Annex I to ED Decision 2020/022/R

‘Acceptable Means of Compliance (AMC) and Guidance Material (GM) to Commission Implementing Regulation (EU) 2019/947 — Issue 1, Amendment 1’

Annex I to ED Decision 2019/021/R is amended as follows:

The text of the amendment is arranged to show deleted text, new or amended text as shown below:

(a) deleted text is marked with ~~strikethrough~~;

(b) new or amended text is highlighted in blue;

(c) an ellipsis ‘(…)’ indicates that the remaining text is unchanged.

LIST OF ABBREVIATIONS

AEC	airspace encounter category
AEH	airborne electronic hardware
ANSP	air navigation service provider
ARC	air risk class
AGL	above ground level
AMC	acceptable means of compliance
AO	airspace observer
ATC	air traffic control
BVLOS	beyond visual line of sight
C2	command and control
C3	command, control and communication
ConOps	concept of operations
DAA	detect and avoid
EASA	European Union Aviation Safety Agency
ERP	emergency response plan
EU	European Union
FHSS	frequency-hopping spread spectrum
GRC	ground risk class
GM	guidance material
GNSS	Global Navigation Satellite System
HMI	human machine interface
ISM	industrial, scientific and medical
JARUS	Joint Authorities for Rulemaking on Unmanned Systems
METAR	aviation routine weather report (in (aeronautical) meteorological code)
MCC	multi-crew cooperation
MTOM	maximum take-off mass
NAA	national aviation authority
OM	operations manual
OSO	operational safety objective
PDRA	predefined risk assessment
RBO	risk-based oversight
RCP	required communication performance
RF	radio frequency
RLP	required C2 link performance
RP	remote pilot
RPS	remote pilot station
SAIL	specific assurance and integrity level
SMM	safety management manual
SORA	specific operations risk assessment
SPECI	aviation selected special weather code in (aeronautical) meteorological code
STS	standard scenario
SW	software
TAF	terminal area forecast
TCAS	traffic collision avoidance system
TMPR	tactical mitigation performance requirement
UA	unmanned aircraft

UAS	unmanned aircraft system
UAS Regulation	Commission Implementing Regulation (EU) 2019/947 of 24 May 2019 on the rules and procedures for the operation of unmanned aircraft
VLL	very low level
VLOS	visual line of sight
VO	visual observer

AMC1 Article 11 Rules for conducting an operational risk assessment

SPECIFIC OPERATIONS RISK ASSESSMENT (SOURCE JARUS SORA V2.0)

EDITION ~~September 2019~~December 2020

[…]

1.5 Roles and responsibilities

[…]

(d) UAS manufacturer — For the purposes of the SORA, the UAS manufacturer is the party that designs and/or produces the UAS. The UAS manufacturer has unique design evidence (e.g. for the system performance, the system architecture, software/hardware development documentation, test/analysis documentation, etc.) that they may choose to make available to one or many UAS operator(s) or to the competent authority to help to substantiate the UAS operator's safety case. Alternatively, a potential UAS manufacturer may utilise the SORA to target design objectives for specific or generalised operations. To obtain airworthiness approval(s), these design objectives could be complemented by the use of certification specifications (CS) or industry consensus standards if they are found to be acceptable by EASA~~the competent authority~~.

[…]

(f) Competent authority — The competent authority that is referred to throughout this AMC is the ~~recognised national~~ authority designated by the Member State in accordance with Article 17 of the UAS regulation to assess ~~for approving~~ the safety case of UAS operations and to issue the operational authorisation~~, according to~~ in accordance with Article 12 of the UAS Regulation. The competent authority may accept an applicant's SORA submission in whole or in part. Through the SORA process, the applicant may need to consult with the competent authority to ensure the consistent application or interpretation of individual steps. The competent authority must perform oversight of the UAS operator ~~according to~~in accordance with paragraphs (i) and (j) of Article 18 of the UAS Regulation. According to Regulation (EU) 2018/1139[3] (the EASA 'Basic Regulation'), EASA is the authority competent in the European Union to verify compliance of the UAS design and its components with the applicable rules, while the authority that is designated by the Member State is competent to verify compliance with the operational requirements and compliance of the personnel's competency with those rules. The following elements are related to the UAS design:

— OSOs #02, #04, #05, #06, #10, #12, #18, #19 (limited to criterion #3), #20, and #24;

[3] Regulation (EU) 2018/1139 of the European Parliament and of the Council of 4 July 2018 on common rules in the field of civil aviation and establishing a European Union Aviation Safety Agency, and amending Regulations (EC) No 2111/2005, (EC) No 1008/2008, (EU) No 996/2010, (EU) No 376/2014 and Directives 2014/30/EU and 2014/53/EU of the European Parliament and of the Council, and repealing Regulations (EC) No 552/2004 and (EC) No 216/2008 of the European Parliament and of the Council and Council Regulation (EEC) No 3922/91 (OJ L 212, 22.8.2018, p. 1) (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32018R1139).

— M1 mitigation (tethered operations): criterion #1 and M2 mitigation: criterion #1;

— verification of the system to contain the UAS within the operational volume in accordance with Step #9 of the SORA process.

When according to the SAIL or to the claimed mitigation means, the level of assurance of the above OSOs and/or mitigation means is 'high' (i.e. SAIL V and VI), a verification by EASA is required according to Article 40(1)(d) of Regulation (EU) 2019/945[4]. For the other OSOs and mitigation means, the competent authority defines which third party is able to verify compliance with them.

If the level of robustness of the design-related OSOs and/or mitigation means is lower than 'high', the competent authority may still require a verification by EASA of the compliance of the UAS and/or its components with the design-related OSOs and/or mitigation means according to point Article 40(1)(d) of Regulation (EU) 2019/945. Similarly, also for UAS operators to which the competent authority granted a light UAS operator certificate (LUC), the terms of the approval may require to use a UAS that is verified by EASA when conducting operations for which the level of robustness of the design-related OSOs and/or mitigation means is lower than 'high'. In those cases, EASA will verify that the achievement of the design integrity level is appropriate to the related SAIL and to the mitigation means, when those means are applicable, and will issue a type certificate (TC) (or a restricted type certificate (RTC)) to the UAS manufacturer, which will cover all design-related OSOs, the design-related mitigation means, and the enhanced containment verification in accordance with Step #9, if that verification is applicable. Alternatively, the competent authority that issues the operational authorisation may accept a declaration by the UAS operator, who is responsible for compliance of the UAS with the design-related OSOs.~~EASA may perform oversight of the UAS design and/or production organisation, and, when considered necessary, of the component design and/or production organisation, and may approve the design and/or the production of each. The competent authority also provides the operational approval to the UAS operator.~~

[…]

2. The SORA process

[…]

2.2 SORA process outline

[…]

[4] Commission Delegated Regulation (EU) 2019/945 of 12 March 2019 on unmanned aircraft systems and on third-country operators of unmanned aircraft systems (OJ L 152, 11.6.2019, p. 1) (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32019R0945).

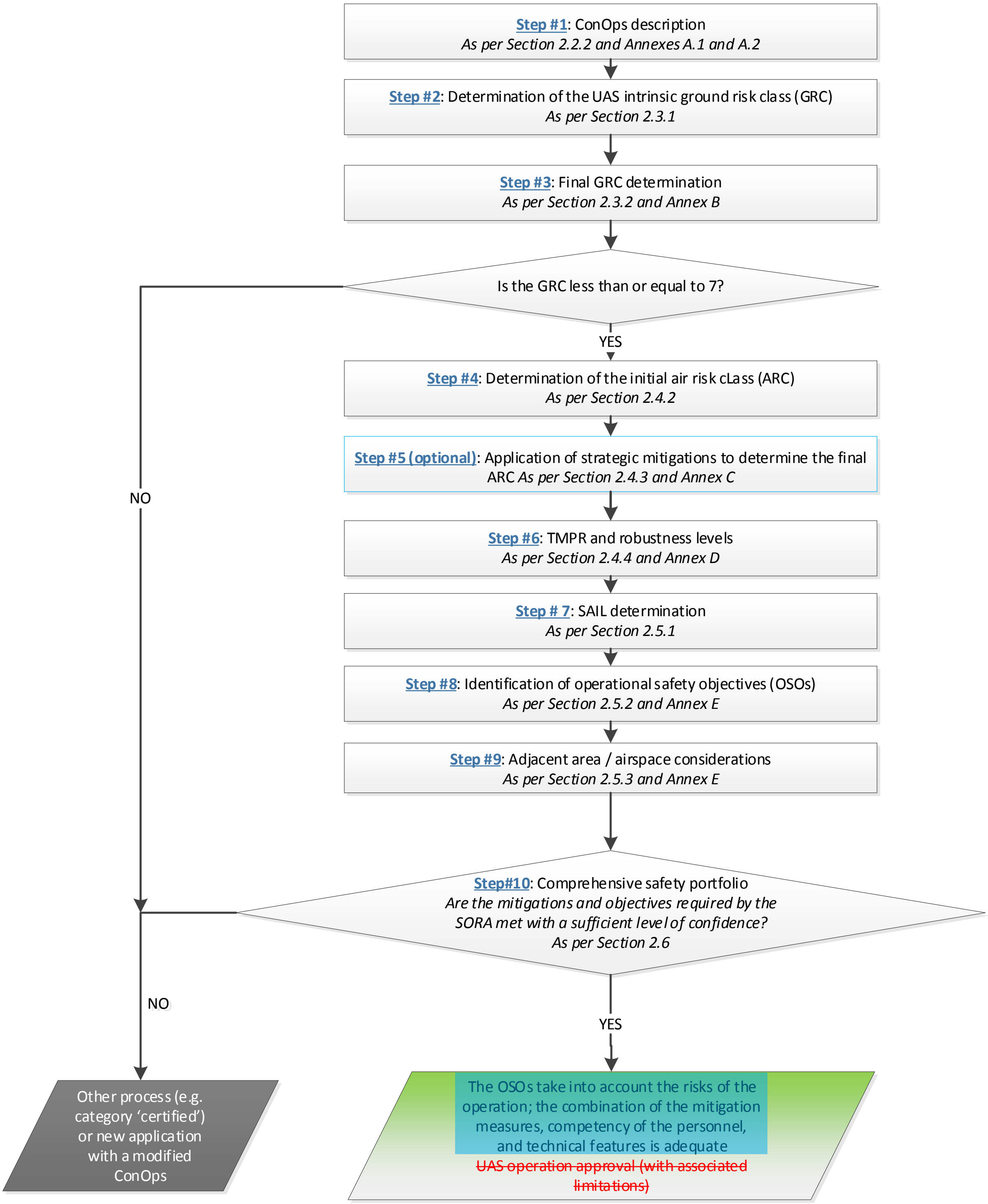


Figure 3 — The SORA process

Note: If operations are conducted across different environments, some steps may need to be repeated for each particular environment.

[…]

2.3 The ground risk process

2.3.1 Step #2 — Determination of the intrinsic UAS ground risk class (GRC)

[…]

(c) The applicant needs to have defined the area at risk when conducting the operation (also called the 'area of operation') including:

[…]

(d) Table 2 illustrates how to determine the intrinsic ground risk class (GRC). The intrinsic GRC is found at the intersection of the applicable operational scenario and the maximum UA characteristic dimension that drives the UAS lethal area. ~~In case of~~If there is a mismatch between the maximum UAS characteristic dimension and the typical kinetic energy expected, the applicant should provide substantiation for the chosen column.

Intrinsic UAS ground risk class				
Max UAS characteristics dimension	1 m / approx. 3 ft	3 m / approx. 10 ft	8 m / approx. 25 ft	> 8 m / approx. 25 ft
Typical kinetic energy expected	< 700 J (approx. 529 ft lb)	< 34 kJ (approx. 25 000 ft lb)	< 1 084 kJ (approx. 800 000 ft lb)	> 1 084 kJ (approx. 800 000 ft lb)
Operational scenarios				
VLOS/BVLOS over a controlled ground area[6]	1	2	3	4
VLOS ~~in~~over a sparsely populated ~~environment~~area	2	3	4	5
BVLOS ~~in~~over a sparsely populated ~~environment~~area	3	4	5	6
VLOS ~~in~~over a populated ~~environment~~area	4	5	6	8
BVLOS ~~in~~over a populated ~~environment~~area	TBD4[5]5	~~TBD~~[4]6	~~TBD~~[4]8	~~TBD~~[4]10
VLOS over an assembly of people	7			
BVLOS over an assembly of people	~~TBD~~[4]8			

Table 2 — Determination of the intrinsic GRC

(e) The operational scenarios described~~d~~ an attempt to provide discrete categorisations of operations with increasing numbers of **people at risk**. In principle, it is possible to use either qualitative criteria (please refer to next point (f)) or quantitative criteria, or consider both criteria, to assess if an operation takes place over sparsely populated areas, populated areas, or assemblies of people.

[6] In line with Figure 1 and ~~paragraph~~point 2.3.1~~.~~(c), the controlled area should encompass the flight geography, the contingency volume, and the ground risk buffer.

[5] ~~The intrinsic ground risk class for BVLOS operations in populated environment or over gathering of people will be developed in a future edition of the SORA.~~

(f) Reserved.Qualitative assessment: the volume to be used by the operator to classify the operation includes the operational volume and the ground risk buffer (as defined by a semantic model), which determine the intrinsic GRC.

GM1 Article 2(3) 'Definitions I DEFINITION OF 'ASSEMBLIES OF PEOPLE'' provides guidance on when an operation is classified as taking place over assemblies of people.

An operation should be classified as taking place over a populated area if the volume that is used to determine the intrinsic GRC:

— does not include assemblies of people, and

— includes areas that are substantially used for residential, commercial or recreational purposes.

[...]

(h) Controlled ground areas[9] are a way to strategically mitigate the risk on ground (similar to flying in segregated airspace); the UAS operator should ensure, through appropriate procedures, thatassurance that there will be no uninvolved persons is in the area of operation, as defined in Section 2.3.1(c)is under the full responsibility of by the UAS operator.

[...]

2.3.2 Step #3 – Final GRC determination

[...]

(h) In general, a quantitative approach to mitigation means allows to reduce the intrinsic GRC by 1 point if the mitigation means reduce the risk of the operation by a factor of approximately 10 (90 % reduction) compared to the risk that is assessed before the mitigation means are applied. Such quantitative criteria should be used to validate the risk reduction that is claimed when applying Annex B to AMC1 to Article 11.

[...]

2.5.2 Step #8 — Identification of the operational safety objectives (OSOs)

(a) The last step of the SORA process is to use the SAIL to evaluate the defences within the operation in the form of OSOs, and to determine the associated level of robustness. Table 6 provides a qualitative methodology to make this determination. In this table, O is optional, L is recommended with low robustness, M is recommended with medium robustness, and H is recommended with high robustness. The various OSOs are grouped based on the threat they help to mitigate; hence, some OSOs may be repeated in the table.

(b) Table 6 is a consolidated list of the common OSOs that historically have been used to ensure safe UAS operations. It represents the collected experience of many experts, and is therefore a solid starting point to determine the required safety objectives for a

[9] See the definition in Article 2(21) of the UAS Regulation.

specific operation. The competent authorities that issue the operational authorisation may define additional OSOs for a given SAIL and the associated level of robustness.

OSO number (in line with Annex E)		SAIL					
		I	II	III	IV	V	VI
	Technical issue with the UAS						
OSO#01	Ensure the UAS operator is competent and/or proven	O	L	M	H	H	H
OSO#02	UAS manufactured by competent and/or proven entity	O	O	L	M	H	H
OSO#03	UAS maintained by competent and/or proven entity	L	L	M	M	H	H
OSO#04	UAS developed to authority recognised design standards[6]	O	O	~~O~~L	L	M	H
OSO#05	UAS is designed considering system safety and reliability	O	O	L	M	H	H
OSO#06	C3 link performance is appropriate for the operation	O	L	L	M	H	H
OSO#07	Inspection of the UAS (product inspection) to ensure consistency with the ConOps	L	L	M	M	H	H
OSO#08	Operational procedures are defined, validated and adhered to	L	M	H	H	H	H
OSO#09	Remote crew trained and current and able to control the abnormal situation	L	L	M	M	H	H
OSO#10	Safe recovery from a technical issue	L	L	M	M	H	H
	Deterioration of external systems supporting UAS operations						
OSO#11	Procedures are in-place to handle the deterioration of external systems supporting UAS operations	L	M	H	H	H	H
OSO#12	The UAS is designed to manage the deterioration of external systems supporting UAS operations	L	L	M	M	H	H
OSO#13	External services supporting UAS operations are adequate for the operation	L	L	M	H	H	H
	Human error						
OSO#14	Operational procedures are defined, validated and adhered to	L	M	H	H	H	H

[6] ~~The robustness level does not apply to mitigations for which credit has been taken to derive the risk classes. This is further detailed in para. 3.2.11(a).~~In case of experimental flights that investigate new technical solutions, the competent authority may accept that recognised standard are not met.

OSO number (in line with Annex E)		SAIL					
		I	II	III	IV	V	VI
OSO#15	Remote crew trained and current and able to control the abnormal situation	L	L	M	M	H	H
OSO#16	Multi-crew coordination	L	L	M	M	H	H
OSO#17	Remote crew is fit to operate	L	L	M	M	H	H
OSO#18	Automatic protection of the flight envelope from human error	O	O	L	M	H	H
OSO#19	Safe recovery from human error	O	O	L	M	M	H
OSO#20	A human factors evaluation has been performed and the human machine interface (HMI) found appropriate for the mission	O	L	L	M	M	H
	Adverse operating conditions						
OSO#21	Operational procedures are defined, validated and adhered to	L	M	H	H	H	H
OSO#22	The remote crew is trained to identify critical environmental conditions and to avoid them	L	L	M	M	M	H
OSO#23	Environmental conditions for safe operations are defined, measurable and adhered to	L	L	M	M	H	H
OSO#24	UAS is designed and qualified for adverse environmental conditions	O	O	M	H	H	H

Table 6 — Recommended OSOs

2.5.3 Step #9 – Adjacent area/airspace considerations

[…]

(c) The enhanced containment, which consists in the following three safety requirements, appliesy forto operations conducted:

[…]

(2) Or where the operational volume is in a populated areaenvironments where:

(i) M1 mitigation has been applied to lower the GRC; or

(ii) operating in a controlled ground area.

(a) The UAS is designed to standards that are considered adequate by the competent authority and/or in accordance with a means of compliance that is acceptable to that authority such that:

1.(1) Tthe probability of the UA leaving the operational volume should be less than

10^{-4}/FH; and.   ~~2.~~(2) ~~N~~no single failure~~12~~* of the UAS or any external system supporting the operation should lead to its operation outside the ground risk buffer.   Compliance with the requirements above should be substantiated by analysis and/or test data with supporting evidence.   ~~3.~~(b) Software (SW) and airborne electronic hardware (AEH) whose development error(s) could **directly** (refer to Note 2) lead to operations outside the ground risk buffer should be developed to an industry standard or methodology that is recognised as being adequate by the competent authority.

[…]

ANNEX C TO AMC1 TO ARTICLE 11

STRATEGIC MITIGATION — COLLISION RISK ASSESSMENT

[…]

C.4 General air-SORA mitigation overview

SORA classification of mitigations

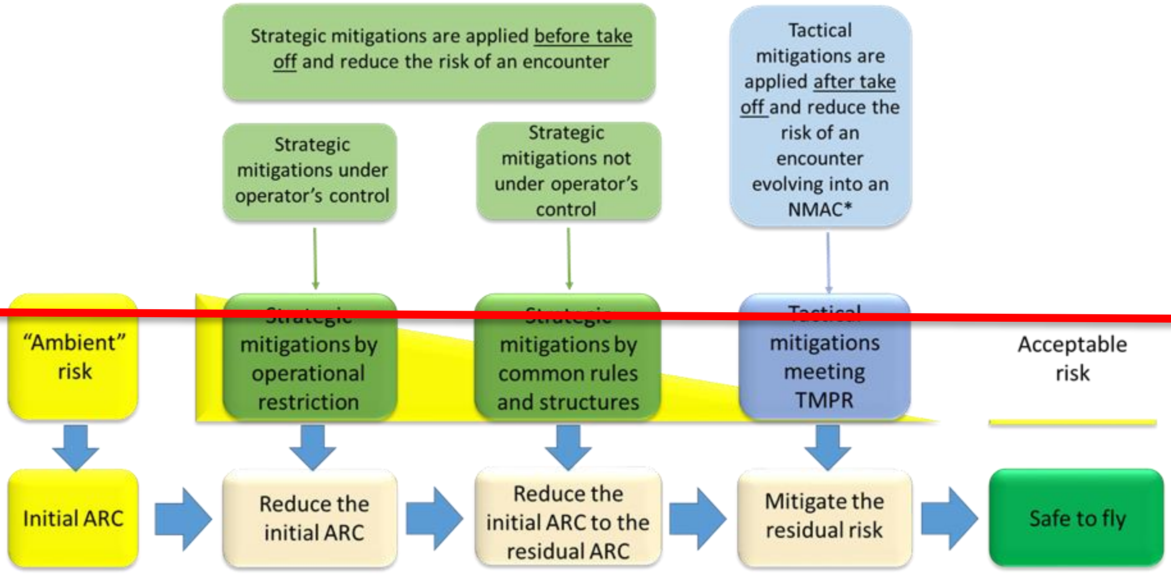
The SORA classifies mitigations to suit the operational needs of a UAS in the 'specific' class. These mitigations are classified as:

(a) strategic mitigations by the application of operational restrictions;

(b) strategic mitigations by the application of common structures and rules; and

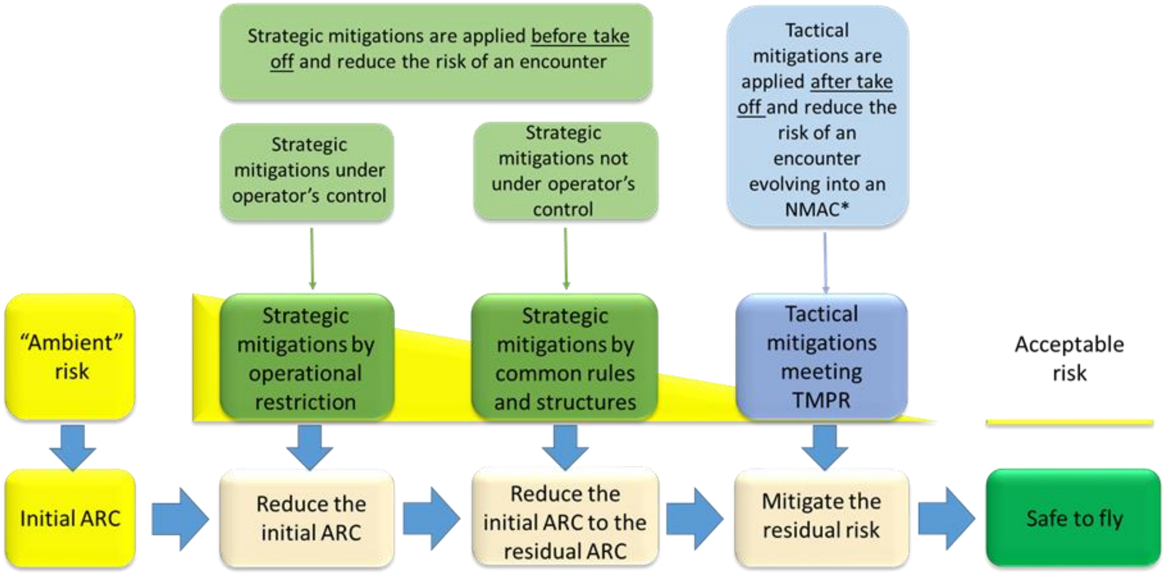
(c) tactical mitigations.

* The term 'failure' needs to be understood as an occurrence that affects the operation of a component, part, or element such that it can no longer function as intended. Errors may cause failures, but are not considered to be failures. Some structural or mechanical failures may be excluded from the criterion if it can be shown that these mechanical parts were designed according to aviation industry best practices.



* NMAC: near mid-air collision

~~Figure C.5 shows the alignment of the mitigation definitions between ICAO and the SORA.~~



* NMAC: near mid-air collision

Figure C.5 — SORA air conflict mitigation process

[...]

ANNEX E TO APPENDIX A TO AMC1 TO ARTICLE 11

INTEGRITY AND ASSURANCE LEVELS FOR THE OPERATIONAL SAFETY OBJECTIVES (OSOs)

E.2 OSOs related to technical issues with the UAS

[…]

OSO #02 — UAS manufactured by a competent and/or proven entity

TECHNICAL ISSUE WITH THE UAS		**Level of integrity**		
		Low	**Medium**	**High**
OSO #02 UAS manufactured by competent and/or proven entity	Criteria	As a minimum, manufacturing procedures cover: (a) the specification of materials; (b) the suitability and durability of materials used; and (c) the processes necessary to allow for repeatability in manufacturing, and conformity within acceptable tolerances.	Same as low. In addition, manufacturing procedures also cover: (a) configuration control; (b) the verification of incoming products, parts, materials, and equipment; (c) identification and traceability; (d) in-process and final inspections & testing; (e) the control and calibration of tools; (f) handling and storage; and (g) the control of non-conforming items.	~~Same as medium. In addition, the manufacturing procedures cover at least:~~ ~~(a) manufacturing processes;~~ ~~(b) personnel competence and qualifications; and~~ ~~(c) supplier control.~~ The manufacturer complies with the organisational requirements that are defined in Annex I (Part 21) to Regulation (EU) No 748/2012.
	Comments	*N/A*	*N/A*	*N/A*

TECHNICAL ISSUE WITH THE UAS		**Level of assurance**		
		Low	**Medium**	**High**
OSO #02 UAS manufactured by competent and/or proven entity	Criteria	The declared manufacturing procedures are developed to a standard considered adequate by the competent authority and/or in accordance with a means of compliance acceptable to that authority. The competent authority may request EASA to validate the claimed integrity.	Same as low. In addition, evidence is available that the UAS has been manufactured in conformance to its design. The competent authority may request EASA to validate the claimed integrity.	~~Same as medium. In addition:~~ ~~(a) manufacturing procedures; and~~ ~~(b) the conformity of the UAS to its design and specification~~ ~~are recurrently verified through process or product audits by a competent third party (or competent third parties).~~ Same as medium. In addition:

				EASA validates compliance with the organisational requirements that are defined in Annex I (Part 21) to Regulation (EU) No 748/2012.

[…]

OSO #04 — UAS developed to authority recognised design standards

TECHNICAL ISSUE WITH THE UAS		**Level of integrity**		
		Low	**Medium**	**High**
OSO #04 UAS developed to authority recognised design standards	Criteria	The UAS is designed to standards considered adequate by the competent authority and/or in accordance with a means of compliance acceptable to that authority. The standards and/or the means of compliance should be applicable to a low level of integrity and the intended operation.	The UAS is designed to standards considered adequate by the competent authority and/or in accordance with a means of compliance acceptable to that authority. The standards and/or the means of compliance should be applicable to a medium level of integrity and the intended operation.	The UAS is designed to standards considered adequate by the competent authority and/or in accordance with a means of compliance acceptable to that authority. The standards and/or the means of compliance should be applicable to a high level of integrity and the intended operation.
	Comments	~~*NAAs may define the standards and/or the means of compliance they consider adequate.*~~ *In case of experimental flights that investigate new technical solutions, the competent authority may accept that recognised standards are not met.*		

TECHNICAL ISSUE WITH THE UAS		**Level of assurance**		
		Low	**Medium**	**High**
OSO #04 UAS developed to authority recognised design standards	Criteria	Consider the criteria defined in Section 9		
	Comments	~~*N/A*~~*The competent authority may request EASA to validate the claimed integrity.*	~~*N/A*~~*If the operation is classified as SAIL V, EASA validates the claimed integrity. In all other cases, the competent authority may request EASA to validate the claimed integrity.*	*N/A*

OSO #05 — UAS is designed considering system safety and reliability

[…]

TECHNICAL ISSUE WITH THE UAS		Level of integrity		
		Low	**Medium**	**High**
OSO #05 UAS is designed considering system safety and reliability	Criteria	The equipment, systems, and installations are designed to minimise hazards[1] in the event of a probable[2] malfunction or failure of the UAS.	Same as low. In addition, the strategy for detection, alerting and management of any malfunction, failure or combination thereof, which would lead to a hazard, is available.	Same as medium. In addition: (a) Major failure conditions are not more frequent than remote[3]; (b) Hazardous failure conditions are not more frequent than extremely remote[3]; (c) Catastrophic failure conditions are not more frequent than extremely improbable[3]; and (d) SW and AEH whose development error(s) may cause or contribute to hazardous or catastrophic failure conditions are developed to an industry standard or a methodology considered adequate by EASA~~the competent authority~~ and/or in accordance with means of compliance acceptable to EASA~~that authority~~[4].
	Comments	*[1] For the purpose of this assessment, the term 'hazard' should be interpreted as a failure condition that relates to major, hazardous, or catastrophic consequences.* *[2] For the purpose of this assessment, the term 'probable' should be interpreted in a qualitative way as 'anticipated to occur one or more times during the entire system/operational life of a UAS'.*	*N/A*	*[3] Safety objectives may be derived from JARUS AMC RPAS.1309 Issue 2 Table 3 depending on the kinetic energy assessment made in accordance with Section 6 of EASA policy E.Y013-01.* *[4] Development assurance levels (DALs) for SW/AEH may be derived from JARUS AMC RPAS.1309 Issue 2 Table 3 depending on the kinetic energy assessment made in accordance with Section 6 of EASA policy E.Y013-01.*

TECHNICAL ISSUE WITH THE	Level of assurance

UAS		Low	Medium	High
OSO #05 **UAS is designed considering system safety and reliability**	Criteria	A functional hazard assessment[1] and a design and installation appraisal that shows hazards are minimised, are available. The competent authority may request EASA to validate the claimed integrity.	Same as low. In addition: (a) Safety analyses are conducted in line with standards considered adequate by the competent authority and/or in accordance with a means of compliance acceptable to that authority. (b) A strategy for the detection of single failures of concern includes pre-flight checks. The competent authority may request EASA to validate the claimed integrity.	Same as medium. In addition, safety analyses and development assurance activities are validated by EASA~~, according to Article 40 of Regulation (EU) 2019/945~~.
	Comments	*[1] The severity of failure conditions (no safety effect, minor, major, hazardous and catastrophic) should be determined according to the definitions provided in JARUS AMC RPAS.1309 Issue 2.*	*N/A*	*N/A*

OSO #06 — C3 link characteristics (e.g. performance, spectrum use) are appropriate for the operation

[…]

TECHNICAL ISSUE WITH THE UAS		**Level of assurance**		
		Low	**Medium**	**High**
OSO #06 **C3 link characteristics (e.g. performance, spectrum use) are appropriate for the operation**	Criteria	Consider the assurance criteria defined in Section 9 (low level of assurance). The competent authority may request EASA to validate the claimed integrity.	Demonstration of the C3 link performance is in accordance with standards considered adequate by the competent authority and/or in accordance with means of compliance acceptable to that authority. The competent authority may request EASA to validate the claimed integrity.	Same as medium. In addition, evidence is validated by EASA~~a competent third party~~.
	Comments	*N/A*	*N/A*	*N/A*

[…]

E.5 OSOs related to safe design

[…]

		LEVEL of ASSURANCE		
		Low	**Medium**	**High**
OSO #10 & OSO #12	Criteria	A design and installation appraisal is available. In particular, this appraisal shows that: (a) the design and installation features (independence, separation and redundancy) satisfy the low integrity criterion; and (b) particular risks relevant to the ConOps (e.g. hail, ice, snow, electromagnetic interference, etc.) do not violate the independence claims, if any.	Same as low. In addition, the level of integrity claimed is substantiated by analysis and/or test data with supporting evidence. The competent authority may request EASA to validate the claimed integrity.	Same as medium. In addition, ~~a competent third party~~EASA validates the level of integrity claimed
	Comments	*N/A*	*N/A*	*N/A*

[…]

E.7 OSOs related to Human Error

[…]

HUMAN ERROR		LEVEL of ASSURANCE		
		Low	**Medium**	**High**
OSO #18 Automatic protection of the flight envelope from human errors	Criteria	The automatic protection of the flight envelope has been developed in-house or out of the box (e.g. using commercial off-the-shelf elements), without following specific standards. The competent authority may request EASA to validate the claimed integrity.	The automatic protection of the flight envelope has been developed to standards considered adequate by the competent authority and/or in accordance with a means of compliance acceptable to that authority. The competent authority may request EASA to validate the claimed integrity.	Same as Medium. In addition, evidence is validated by EASA.
	Comments	*N/A*	*N/A*	*N/A*

OSO #19 — Safe recovery from human errors

[…]

HUMAN ERROR		LEVEL of ASSURANCE		
		Low	**Medium**	**High**
OSO #19 Safe recovery from Human Error	Criterion #1 (Procedures and checklists)	— Procedures and checklists do not require validation against either a standard or a means of compliance considered adequate by the competent authority. — The adequacy of the procedures and checklists is declared.	— Procedures and checklists are validated against standards considered adequate by the competent authority and/or in accordance with a means of compliance acceptable to that authority. — Adequacy of the procedures and checklists is proven through: — Dedicated flight tests, or — Simulation, provided the simulation is proven valid for the intended purpose with positive results.	Same as Medium. In addition: — Flight tests performed to validate the procedures and checklists cover the complete flight envelope or are proven to be conservative. — The procedures, checklists, flight tests and simulations are validated by a competent third party.
	Comments	*N/A*	*N/A*	*N/A*
	Criterion #2 (Training)	Consider the criteria defined for the level of assurance of the generic remote crew training OSO (i.e. OSO #09, OSO #15 and OSO #22) corresponding to the SAIL of the operation		
	Comments	*N/A*	*N/A*	*N/A*
	Criterion #3 (UAS design)	~~Consider the criteria defined in Section 9~~The applicant declares that the required level of integrity has been achieved[1]. The competent authority may request EASA to validate the claimed integrity.	The applicant has supporting evidence that the required level of integrity is achieved. That evidence is provided through testing, analysis, simulation[2], inspection, design review or operational experience. If the operation is classified as SAIL V, EASA validates the claimed integrity. In all other cases, the competent authority may request EASA to validate the claimed integrity.	EASA validates the claimed level of integrity.
	Comments	~~*N/A*~~ *[1] Supporting evidence may or may not be available.*	~~*N/A*~~ *[2] When simulation is performed, the validity of the targeted environment that is used in the simulation needs to be justified.*	*N/A*

OSO #20 — A Human Factors evaluation has been performed and the HMI found appropriate for the mission

[…]

HUMAN ERROR		**LEVEL of ASSURANCE**		
		Low	**Medium**	**High**
OSO #20 A Human Factors evaluation has been performed and the HMI found appropriate for the mission	Criteria	The applicant conducts a human factors evaluation of the UAS to determine whether the HMI is appropriate for the mission. The HMI evaluation is based on inspection or analyses. The competent authority may request EASA to witness the HMI evaluation of the UAS.	Same as Low but the HMI evaluation is based on demonstrations or simulations.[1] If the operation is classified as SAIL V, EASA witnesses the HMI evaluation of the UAS. In all other cases, the competent authority may request EASA to witness the HMI evaluation of the UAS.	Same as Medium. In addition, EASA witnesses the HMI evaluation of the UAS and a competent third party witnesses the HMI evaluation of the possible electronic means used by the VO.
	Comments	*N/A*	*[1] When simulation is ~~used~~performed, the validity of the targeted environment that is used in the simulation needs to be justified.*	*N/A*

[…]

E.9 Assurance level criteria for technical OSO

		LEVEL of ASSURANCE		
		Low	**Medium**	**High**
TECHNICAL OSO	Criteria	The applicant declares that the required level of integrity has been achieved[1].	The applicant has supporting evidence that the required level of integrity is achieved. This is typically done by testing, analysis, simulation[2], inspection, design review or through operational experience. The competent authority may request EASA to validate the claimed integrity.	EASA validates the claimed level of integrity.
	Comments	*[1] Supporting evidence may or may not be available.*	*[2] When simulation is performed~~used~~, the validity of the targeted environment that is used in the simulation needs to be justified.*	*N/A*