
SPECIFIC OPERATIONS RISK ASSESSMENTS (SORA) COURSE APPLIED TO UNMANNED AERIAL VEHICLES



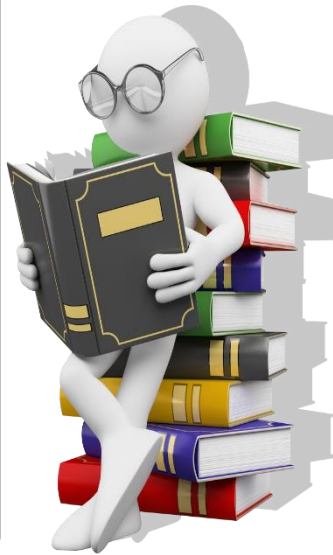


CHAPTER V: SORA RISK ASSESSMENT PROCESS

STEP 7 - DETERMINATION OF THE SPECIFIC LEVEL OF ASSURANCE AND INTEGRITY (SAIL)



SAIL Determination				
	Residual ARC			
Final GRC	a	b	c	d
≤2	I	II	IV	VI
3	II	II	IV	VI
4	III	III	IV	VI
5	IV	IV	IV	VI
6	V	V	V	VI
7	VI	VI	VI	VI
>7	Category C (Certified) operation ¹⁰			



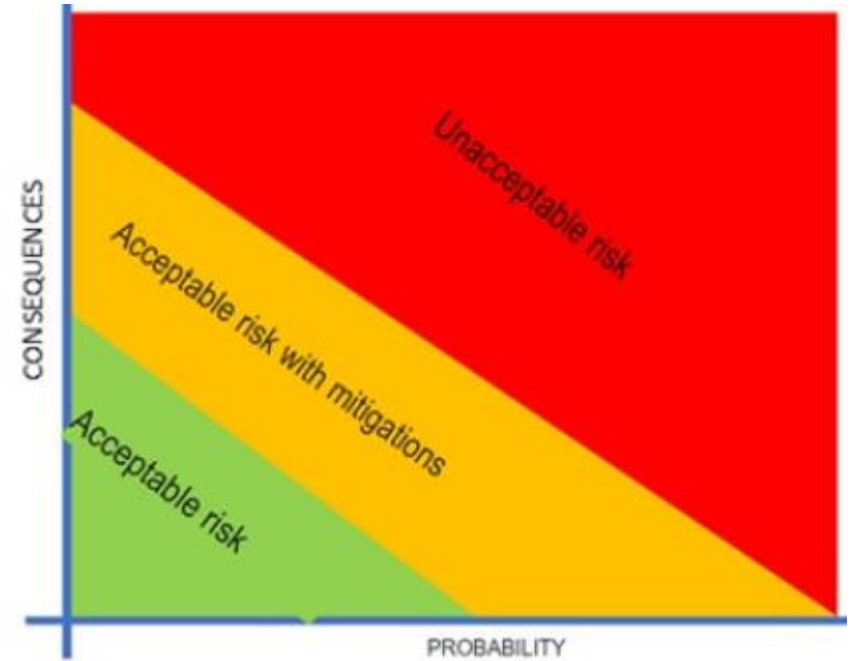
SAIL Determination				
	Residual ARC			
Final GRC	a	b	c	d
≤2	I	II	IV	VI
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>7	Category C (Certified) operation ¹⁰			

STEP 8 - IDENTIFICATION OF SAFETY OBJECTIVES (OSOS)

OSO ID	Operational Safety Objective	SAIL						Dependencies (Crit. references as per Annex E)		
		I	II	III	IV	V	VI	Operator	Training org	Designer
OSO#01	Ensure the Operator is competent and/or proven	NR	L	M	H	H	H	x		
OSO#02	UAS manufactured by competent and/or proven entity	NR	NR	L	M	H	H			x
OSO#03	UAS maintained by competent and/or proven entity	L	L	M	M	H	H	Crit. 1 Crit. 2		Crit. 1
OSO#04	UAS components essential to safe operations are designed to an Airworthiness Design Standard (ADS)	NR	NR	NR	L	M	H			x
OSO#05	UAS is designed considering system safety and reliability	NR	NR ^(c)	L	M	H	H			x
OSO#06	C3 link characteristics are appropriate for the operation	NR	L	L	M	H	H	x		x
OSO#07	Conformity check of the UAS configuration	L	L	M	M	H	H	Crit. 1 Crit. 2		Crit. 1
OSO#08	Operational procedures are defined, validated and adhered to	L	M	H	H	H	H	x		Crit. 1
OSO#09	Remote crew trained and current	L	L	M	M	H	H	x	x	
OSO#13	External services supporting UAS operations are adequate to the operation	L	L	M	H	H	H	x		
OSO#16	Multi crew coordination	L	L	M	M	H	H	Crit. 1 Crit. 3	Crit. 2	
OSO#17	Remote crew is fit to operate	L	L	M	M	H	H	x		
OSO#18	Automatic protection of the flight envelope from human errors	NR	NR	L	M	H	H			x
OSO#19	Safe recovery from human error	NR	NR	L	M	M	H			x
OSO#20	A Human Factors evaluation has been performed and the HMI found appropriate for the mission	NR	L	L	M	M	H	x		x
OSO#23	Environmental conditions for safe operations defined, measurable and adhered to	L	L	M	M	H	H	x		x
OSO#24	UAS designed and qualified for adverse environmental conditions	NR	NR	M	H	H	H			x

STEP 8 - IDENTIFICATION OF SAFETY OBJECTIVES (OSOS)

	I	II	III	IV	V	VI
O	9	6	1	0	0	0
L	15	14	6	1	0	0
M	0	4	13	16	4	0
H	0	0	4	7	20	24



STEP 8 - IDENTIFICATION OF SAFETY OBJECTIVES (OSOS)



Integrity	Guarantee	Documentary justification
Low Level		
<p>The operator must demonstrate extensive knowledge of the use of the UAS and the implementation of at least the procedures detailed operational continuation:</p> <ul style="list-style-type: none"> • Definition of responsibilities functions. • Maintenance program. • Training and education • Checklists. 	<p>Responsible statement by the operator. The operator shall collect everything specified in the level of integrity in your operations manual, agenda from maintenance, manual from instruction (if applicable) and the pilot's flight book.</p>	<p>Responsible statement that compliance with the level of integrity.</p>
Middle Level		
<p>The same as for low level. Additionally, the operator must have:</p> <ul style="list-style-type: none"> • An organization commensurate with its size and the complexity of their operations. • A method for identifying, evaluating and mitigating the risks associated with the operations, of agreement with the nature and extent of these. 	<p>Should be submitted for review by EASA:</p> <ul style="list-style-type: none"> • Manual of operations. • Maintenance program. • Instruction manual (if applicable). • The pilot's flight book. <p>In addition, you will need to implement a method to identify, assess and mitigate the associated risks to the operations.</p>	<ul style="list-style-type: none"> • Manual of operations. • Method for identifying, evaluating and mitigating the risks associated with the operations (may be included in the operations manual). • Maintenance program. • Instruction manual (if applicable).
High Level		
<p>The same as for medium level.</p>	<p>The operator must demonstrate that he possesses a air Operator scheme sufficiently robust or has a test organization of similar flight. Evidence must be presented of:</p>	<ul style="list-style-type: none"> • Characterization of aircraft. • Characterization of the simulators (yes proceed).
	<ul style="list-style-type: none"> • To own aircraft. • To have appointed responsible positions. • Have implemented a manual of operations. • Have implemented a management system of the security. • Have a simulator (if necessary). • Have the operational authorizations relevant. • To have implemented a system of maintenance (similar to CAMO). 	<ul style="list-style-type: none"> • Manual of operations. • Security management system • Operating, maintenance and inspection. • Maintenance Program. • Instruction manual (if applicable). • Authorizations that you have.

STEP 8 - IDENTIFICATION OF SAFETY OBJECTIVES (OSOS)

SAIL Determination				
Final GRC	Residual ARC			
	a	b	c	d
≤2	I	II	IV	VI
3	II	II	IV	VI
4	III	III	IV	VI
5	IV	IV	IV	VI
6	V	V	V	VI
7	VI	VI	VI	VI
>7	Category C (Certified) operation ¹⁰			

OSO ID	Operational Safety Objective	SAIL					Dependencies (Crit. references as per Annex E)			
		I	II	III	IV	V	VI	Operator	Training org	Designer
OSO#01	Ensure the Operator is competent and/or proven	NR	L	M	H	H	H	x		
OSO#02	UAS manufactured by competent and/or proven entity	NR	NR	L	M	H	H			x
OSO#03	UAS maintained by competent and/or proven entity	L	L	M	M	H	H	Crit. 1 Crit. 2		Crit. 1
OSO#04	UAS components essential to safe operations are designed to an Airworthiness Design Standard (ADS)	NR	NR	NR	L	M	H			x
OSO#05	UAS is designed considering system safety and reliability	NR	NR ^(c)	L	M	H	H			x
OSO#06	C3 link characteristics are appropriate for the operation	NR	L	L	M	H	H	x		x
OSO#07	Conformity check of the UAS configuration	L	L	M	M	H	H	Crit. 1 Crit. 2		Crit. 1
OSO#08	Operational procedures are defined, validated and adhered to	L	M	H	H	H	H	x		Crit. 1
OSO#09	Remote crew trained and current	L	L	M	M	H	H	x	x	
OSO#13	External services supporting UAS operations are adequate to the operation	L	L	M	H	H	H	x		
OSO#16	Multi crew coordination	L	L	M	M	H	H	Crit. 1 Crit. 3	Crit. 2	
OSO#17	Remote crew is fit to operate	L	L	M	M	H	H	x		
OSO#18	Automatic protection of the flight envelope from human errors	NR	NR	L	M	H	H			x
OSO#19	Safe recovery from human error	NR	NR	L	M	M	H			x
OSO#20	A Human Factors evaluation has been performed and the HMI found appropriate for the mission	NR	L	L	M	M	H	x		x
OSO#23	Environmental conditions for safe operations defined, measurable and adhered to	L	L	M	M	H	H	x		x
OSO#24	UAS designed and qualified for adverse environmental conditions	NR	NR	M	H	H	H			x

STEP 8 - IDENTIFICATION OF SAFETY OBJECTIVES (OSOS)

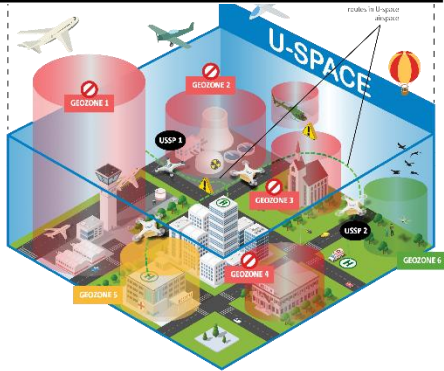
Integrity	Guarantee	Documentary justification
Low Level		
<p>The operator must demonstrate extensive knowledge of the use of the UAS and the implementation of at least the procedures detailed operational continuation:</p> <ul style="list-style-type: none"> • Definition of responsibilities and functions. • Maintenance program. • Training and education • Checklists. 	<p>Responsible statement by the operator. The operator shall collect everything specified in the level of integrity in your operations manual, agenda from maintenance, manual from instruction (if applicable) and the pilot's flight book.</p>	<p>Responsible statement that compliance with the level of integrity.</p>
Medium Level		
<p>The same as for low level. Additionally, the operator must have:</p> <ul style="list-style-type: none"> • An organization commensurate with its size and the complexity of their operations. • A method for identifying, evaluating and mitigating the risks associated with the operations, of agreement with the nature and extent of these. 	<p>Should be submitted for review by EASA:</p> <ul style="list-style-type: none"> • Manual of operations. • Maintenance program. • Instruction manual (if applicable). • The pilot's flight book. <p>In addition, you will need to implement a method to identify, assess and mitigate the associated risks to the operations.</p>	<ul style="list-style-type: none"> • Manual of operations. • Method for identifying, evaluating and mitigating the risks associated with the operations (may be included in the operations manual). • Maintenance program. • Instruction manual (if applicable).
High Level		
<p>The same as for medium level.</p>	<p>The operator must demonstrate that he possesses a air Operator scheme sufficiently robust or has a test organization of similar flight. Evidence must be presented of:</p>	<ul style="list-style-type: none"> • Characterization of aircraft. • Characterization of the simulators (yes proceed).
	<ul style="list-style-type: none"> • To own aircraft. • To have appointed responsible positions. • Have implemented a manual of operations. • Have implemented a management system of the security. • Have a simulator (if necessary). • Have the operational authorizations relevant. • To have implemented a system of maintenance (similar to CAMO). 	<ul style="list-style-type: none"> • Manual of operations. • Security management system • Operating, maintenance and inspection. • Maintenance Program. • Instruction manual (if applicable). • Authorizations that you have.

Integrity
<p>The operator must demonstrate extensive knowledge of the use of the UAS and the implementation of at least the procedures detailed operational continuation:</p> <ul style="list-style-type: none"> • Definition of responsibilities and functions. • Maintenance program. • Training and education • Checklists.

Guarantee
Low Level
<p>Responsible statement by the operator. The operator shall collect everything specified in the level of integrity in your operations manual, agenda from maintenance, manual from instruction (if applicable) and the pilot's flight book.</p>
Documentary justification
<p>Responsible statement that compliance with the level of integrity.</p>

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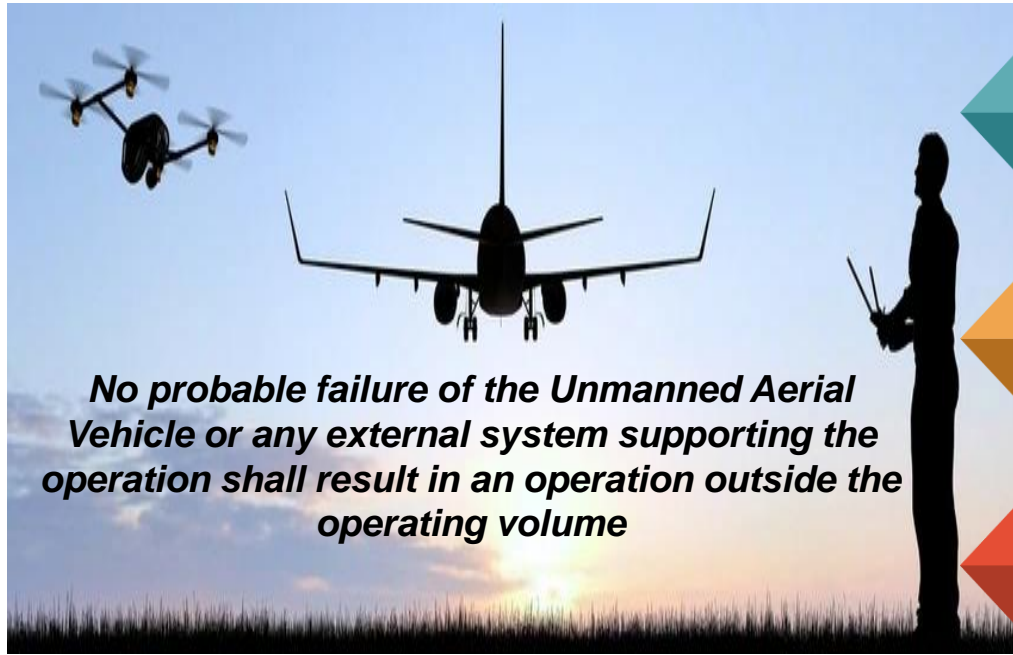
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		Operator	Training	org	Designer	Operator	Training	org	Designer
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OSO#02	JAS manufactured by competent and/or proven entity	NR	NR	L	M	H	H		x
OSO#03	JAS maintained by competent and/or proven entity	L	L	M	M	H	H	Crit. 1	Crit. 1
OSO#04	JAS components essential to safe operations are designed to an Airworthiness Design Standard (ADS)	NR	NR	NR	L	M	H		x
OSO#05	JAS is designed considering system safety and reliability	NR	NR	NR	L	M	H		x
OSO#06	Link characteristics are appropriate for the operation	NR	L	L	M	H	H	x	x
OSO#07	Conformity check of the UAS configuration	L	L	M	M	H	H	Crit. 1	Crit. 1
OSO#08	Operational procedures are defined, validated and adhered to	L	L	M	H	H	H	x	Crit. 1
OSO#09	Remote crew trained and current	L	L	M	M	H	H	x	x
OSO#13	External services supporting UAS operations are adequate to the operation	L	L	M	M	H	H	x	
OSO#16	Multi crew coordination	L	L	M	M	H	H	Crit. 1	Crit. 2
OSO#17	Remote crew is fit to operate	L	L	L	M	M	H	x	
OSO#18	Automatic protection of the flight envelope from human errors	NR	NR	L	M	H	H		x
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OSO#23	Environmental conditions for safe operations defined, measurable and adhered to	L	L	L	M	M	H	x	x
OSO#24	JAS designed and qualified for adverse environmental conditions	NR	NR	M	H	H	H		x



Low Level		
The operator must demonstrate extensive knowledge of the use of the UAS per the implementation of at least the procedures detailed operational manual, maintenance program, flight manual, manual of procedure (if applicable) and the pilot's flight book.	Responsible statement by the operator. The operator shall create a written statement in the level of integrity in your operations manual, maintenance program, flight manual, manual of procedure (if applicable) and the pilot's flight book.	Responsible statement that compliance with the level of integrity:
<ul style="list-style-type: none"> Definition of responsibilities Maintenance program Training and education Crewability 		
Medium Level		
The operator must have:	EASA: <ul style="list-style-type: none"> Manual of operations Maintenance program Instruction manual (if applicable) Pilot's flight book In addition, you will need to implement a method to identify, assess and mitigate the associated risks for the operation.	the risks associated with the operations (crit. 1) be included in the operations manual) <ul style="list-style-type: none"> Maintenance program Instruction manual (if applicable)
High Level		
The same as for medium level	The operator must demonstrate that he possesses a an Operator achieving sufficient robust or help a lost organization of former flight. Experience must be presented as: <ul style="list-style-type: none"> To own aircraft To have designated a responsible position Have implemented a manual of the security Have implemented a management system of the security Have a simulator (if necessary) Have the operational authorizations relevant To have implemented a system of maintenance (similar to CAA/CAA) 	<ul style="list-style-type: none"> Characterization of aircraft Characterization of the simulators (crit. 1) process Manual of operations Secure management system Operating, maintenance and inspection Maintenance Program Instruction manual (if applicable) Authorizations that you have

STEP 9 - CALCULATION OF **ADJACENT AIRSPACE**

The objective of this section is to address the risk posed by a loss of control of the operation, resulting in a violation of adjacent areas on the ground and/or adjacent airspace



**ENHANCED CONTAINMENT
APPLIES TO OPERATIONS
PERFORMED:**



IN ADJACENT AREAS



**WHEN THE OPERATING VOLUME
IS IN A POPULATED AREA**

STEP 9 - CALCULATION OF **ADJACENT AIRSPACE**

How do we calculate adjacent airspace?


$$A.D.t = A.D. no mit \times F_m$$

Please select the SAIL level

OSOs

II

Please select the level of robustness: L for Low, M for Medium or H for High

Step 9

Not applicable

Introduce the following data

For Unmitigated Adjacent Distance

Operating expected scape Speed (km/h)

25,2

Endurance (min)

3

Unmitigated Adjacent Distance (km) (maximun 35 km)

1,26

Adjacent Distance (km)

0,82

STEP 10 - COMPREHENSIVE **SECURITY REPORT**

The safety study represents the documentary materialization of the evidence that supports the process by which the risk assessment has been carried out

1. COVER
2. INDEX OF PAGES
3. REVISION LOG
4. LIST OF EFFECTIVE PAGES
5. INTRODUCTION
6. PURPOSE AND SCOPE
7. ACRONYMS, TERMS AND DEFINITIONS
8. METHODOLOGY USED
9. REFERENCE DOCUMENTS
10. THE STEPS OF THE METHODOLOGY
11. THE ANNEXES



QUESTION TIME!

