IV. CRD table of comments, responses and resulting text

(General Comments)	-

comment	*4* comment by: *Luftfahrt-Bundesamt* The LBA has no comments.
response	Noted.

comment	*9* comment by: *JEDA* The scope of this MOC is unclear. It is limited to the maintenance instructions which are a very partial compliance to OSO #03 in SAIL III. Could you elaborate further how to comply with the operational and training requirements from OSO #03? Is it in a GM? Or a different MOC ? Linking this to this document would make sense.
response	Noted. The scope of the MoC is to cover the airworthiness requirements of OSO#03 – medium and SC-LUAS 2625. These requirements are referred in Section 3.1 of the MoC. There is currently no GM or MoC for the operational/training requirements as those should be covered in the operations manual of the UAS operator.

comment	*33* comment by: *Wing Aviation* Current text: "*EASA Certification Memoranda clarify the European Union Aviation Safety Agency's general position on specific initial airworthiness, validation, continuing airworthiness or organisational items.*" Comment: According to https://www.easa.europa.eu/en/document-library/public-consultations/certification-memoranda, EASA's position / general course of action expressed in a Certification Memorandum relates to "*specific certification items*", which may be misleading here as no certification of the design is required for UAS operated in the 'specific' category under SAIL III or SAIL IV. Clarification is requested on the rationale behind the intention of adopting a CM instead of a MoC as for other SORA OSOs.
response	Agreed. This document has been published as a CM in an effort align the publications of the means of compliance for the OSOs and SC-LUAS to the existing EASA's publications formats. However, following further analysis, it was decided that Certification Memorandum (CM) are not a suitable mean to address the requirements of UAS intended to be operated at SAIL III.

comment	*34* comment by: *Wing Aviation* Current text: "*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.*" Comment and proposal: See proposal next based on https://www.easa.europa.eu/en/document-library/public-consultations/certification-memoranda: "*They are intended to provide guidance on a particular subject and, **as non-binding material,** may provide complementary information for compliance demonstration, similar to AMC/GM even if not formally adopted through an ED Decision.*"

response

Agreed. The text was part of the EASA CM template. This document has been published as a CM in an effort align the publications of the means of compliance for the OSOs and SC-LUAS to the existing EASA's publications formats. However, following further analysis, it was decided that Certification Memorandum (CM) are not a suitable mean to address the requirements of UAS intended to be operated at SAIL III.

comment

53 comment by: *Airbus Helicopters*

The Means of Compliance to OSO#3 are issued as part of a certification Memorandum which differs from the approach taken in previous MoC to OSO#5, 18, 24, 6
Please clarify the rationale for the change of tool used to publish MoC content.

response

Agreed. This document has been published as a CM in an effort align the publications of the means of compliance for the OSOs and SC-LUAS to the existing EASA's publications formats. However, following further analysis, it was decided that Certification Memorandum (CM) are not a suitable mean to address the requirements of UAS intended to be operated at SAIL III.

comment

55 comment by: *Drone Alliance Europe*

Current text:
"EASA Certification Memoranda clarify the European Union Aviation Safety Agency's general position on specific initial airworthiness, validation, continuing airworthiness or organisational items."

Comment:
According to https://www.easa.europa.eu/en/document-library/public-consultations/certification-memoranda, EASA's position / general course of action expressed in a Certification Memorandum relates to "specific certification items", which may be misleading here as no certification of the design is required for UAS operated in the 'specific' category under SAIL III or SAIL IV. Clarification is requested on the rationale behind the intention of adopting a CM instead of a MoC as for other SORA OSOs.

response

See comment 33.

comment

56 comment by: *Drone Alliance Europe*

Current text:
"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."

Comment and proposal:
See proposal next based on https://www.easa.europa.eu/en/document-library/public-consultations/certification-memoranda:
"They are intended to provide guidance on a particular subject and, **as non-binding material**, may provide complementary information for compliance demonstration, similar to AMC/GM even if not formally adopted through an ED Decision."

response

See comment 34.

comment	*78* comment by: *LHD* The Means of Compliance to OSO#3 are issued in the form of a Certification Memorandum which is a different approach with respect to previous MoC to OSO#5, 6, 18 and 24. Could you please clarify the rationale for this change of approach?
response	Agreed. This document has been published as a CM in an effort align the publications of the means of compliance for the OSOs and SC-LUAS to the existing EASA's publications formats. However, following further analysis, it was decided that Certification Memorandum (CM) are not a suitable mean to address the requirements of UAS intended to be operated at SAIL III.

comment	*81* comment by: *Federal Aviation Administration* FAA comment: The FAA recommends changing instances of "applicant should" to "applicant must" for the means of compliance language throughout the document. As this document provides a means of compliance to a requirement, the language should use prescriptive language.
response	Rejected. The means of compliance are possible ways provided to applicants to demonstrate compliance towards certain requirements of a regulation. Applicants may still provide alternative means of compliance, therefore as compliance towards the CM/MoCs is not mandatory the language to be used is "should".

2. Applicability p. 3

comment	*1* comment by: *Adrien B* This CM should also be consider to substantiate the maintenance procedures of a mitigation mean (eg. parachute). For example, this CM could be use while applying MOC Light-UAS.2512-01 to partially substantitate the task 2.1.4 *"If applicable, document the required operational procedures for the utilization and maintenance of the mitigation means."*
response	Accepted. A clarification in this regard has been included in section 2.

comment	*21* comment by: *Department of Aviation & Aeronautical Sciences, Lund University* Demonstrating compliance with the airworthiness requirements of OSO#03 should be able to show how performed maintenance is compliant with the specific requirements outlined in the manufacturers maintenance instructions. Therefor we suggest that manufacturers maintenance instructions should be codified in a way similar to if not adaptive of the ATA 100 system as applicable to manned aviation.
response	Noted. At the moment there is no such standard, therefore the codification can be done by the manufacturer on a product by product

	basis. Once an acceptable standard will be available, the MoC may be updated so to require to codify maintenance instructions in accordance to that standard.

comment	*37* comment by: *Wing Aviation* Current text: "*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.*" Comment and proposal: Same comment as before; OSO#03 Medium is applicable to both SAIL III and SAIL IV operations, while the CM limit its applicability to SAIL III only, without providing a clear rationale. We propose to extend the applicability of the proposed CM to include SAIL IV as well, thereby aligning with the SORA methodology.
response	Accepted. The scope of this MoC has been extended to SC-LUAS 2625 (applicable at SAIL IV).

comment	*38* comment by: *Wing Aviation* Current text: "*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***." Comment and proposal: It would be helpful to quote the OSO#03 airworthiness requirements that are addressed by this proposed CM.
response	Rejected. The goal of this MoC is to provide a mean to comply with OSO#03 as it is laid down both in SORA 2.0 and 2.5, once it will be adopted in the European framework. To avoid the need of an update in the near future, the MoC refers to the airworthiness requirements, specifying that those requirements are related to the provisions of ICA.

comment	*59* comment by: *Drone Alliance Europe* Current text: "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." Comment and proposal: Same comment as before; OSO#03 Medium is applicable to both SAIL III and SAIL IV operations, while the CM limit its applicability to SAIL III only, without providing a clear rationale. We propose to extend the applicability of the proposed CM to include SAIL IV as well, thereby aligning with the SORA methodology.
response	Accepted. See comment 37.

comment	*60* comment by: *Drone Alliance Europe*

Current text:
"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**."

Comment and proposal:
It would be helpful to quote the OSO#03 airworthiness requirements that are addressed by this CM.

response Rejected. See comment 38.

3.1. Introduction p. 3

comment *2* comment by: *Adrien B*

To ensure proper coverage of the OSO#03 (procedural and staff training as well), the CM should provide a coverage analysis to OSO#03 requirement.
This could be done by indicating for each sub-paragraph of OSO#03, if applying this CM, give full/partial/or no compliance.

response Noted. In section 3.1 it has been specified that the MoC is referred to the provisions of ICA by the UAS designer.

comment *12* comment by: *JEDA*

OSO #03 deals with proving that "UAS maintained by a competent and/or proven entity". The proposed MOC does not address how maintenance organisations can prove they are competent, nor does it address requirements for maintenance procedures nor training for maintenance personnel. It is not clear what part of the OSO #03 criteria these "airworthiness provisions" cover. Does EASA foresee that if a designer has declared compliance to this MoC and thus compiled compliant maintenance instructions and an operator has compiled a maintenance programme based on these maintenance instructions, then OSO #03 medium assurance criterion 1 point (a) is proven for the operator? Proposal is to make it more clear in chapter 3.1 what part of the OSO criteria this MoC is addressing.

response Partially accepted. The text of section 3.1 has been amended so to better clarify the scope of the MoC. The ICA developed by the UAS designers should be used by the UAS operator to comply with point 1(a) of the integrity requirements of OSO#03 - medium robustness.

comment *22* comment by: *Department of Aviation & Aeronautical Sciences, Lund University*

The last paragraph seems to suggest an alternative means of compliance that ascribes to the operator the responsibility for the development of a maintenance program based on UAS manufacturers specific requirements. We suggest that manufacturers should provide a fundamental maintenance program that operators can adopt and adapt to more along the lines of an acceptable means of compliance.

response

Partially accepted. This paragraph is not referring to an alternative means of compliance, as OSO#03 specifically require UAS operators to develop the maintenance programme. Paragraph 3.1 has been rephrased to clarify the conditions under which the maintenance programme could consist of the ICA.

comment

24 comment by: *DGAC FR*

Department	Reference	Page	Comment	Resolution
DGAC/DSAC	Point §3.1	3	We suggest a more precise drafting of point §3.1, second paragraph.	Preferred drafting: "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**, on request, to any other person required to comply with those instructions. ICA are constituted by:**

response

Rejected. As OSO#03 does not require a third party maintenance organisation involvement, the only actors involved are the UAS operator and UAS designer. If the UAS operator subcontract the maintenance activities, the contracted organisation may then be involved and will receive the maintenance programme, but it still will be up to the operator to choose if a maintenance organisation will be contracted.

comment *25* comment by: *DGAC FR*

Department	Reference	Page	Comment	Resolution
DGAC/DSAC	Point §3.1	4	Suggested paragraph to be added before the last paragraph of §3.1 (after "2 - Maintenance instructions").	Suggested paragraph to be added: "UAS designers should also make available changes to those instructions to all known UAS operators of the UAS affected by the change and, on request, to any other person required to comply with those changes."

response

Rejected. As OSO#03 does not require a third party maintenance organisation involvement, the only actors involved are the UAS operator and UAS designer. If the UAS operator subcontract the maintenance activites, the contracted organisation may then be involved and will receive the maintenance programme, but it still will be up to the operator to choose if a maintenance organisation will be contracted.

comment *26* comment by: *DGAC FR*

Department	Reference	Page	Comment	Resolution
DGAC/DSAC	Point §3.1	4	With regards to manned aircraft, in Part-ML (light aviation), it is possible for the operator to not formally produce a maintenance programme under the conditions of the following paragraph (that has been adapted for UAS): "As an alternative, the development of a maintenance programme by the	It is suggested that this paragraph be added at the end of point §3.1: "As an alternative, the development of a maintenance programme by the UAS operator is not necessary when the following conditions are met: • *all the ICA issued by the UAS designer are

			UAS operator is not necessary when 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: - specific installed equipment and modifications of the UAS; - repairs carried out in the UAS; - life-limited components and flight-safety-critical components; - use of the UAS and operational environment. If the above conditions are met, the maintenance programme applicable to the UAS could consist of the ICA issued by the UAS designer.”	followed without any deviations; • *there are no additional maintenance tasks to be performed resulting from: - specific installed equipment and modifications of the UAS; - repairs carried out in the UAS; - life-limited components and flight-safety-critical components; - use of the UAS and operational environment. If the above conditions are met, the maintenance programme applicable to the UAS could consist of the ICA issued by the UAS designer.”

response

Accepted. The provisions related to the UAS operator have been included in a note, which indicates when the maintenance programme may consist of the ICA. The text takes into consideration the provisions in Part-ML-UAS.

comment

31 comment by: *Antidio Viguria (FADA-CATEC)*

We propose to include the following clarification:

It is important that UAS designer differentiate maintenance tasks from deployment tasks. Deployment tasks are those needed to be performed repeatedly before starting a UAS operation. For example, UAS assembly, change of batteries or blade installation as part of the pre-flight activities.

This comment has been agreed between Spanish Working GRoup for SAIL III coordinated by AESA and EUROCAE WG-105 SG6 (Activity related to design of guidelines to non-designed OSOs)

response

Partially accepted. As the OSOs does not mention the term "deployment procedures", it has been clarified in section 3.1 that the MoC does not refer to the operator procedures developed to show compliance with OSO#08, as the pre-flight procedures.

comment

39 comment by: *Wing Aviation*

Current text: "*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.*" Comment and proposal: This corresponds to the title of SORA OSO#03, and it is not an actual requirement. To avoid any ambiguity, we suggest rewording the paragraph as follows: "*The requirements **of OSO#03 "UAS is maintained by competent and/or proven entity"** are not limited to airworthiness, but **also encompass** procedural and staff training requirements.*"

response

Accepted. The text has been updated according to this comment.

comment

40 comment by: *Wing Aviation*

Current text: "***An UAS** operator may also develop further maintenance tasks, considering the operational conditions of the UAS and additional factors to meet its operational needs.*" Editorial improvement proposal: "***A UAS** operator may also develop further maintenance tasks, considering the operational conditions of the UAS and additional factors to meet its operational needs.*"

response

Accepted. The text has been updated according to this comment.

comment

61 comment by: *Drone Alliance Europe*

Current text:
"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."

Comment and proposal:
This corresponds to the title of SORA OSO#03, and it is not an actual requirement. To avoid any ambiguity, we suggest rewording the paragraph as follows:
"The requirements **of OSO#03 "UAS is maintained by competent and/or proven entity**" are not limited to airworthiness, **but also encompass** procedural and staff training requirements."

response

Accepted. See comment 39.

comment	*62*	comment by: *Drone Alliance Europe*
	Current text: "**An UAS** operator may also develop further maintenance tasks, considering the operational conditions of the UAS and additional factors to meet its operational needs." Editorial improvement proposal: "**A UAS** operator may also develop further maintenance tasks, considering the operational conditions of the UAS and additional factors to meet its operational needs."	
response	Accepted. See comment 40.	

1.1. Background p. 3

comment	*10*	comment by: *JEDA*
	"The proposal may need to be assessed by the AW TF and, if found appropriate, may be reflected in further revisions of the CM." The development of alternative or different MoC to compliance requirement has been one of the most important intellectual properties of each and every aviation industries. I suggest that: I) The evaluation and the assessment of the alternative MoC proposed by the industry shall be performed only by the Competent Authority or by independent experts nominated under the responsibility of the Agency/Compentent Authority, II) The evaluation by an external board where other industries/possible competitors are present shall be avoided unless explicitly agreed by the applicant.	
response	Noted. The evaluation of alternative means of compliance should be done by the competent authority, however they should be assessed by the airworthiness task force in the case it is planned to be adopted as a mean of compliance/CM. The airworthiness task force is composed by representatives of the national aviation authorities, and no sensitive data are shared with other industry members. This text is a common text used also for the publication of other MoCs: https://www-easa-europa-eu.translate.goog/en/document-library/product-certification-consultations/means-compliance-mocs-design-uas-operated-sail?_x_tr_sl=en&_x_tr_tl=it&_x_tr_hl=it&_x_tr_pto=sc	

comment	*11*	comment by: *JEDA*
	As far as I am aware, no MoC exist for SAIL IV covering OSO #03 compliance. Why is this MoC applicable only to SAIL III and not SAIL IV as they both require OSO #03 medium robustness? Could we extend it to SAIL IV and if this is the case, we suggest extending the scope to include SAIL IV as well.	

response	Accepted. The scope of this MoC has been extended to SC-LUAS 2625 (applicable at SAIL IV).

comment	*35* comment by: *Wing Aviation* Current text: "*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.* " Comment: Clarification is requested on whether this is a MoC or a CM.
response	Agreed. This document has been published as a CM in an effort align the publications of the means of compliance for the OSOs and SC-LUAS to the existing EASA's publications formats. However, following further analysis, it was decided that Certification Memorandum (CM) are not a suitable mean to address the requirements of UAS intended to be operated at SAIL III.

comment	*36* comment by: *Wing Aviation* Current text: "*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. [...] Applicants who wish to propose the application of alternative standards to those referenced by the **SAIL III** MoCs/CMs should contact their Competent Authority.*" Comment and proposal: SORA OSO#03 Medium is applicable to both SAIL III and SAIL IV operations, while the proposed CM limits its applicability to SAIL III only, without providing a clear rationale. We propose to extend the applicability of the proposed CM to include SAIL IV, to ensure alignment with the SORA methodology.
response	Accepted. The scope of this MoC has been extended to SC-LUAS 2625 (applicable at SAIL IV).

comment	*52* comment by: *Airbus Helicopters* The certification Memo background content indicates that it is applicable to the UAS designers/Manufacturer only. In the SORA 2.5 the OSO#3 now labelled as OSO#V is applicable to both the operator and the UAS designers. In particular the information related to how to carry out the maintenance task is incumbent to the operator. The CM content refers to in particular the number of staff necessary to perform the maintenance task. This determination is the task of the operator as it will depend on the maintenance facilities, availability of qualified maintenance personnel, etc. If the scope of the CM is maintained as applicable to UAS designers only, then information related to the operator's field of responsibility should be removed.
response	Noted. The information related to the development of ICA is assigned to the UAS designer. The provisions related to the amount of staff have been removed.

comment	*57* comment by: *Drone Alliance Europe*

Current text:
"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. "

Comment:
Clarification is requested on whether this is a MoC or a CM.

response

Agreed. This document has been published as a CM in an effort align the publications of the means of compliance for the OSOs and SC-LUAS to the existing EASA's publications formats. However, following further analysis, it was decided that Certification Memorandum (CM) are not a suitable mean to address the requirements of UAS intended to be operated at SAIL III.

comment *58* comment by: *Drone Alliance Europe*

Current text:
"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. [...] Applicants who wish to propose the application of alternative standards to those referenced by the **SAIL III** MoCs/CMs should contact their Competent Authority."

Comment and proposal:
SORA OSO#03 Medium is applicable to both SAIL III and SAIL IV operations, while the proposed CM limits its applicability to SAIL III only, without providing a clear rationale. We propose to extend the applicability of the proposed CM to include SAIL IV, to ensure alignment with the SORA methodology.

response

Accepted. See comment 36.

comment *79* comment by: *LHD*

The Certification Memo background content indicates that the establishment and declaration of compliance are under responsibility of the UAS designers/Manufacturer only. In the SORA 2.5 the OSO#3 now labelled as OSO#V is applicable to both the operator and the UAS designers. In particular the information related to how to carry out the maintenance task is on the operator. The CM content refers for instance to the number of staff necessary to perform the maintenance task. This is an operator task depending on the maintenance facilities and availability of qualified maintenance personnel mainly. In case the scope of the CM is

	kept applicable only to UAS designers/manufacturers, then the information related to the operator's field of responsibility should be removed.
response	Noted. The information related to the development of ICA is assigned to the UAS designer. The provisions related to the amount of staff have been removed.

3.2.1.2. Unscheduled maintenance p. 4

comment	*5* comment by: *Department of Aviation & Aeronautical Sciences, Lund University* *"The UAS designer may include trouble shooting information, describing probable malfunctions, how to recognise those malfunctions, and the remedial action for those malfunctions."* Comment: The word "may" should be replaced with "should" in the above sentence. This is because we suggest that the term "may" provides manufacturers with an option of not including necessary maintenance guidance for returning the UAS to a serviceable and airworthy state. Again, as discussed for scheduled maintenance (see comment for 3.2.1.1), the absence of a standard system such as the ATA 100, limits standarized approaches to maintenance and therefore airworthiness (even for non certified categories). There is also a need for specific instructions covering inspections related to structural damage and critical tasks, for example, to deal with dents, cracks and holes.
response	Accepted.

comment

28 comment by: *DGAC FR*

Department	Reference	Page	Comment
DGAC/DSAC	§3.2.1.2	4	The reference to "further investigation" could warrant a clarification. Certain events would need to be investigated by the drone manufacturer itself, or an authorized representative.

response

Accepted. This is clarified in a note in section 3.2.1.2, OSO#01 medium in SORA 2.0 already include provisions requiring the identification, assessment and mitigations of identified risks. This may include the investigation of events which led to unscheduled maintenance. SORA 2.5 provides additional clarity as it will require to report to the UAS designer the design-related occurrences.

comment

29 comment by: *DGAC FR*

Department	Reference	Page	Comment
DGAC/DSAC	§3.2.1.2	5	Regarding the paragraph "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", it would be interesting to trace those malfunctions, to assess the recurrence of such malfunctions, and therefore decide whether design actions would be necessary to correct certain malfunctions.

response | Noted. OSO#01 - medium robustness already cover this requirement both in SORA 2.0 and, more clearly, in SORA 2.5.

comment | *32* comment by: *Antidio Viguria (FADA-CATEC)*

We propose to change the following paragraph

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

By the following one:
The aim of this indication is not to require providing a list of events triggering unscheduled maintenance, but to provide informative material and first set of examples instead. These examples may have been identified during the design process or the operational life of the aircraft as the ones that may occur with more frequency.

In order to highlight that at design phase not all the unschduled maintenance tasks should be indentified, and this list could be extended during the experience with the UA is gained.

This comment has been agreed between Spanish Working GRoup for SAIL III coordinated by AESA and EUROCAE WG-105 SG6 (Activity related to design of guidelines to non-designed OSOs)

response | Partially accepted. The text has been updated to reflect the considerations included in this comment.

comment | *41* comment by: *Wing Aviation*

Current text: "*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.* " Editorial improvement proposal: "*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* ***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. 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.*"

response | Accepted. The text has been updated according to this comment.

comment | *42* | comment by: *Wing Aviation*

Current text: "***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.*" Editorial improvement proposal: "***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.*"

response | Accepted. The text has been updated according to this comment.

comment | *65* | comment by: *Drone Alliance Europe*

Current text:
"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. "

Editorial improvement proposal:
"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 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. 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."

response | Accepted. See comment 41.

comment | *66* | comment by: *Drone Alliance Europe*

Current text:
"**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."

Editorial improvement proposal:
"**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."

response Accepted. See comment 42.

comment *74* comment by: *UAVDACH*

Unscheduled maintenance: No requirements are listed that applicants need to define triggers/thresholds from which unscheduled maintenance is required - for specific, critical system components like propulsion, controller etc.

Proposal: Information should be provided by the applicant which systems need to be available at what service level to still operate safely (compare to MEL in manned aviation).

response Rejected. The CM is about the issuance of the ICA by the UAS designer and is linked with OSO#03 and SC-LUAS 2625. These provisions do not include the requirement of issuing information such as the MMEL, therefore such requirement cannot be included in the CM.

3.2.1.1. Scheduled maintenance p. 4

comment *6* comment by: *Department of Aviation & Aeronautical Sciences, Lund University*

Currently, concerning UAS, a system like the ATA100 system is non-existing and, as is the case for ensuring airworthiness/continuing airworthiness with manned aviation, there is a need for standardization for systems and subsystems regarding maintenance of UAS, from a saftey management, a maintenance release and accountability perspective. Compliance implies, from a minimum regulatory perspective, being able to provide a clear reference to a relevant technical specification or standard requirement that is aligned with a standard system for controlling/planning maintenance.

response Noted. Once an acceptable standard will be available, the MoC may be updated so to require to codify maintenance instructions in accordance to that standard.

comment *13* comment by: *JEDA*

OSO #05 requires to identify probable failures that could lead to a loss of control. The ICA should include answers to all components that could lead to a loss of control.

response Noted. Reference to OSO#05 has been removed.

comment	*14*	comment by: *JEDA*
	It is suggested to separate the scheduled maintenance requirements from the requirements derived from OSO #05. It is also suggested to simplify the proposal by defining a "standard scheduled maintenance" for SAIL III, where a "predefined" set of operation is suggested and can then be integrated with the contents of OSO #05. Similar "predefined" maintenance already exists for General Aviation and experimental aircraft, and can be simplified to apply them also to SAIL III drones.	
response	Partially accepted. Reference to OSO#05 has been removed. Examples of maintenance operations are listed in section 3.2.2.1, however the details of the scheduled maintenance vary basing on the design of the UAS and its intended operations.	

comment	*49*	comment by: *Wing Aviation*
	Current text: "*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)***." Comment: This MoC is not yet official, as neither the CRD associated with its consultation nor the final MoC has been published by EASA yet.	
response	Noted. The reference to OSO#05 has been removed.	

comment	*50*	comment by: *Wing Aviation*
	Current text: "*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).* Editorial improvement proposal: "*The scheduled maintenance should include all the maintenance tasks for which periodic scheduling information **has** been provided. In addition, it should include the information related to those equipment, systems and installations of the UAS **whose** 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).*"	
response	Accepted. The text has been updated according to this comment.	

comment	*51*	comment by: *Wing Aviation*
	Current text: "*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.*" Editorial improvement proposal: "*The specific maintenance tasks related to parts and systems of the UAS **whose** failure may lead to a loss of control of the operation should be clearly distinguishable from the other maintenance tasks inventoried.*"	
response	Accepted. The text has been updated according to this comment.	

comment	*63*	comment by: *Drone Alliance Europe*

Current text:
"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)**."

Comment: This MoC is not yet official, as neither the CRD associated with its consultation nor the final MoC has been published by EASA yet.

response Noted. See comment 49.

comment *73* comment by: *Drone Alliance Europe*

Attachment #1

Please see attached comment - form does not allow the comment to be saved.

response Accepted. See comment 50 and 51.

3.2. General means of compliance for OSO#03 - ICA p. 4

comment *19* comment by: *Department of Aviation & Aeronautical Sciences, Lund University*

We suggest that there should be initatives started towards putting provisions in place that will eventually require manufacturers to make avaliable and provide easy access to maintenance instructions, updates and manual revisions in order to support operators for performing ICA work. It should be the responsibility of the UAS manufacturer to establish this facility for UAS operators and not on operators carrying out maintenance. Perhaps there is a need to standardize how these requirements can be met across the UAS industry much in the same way as the commercial manned aviation sector adapted their manual system to benefit from the internet development of tthe time.

response Noted. It is already responsibility of the UAS manufacturer to make maintenance instructions available. At low and medium risk operations, it is acceptable that the operator carries out maintenance following the manufacturer's instructions.

comment *27* comment by: *DGAC FR*

Department	Reference	Page	Comment	Resolution
DGAC/DSAC	§3.2	4	Suggestion to modify the first paragraph as such:	Proposed modification of the paragraph: "The UAS designer should produce and make available to UAS operators, **and on**

				request, to any other person required to comply with those instructions, maintenance instructions and requirements in a format which allows a clear presentation of the information included in the following sections:”

response

Rejected. As OSO#03 does not require a third party maintenance organisation involvement, the only actors involved are the UAS operator and UAS designer. If the UAS operator subcontract the maintenance activites, the contracted organisation may then be involved and will receive the maintenance programme, but it still will be up to the operator to choose if a maintenance organisation will be contracted.

3.2.2.1. Types of maintenance tasks p. 5

comment

3 comment by: *Adrien B*

Specify "If part of the UAS design, ICA should cover mitigation means (eg. parachute)".

response

Partially accepted. Mitigation means are part of the UAS, an indication for separate kits has been included in section 2.

comment

8 comment by: *Department of Aviation & Aeronautical Sciences, Lund University*

Description of maintenance tasks should follow aviation standards which clearly distinguish between what is meant by a check, an inspection, and a test.

Servicing: any act of servicing for the purpose of maintaining inherent design capabilities and keeping a UAS serviceable for continued flight.
Inspection: an inspection of an interior or exterior area, component, system, installation or assembly to detect obvious damage, failure or irregularity. This level of inspection is made from within touching distance unless otherwise specified.
Repair: an action necessary to return the item to a specific standard. Repair is limited to actions related to replacement and structual work.
Functional test: a functional test is a task to determine that a system or component is fulfilling its intended purpose and it is a failure-finding task.
Overhaul: an action to restore the UAS and related components to their original and/or an airworthy state.
Software update: An action related to software updates pertaining to ground control stations and/or platforms.

response | Partially accepted. Repair fall in the definition of restoration, the text has been amended so to clarify it. Task type names amended to functional and operational test, and definition of functional test amended. Software updates definition included, not limited to control station as it may cover the full UAS.

comment | *15* | comment by: *JEDA*

Maybe updates (as firmware) should be included in the types of maintenance tasks. Or could you elaborate on whether this could/should be part of maintenance tasks or not?

response | Accepted. Software updates included in the types of tasks.

comment | *16* | comment by: *JEDA*

Even if the ground control system is included in the "Command, control and communication system" it is suggested to put it explicitly within the list.

response | Accepted. The text has been updated according to this comment.

comment | *30* | comment by: *DGAC FR*

Department	Reference	Page	Comment
DGAC/DSAC	§3.2.2.1	5	In the table, at the line 'inspection', it is stated "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." This could be the case, for example in case of ultrasonic inspections.

response | Noted.

comment | *43* | comment by: *Wing Aviation*

Current text: "*The following table **include** a list of the types of tasks that may be defined by an applicant:*" Editorial improvement proposal: "*The following table **includes** a list of the types of tasks that may be defined by an applicant:*"

response | Accepted. The text has been updated according to this comment.

comment | *44* | comment by: *Wing Aviation*

Current text: "- *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.*" Editorial improvement proposal: "*- Operational Check: An operational check 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 Check: A quantitative check to **verify** if one or more functions of an item performs within specified limits.*"

response: Accepted. The text has been updated according to this comment.

comment: *67* comment by: *Drone Alliance Europe*

Current text:
"The following table **include** a list of the types of tasks that may be defined by an applicant:"

Editorial improvement proposal:
"The following table **includes** a list of the types of tasks that may be defined by an applicant:"

response: Accepted. See coment 43.

comment: *68* comment by: *Drone Alliance Europe*

Current text:
"- 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."

Editorial improvement proposal:
"- Operational Check: An operational check 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 Check: A quantitative check to verify if one or more functions of an item performs within specified limits."

response: Accepted. See comment 44.

comment	*77* comment by: *Rigi Technologies SA* While it is understood that the list is not meant to be exhaustive, it is recommended to include "Replacement" in the list, as a frequent example (e.g. batteries, propellers, etc.).
response	Partially accepted. Replacement falls under the definition of removal and installation. The text has been amended so to clarify it.

3.2.2. Maintenance instructions p. 5

comment	*7* comment by: *Department of Aviation & Aeronautical Sciences, Lund University* See comment 3.2.1.1 on scheduled maintenance. "Maintenance tasks" in the context of standard aircraft maintenance (manned flight) is related to a maintenance programme for the specific type. Removal and installation should be specified in this list as a specific type of task (just as in manned aviation). We also suggest that maintenance instructions should also contain basic operational descriptions for components and/or systems.
response	Accepted. Removal and installation included in the list of types of tasks. Regarding the description of components/systems, see 3.2.2 - introduction information.

comment	*75* comment by: *UAVDACH* Point 2 and 3: Servicing and Maintenance requires staff with different skills. **Proposal:** Both, servicing information and maintenance tasks information should include an indicator what type of staff would be eligible to conduct the tasks/what competences are required.
response	Rejected. Maintenance staff competence is out of the scope of this MoC. The scope of the MoC is limited to the development of the instructions for continuing airworthiness.

3.2.2.2. Maintenance tasks content p. 6

comment	*17* comment by: *JEDA* The introduction of a maintenance task identifier is a very organised systematic very welcomed by the industry however it seems a little bit of an overkill for SAIL III Operations for which no failure conditions can be considered catastrophic in the context of OSO #05. We suggest not requiring it for SAIL III (and leaving it at the discretion of the manufacturer) and introducing it for SAIL IV.
response	Rejected. OSO#03 is applicable at the same robustness at SAIL III and IV, therefore the same requirements should apply. The task identifier is

	not linked with the severity of the failure conditions, and the reference to OSO#05 should be removed.

comment	*18* comment by: *JEDA* Definition of "Flight Hours". I would give the possibility to the designer to define the flight hours differently or more specifically (e.g. WoW Off to WoW on, or Engine On to Engine Off).
response	Accepted. The text has been updated according to this comment.

comment	*20* comment by: *Department of Aviation & Aeronautical Sciences, Lund University* We suggest that task identifiers should include clear reference to a standardized system for carrying out maintenance such as the ATA 100 system. Concerning the release of maintenance tasks, such a system seems not only necessary but mandatory.
response	Rejected. At the moment there is no such standard, therefore the codification can be done by the manufacturer on a product by product basis. Once an acceptable standard will be available, the MoC may be updated so to require to codify maintenance instructions in accordance to that standard.

comment	*45*	comment by: *Wing Aviation*
	Current text: "*Calendar time, **i.e.** Hours (HRS) or Days (D) or Years (Y)*" Comment and proposal: Replace '*i.e.*' with '***e.g.***'; depending on the specific system, a more appropriate calendar time unit may be Weeks (W) or Months (M).	
response	Accepted. The text has been updated according to this comment.	

comment	*46*	comment by: *Wing Aviation*
	Current text: "***Flight cycles (FC)**: number of flights performed by the UAS, independently from their duration*" Comment and proposal: We suggest usinga a more generic unit of measurement ('**cycle**') to encompass various contexts like flight cycles, charge cycles (e.g., for batteries), or landing cycles (e.g., for landing gear) - this should be further clarified by the UAS designer in the specific maintenance task(s).	
response	Accepted. The text has been updated according to this comment.	

comment	*47*	comment by: *Wing Aviation*
	Current text: "*In **such case**, the maintenance task will be associated **to** an unscheduled maintenance requirement.* " Editorial improvement proposal: "In such **a** case, the maintenance task will be associated **with** an unscheduled maintenance requirement".	
response	Accepted. The text has been updated according to this comment.	

comment	*48*	comment by: *Wing Aviation*
	Current text: "*Consumables: list of consumables (e.g. oils) needed to perform the task, if any;*" Editorial improvement proposal: We suggest incorporating more examples of consumables for clarification, including: "*Consumables: list of consumables (e.g. **cleaners, sealants,** oils**, disposable gloves, etc.**) needed to perform the task, if any;*"	
response	Accepted. The text has been updated according to this comment.	

comment	*54*	comment by: *Airbus Helicopters*
	The content of the maintenance task related to the amount of staff needed to perform the task is normally not provided by the OEM in the ICA manuals. This determination is the operator's or contracted CAMO's responsibility and should be identified as such or removed from the CM content	
response	Accepted. The provisions related to the amount of staff have been removed.	

comment	*69*	comment by: *Drone Alliance Europe*
	Current text: "Calendar time, **i.e.** Hours (HRS) or Days (D) or Years (Y)" Comment and proposal:	

Replace 'i.e.' with **'e.g**.'; depending on the specific system, a more appropriate calendar time unit may be Weeks (W) or Months (M).

response

Accepted. See comment 45.

comment

70 comment by: *Drone Alliance Europe*

Current text:
"**Flight cycles (FC)**: number of flights performed by the UAS, independently from their duration"

Comment and proposal:
We suggest usinga a more generic unit of measurement ('**cycle**') to encompass various contexts like flight cycles, charge cycles (e.g., for batteries), or landing cycles (e.g., for landing gear) - this should be further clarified by the UAS designer in the specific maintenance task(s).

response

Accepted. See comment 46.

comment

71 comment by: *Drone Alliance Europe*

Current text:
"In **such case**, the maintenance task will be associated to an unscheduled maintenance requirement. "

Editorial improvement proposal: "In such **a** case, the maintenance task will be associated **with** an unscheduled maintenance requirement".

response

Accepted. See comment 47.

comment

72 comment by: *Drone Alliance Europe*

Current text:
"Consumables: list of consumables (e.g. oils) needed to perform the task, if any;"

Editorial improvement proposal:
We suggest incorporating more examples of consumables for clarification, including:

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

response: Accepted. See comment 72.

comment: *76* comment by: *UAVDACH*

Maintenance task content does not list competency requirements for the specific task.

Proposal: Add/extend the "staff" section with "Competencies". This requires an addtional definition of required competencies in the introductionary section of the maintenance instructions.

response: Rejected. Maintenance staff competence is out of the scope of this MoC. The scope of the MoC is limited to the development of the instructions for continuing airworthiness.

comment: *80* comment by: *LHD*

The content of the maintenance task related to the amount of staff needed to perform the task is usually not provided by the OEM in the ICA manuals. This responsibility is in charge to the operator or CAMO and then should be clearly identified or removed.

response: Accepted. The provisions related to the amount of staff have been removed.

5. Remarks p. 7

comment: *23* comment by: *Department of Aviation & Aeronautical Sciences, Lund University*

Comments provided by:

bjorn.wallinius@tfhs.lu.se - Technical Director UAS, Department of Aviation and Aeronautical Sciences, Lund University.

john.woodlock@tfhs.lu.se - Post-doctoral researcher, Department of Aviation and Aeronautical Sciences, Lund University.

response: Noted.

Appendix A
Attachments

DAE comments to EASA's proposed CM SORA OSO#03 -- Scheduled maintenance.pdf

Attachment #1 to comment #73