fabrication process (such as gluing, spot welding, heat-treating, bonding, additive manufacturing, processing of composite materials) requires close control to reach this objective, the process must be performed under a defined process specification.
- (b) Each new fabrication method must be substantiated by test.

7. Mechanical strength

ASD-STAN prEN 4709-001 chapter on mechanical strength is recommended to be applied, with modifications as per Annex A.

8. Configuration control prescriptions for the design organization

Prescription on UAS designation

Any UAS model subject to SAIL III statement of compliance should be designated as shown in Table 1:

	Model identifier	HW configuration identifier	SW configuration identifier
UAS	(1)	(4)	(7)
UA	(2)	(5)	(8)
CMU	(3)	(6)	(9)

Table 1: UAS designation

This table intends to provide flexibility to industry without forcing, up to SAIL III, a change of usual methods adopted by the declarant to designate model and configuration of the UAS.

How to fill the table:

Not all cells of the table must be filled.

Model identifier: normally, for products on the market, the model identifier is usually associated with the UAS¹, not with the UA and, separately, the CMU. However some declarants may prefer this second option. The declarant would therefore either fill cell (1) and leave (2) and (3) empty, or fill both (2) and (3) and leave (1) empty. It is not forbidden that the declarant fills all 3 cells, however normally it would not be expected.

HW and SW configuration identifiers:

- It is normally expected that they are associated, separately, to the UA and the CMU.
 - o if the model identifier is associated uniquely to the UAS, the cells to be filled in the table would be (1), (5), (6), (8) and (9) while (2), (3), (4) and (7) would not be filled.
 - o If the model identifier is associated separately to UA and CMU, all cells would be filled apart (1), (4) and (7)
- However, the table does not forbid to associate an HW and SW configuration to the UAS only, filling only the cells (1), (4) and (7).
- The declarant should never associate a model separately to UA and CMU and then fill the HW and SW configuration of the UAS only (i.e. filling cells (2), (3), (4) and (7) and leaving all the other empty should be avoided)

Prescriptions on the configuration control system

The design organization should have an appropriate configuration control system in place and shall, for each configuration change (HW and / or SW)²:

- (1) Define the model identifier(s) and the configuration identifier(s) to which the configuration change is applied
- (2) Define the new configuration identifier(s) after the application of the configuration change
 - a. Change the model identifier whenever the configuration change affects any of the parameters in Annex B or when, due to the design change, a change of the flight manual is necessary for aspects which may influence operational safety³
- (3) Define the configuration change: whether it affects the UA, and/or the CMU, whether it relates to HW and/or SW, what is the reason / objective of the configuration change

¹ It is reminded that UAS = UA + CMU

² A change may group one or more SW and HW changes

³ The list includes the main parameters affecting the SORA conduction and, potentially, the operational authorization. The design organization may further change the model identifier whenever, for any reason (e.g. commercial), it considers such change appropriate.

- (4) Determine if the change may **potentially** impact the compliance with any aspect of the SAIL III MoCs (yes/no)
 - a. In this determination, and particularly for SW changes, consider the possibility that such changes may inadvertently influence SW functions beyond those subject to change.
 - b. For changes to SW functions which are directly linked with preserving control of the operation, the prescriptions indicated by the SAIL III MoC to OSO#5 under “guidance on development errors” need to be complied, in addition to what herein indicated.
 - (5) If the answer to (4) is yes, determine against which SAIL III MoC compliance needs to be rechecked and, for those which need to be rechecked, if entirely or specifically which chapters / prescriptions of the subject MoCs needs to be rechecked. The re-check is aimed at ensuring that the UAS configuration *after the change* still complies with the SAIL III MoCs
 - (6) Recheck compliance as appropriate
 - (7) Complement, update and produce the documents which provide the evidence of compliance (those listed in the table included in the statement of compliance of the affected MoC), re-issuing the affected documents in a new version. Such new version must be clearly linked with the HW and SW configuration identifiers after the change.
 - (8) Keep a record of all the elements produced **for points 1 to 8** above in the company’s internal configuration control system
- In case of change of model identifier, on top of the above prescriptions regarding how to manage the change in the internal configuration control system, the design organization is required to issue a new statement of compliance (SoC) referred to the new model identifier after the change, and fully re-declare compliance against all the elements of the new SoC and annexes⁴ related to the SAIL III MoCs.
 - The declarant has the obligation to immediately provide to known operators of the product information regarding unsafe conditions and recommendations on adoption of changes aimed at addressing unsafe conditions (e.g. identified SW errors which may lead to unsafe operation) The declarant may authorize the operator of the product to implement the change, such authorizations need to be provided in written to operators and need to be recorded in the internal configuration control system.
 - The company’s configuration control system and appropriate management of changes can be audited by the authority which has provided a SAIL III operational authorization for the UAS subject of the SoC.

9. Configuration control prescriptions for the production organization

The configuration control of the production organization should be such to ensure that the produced configuration matches the designed configuration, and that the production process is adapted, when necessary, to the change of design. In case of design change, the production organization will maintain the records of all the identified actions (analysis of impact on the production process and adaptation of the process where necessary) in order to appropriately introduce the change into the manufacturing process.

As a minimum the production organization should release the certificate of conformity establishing that the released product is in compliance with the design data. The certificate of conformity ensures that that UAS model with associated specific HW and SW configuration (to be specified in the certificate of conformity) has been produced in conformity with the design data.

⁴ EASA intends to join all the SAIL III forms of declaration of compliance under a unique SAIL III SoC (statement of compliance). The SoC will have 8 annexes, one for each SAIL III MoC (OSO# 2, 3, 5, 6, 8, 18, 19/20, 24).

10. Annex A: changes to ASD-STAN prEN 4709-001 prescriptions for “mechanical strength” for application under this MoC

PrEN Chapter	Change	Changed text
5.5.1.1	Remove	N/A
5.5.1.2 (2)	Change text as described	Any primary structure ... shall be able to carry the ultimate loads (design loads with a safety factor of 1.5) without loss of structural integrity (“collapse”) ...
5.5.1.2. (3)	Change the following text “All other parts of the structure shall be able to carry design loads at MTOM with maximum horizontal speed without detrimental loss of structural integrity, deformation and vibration affecting controllability or safety” as indicated.	All other parts of the structure shall be able to carry design loads without blockage of control surfaces, damage or permanent deformation, and ultimate loads (design loads with a safety factor of 1.2) without loss of structural integrity. Verification can be done by analysis or test.
5.5.1.2.	Add	(4) All other parts of the structure shall be able to carry the ultimate loads (design loads with a safety factor of 1.2) without loss of structural integrity (“collapse”) for not less than 3 seconds.
5.5.1.2. (4)	Change as indicated	(45) the safety factor of 1.52 .
5.5.1.3 (1) b.	Change as described	for multicopter configurations, non-aerobatic use: - $n_{max} = 2,01,5 \times$ (maximum thrust of all propellers)/(minimum weight), $n_{min} = -1,0$;
5.5.2.3	Substitute the following text “By performing post-flight visual inspection ... flight test performed as per 6.3” with the indicated sentence	Verification of the strength can be performed with analysis or test, or a combination thereof. Test can be performed on component level. If analysis is used, it should be shown to be conservative.
5.5.2.4 2.	Change as indicated	A mass $m = (j \cdot n) - 1 \cdot m_{PL}$ with $n = n_{max}$ and $ n_{min} $ $j = 1,520$ safety factor m_{PL} = mass of external item, payload or accessory is to be placed on top of the item above its centre of gravity or suspended below its centre of gravity. The specimen shall be kept in equilibrium.

RED: Text to be deleted

GREEN: Text to be added

11. Annex B: parameters whose change requires a change of model identifier

Parameter impacting SORA 2.5	Options
Type category	SINGLE-CHOICE Fixed-wing Rotorcraft - Helicopter Rotorcraft - Gyroplane Multirotor Single rotor Lighter than air
Is the UAS equipped with an M2 mitigation	SINGLE-CHOICE Yes No
Type of M2 mitigation	SINGLE-CHOICE With parachute Without parachute
Level of robustness of M2 mitigation	SINGLE-CHOICE Medium High
Is the UAS equipped with a containment function	SINGLE-CHOICE Yes No
Type of containment function	SINGLE-CHOICE With parachute Without parachute
Level of robustness of containment	SINGLE-CHOICE Low Medium High
Maximum UA characteristic dimension (in meters)	
Maximum take-off mass (in kilograms)	
Max. horizontal speed (in meters per second)	
Max. pitch angle (in degrees)	
Max. roll angle (in degrees)	
Max. operational altitude from the mean sea level (in meters)	

Max. climb rate (in meters per second)	
Max. descent rate (in meters per second)	
Glide Ratio	
Maximum thrust	
Max. permissible wind speed (in meters per second)	
Propulsion system	SINGLE-CHOICE Electric Combustion Hybrid (free text box to further specify type) Other (free text box to further specify type)
Main altitude measurement	SINGLE-CHOICE Barometric GNSS Radar altimeter Other
Type of C2 link	SINGLE-CHOICE Direct radio link Satellite LTE/5G Other
Maximum C2 link latency (in seconds)	
Are the flight control surfaces permanently set in a way that no glide is possible to terminate the flight?	SINGLE-CHOICE Yes No
Height measurement error (in meters)	
Time to open the parachute (in seconds)	
Parachute rate of descent (in meters per second)	
GNSS accuracy - horizontal measurement error (in meters)	
Position holding error (in meters)	
Max. reaction time (in seconds) for activation of automatic contingency and emergency procedures	

Capable of transporting dangerous goods	SINGLE-CHOICE Yes No
Capable of transporting dangerous goods	SINGLE-CHOICE With container in case of crash Other
Capable of dropping material	Additional details
the UAS has been designed to comply with the TMPRs applicable up to ARC:	SINGLE-CHOICE ARC-a ARC-b ARC-c ARC-d
UAS designed to have a single CMU controlling more than one UA simultaneously	SINGLE-CHOICE Yes No
Max. no. of UAS simultaneously allowed to be controlled by a single CMU	

12. Abbreviations

ARC	Air Risk Class
C2	command and control
CMU	control and monitoring unit
EN	European Norm
HW/SW	hardware / software
MoC	means of compliance
NAA	National Aviation Authority
OSO	operational safety objective
SAIL	specific assurance and integrity level
SoC	statement of compliance
SORA	specific operation risk assessment