



Predefined Risk Assessment, PDRA-02:

- **USING UNMANNED AIRCRAFT UP TO 3 M DIMENSION**
- **BVLOS OVER A LIGHTLY POPULATED AREA (50 People/km²)**
- **IN AN ENVIROMENT WHERE MOST PEOPLE ARE SHELTERED**
- **IN AIRSPACE THAT IS RESERVED OR SEGREGATED FOR THE OPERATION**

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10 Contents

- 11 1. Introduction
- 12 2. Scope
- 13 3. Risk Assessment (A2-Form)
- 14 4. Reference to OM & Modules
- 15 5. Compliance Matrix
- 16

17 1. Introduction

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18 This Predefined Risk Assessment (PDRA) is an application of the SORA intended to provide UAS operators with an already
19 completed risk assessment for the operation covered under this PDRA as defined by the scope and risk assessment
20 (sections 2 and 3).

21 Before deciding to apply for an authorization under this PDRA, UAS operators should carefully evaluate whether it will
22 accommodate the intended operations. This should be done by evaluating the scope of the PDRA.

23 All documents should be adjusted to reflect the actual UAS operation, however significant care should be directed to
24 the mutual dependency of SORA risk assessment writing template, comprehensive safety portfolio (compliance matrix)
25 and operations manual. All red shaded boxes in the forms are predefined and shall not be changed. If one of these
26 would have to be changed to conduct operation please revert to a SORA application. All boxes still white in the form
27 (except for the remark sections) have to be filled by the applicant.

28 The requirements that are driven by this Risk assessment should be in full compliance with SORA and the respective
29 Annexes.

30 The competent authority reviews the application in accordance with the provisions arising from the risk assessment and
31 the respective SAIL. In this process, the implementation of all technical and operational requirements are checked based
32 on the descriptions in the operations manual, or other associated documents as required. The competent authority has
33 the option to request revisions of documents or to ask for additional supporting documentation.

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35 2. Scope of PDRA-02

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37 (a) Scope

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39 This PDRA-02 covers UAS operations performed with the following main attributes:

- 40 • unmanned aircraft with a maximum characteristic dimension (e.g. wingspan or rotor diameter/area) up to 3
41 m and a maximum speed of 35 m/s, MTOM <25kg
- 42 • operated beyond visual line of sight (BVLOS) of the remote pilot,
- 43 • With a maximum population density of 50 people/km² or in qualitative terms lightly populated areas,
- 44 • In airspace reserved or segregated for the operation, e.g. danger area or restricted area appropriate for
45 unmanned aircraft operations.
- 46 • Adjacent Area of sheltered nature with an Average Population density of less than 5000 ppl/km²

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48 (b) PDRA characterisation and conditions

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50 The characterisation and conditions for this PDRA are summarised in section 3.

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52 **3. Risk Assessment - A2 -Form**

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Specific Operational Risk Assessment overview for UAS operations	
0. Data of the UAS and operation	
0.1 UAS operator identification	
0.2 Manufacturer or type certificate holder	
0.3 Model name	
0.4 Type of UAS configuration	<input type="checkbox"/> Conventional airplane <input type="checkbox"/> Helicopter <input type="checkbox"/> Multirotor <input type="checkbox"/> Hybrid/VTOL <input type="checkbox"/> Lighter than air <input type="checkbox"/> Other, please specify:
0.5 Is the UAS tethered during the operation?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
0.6 Maximum characteristic dimension	≤ 3 m
0.7 Maximum take-off mass (MTOM) (indicated by the operator equal to or less than the manufacturer's specification)	≤ 25 kg
0.8 Maximum operational speed	≤ 35 m/s
0.9 Type of propulsion system	<input type="checkbox"/> Electric <input type="checkbox"/> Combustion <input type="checkbox"/> Hybrid, specify type: _____ <input type="checkbox"/> Other, please specify: _____
0.10 Number of type certificate (if available)	N/A
0.11 Certificate of airworthiness (if available)	N/A
0.12 Number of noise certificate (if available)	N/A
0.13 Transport of dangerous goods	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
0.14 Type of operation	<input type="checkbox"/> Visual line of sight (VLOS) <input type="checkbox"/> Extended visual line of sight (EVLOS) <input checked="" type="checkbox"/> Beyond visual line of sight (BVLOS)
0.15 Does the remote pilot control more than one UA simultaneously?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

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1. Specific Operations Risk Assessment

Step #1 Operations manual

#1.1 Description of proposed operation including the locations	<ul style="list-style-type: none"> • If location-specific: Please provide the geo-coordinates for each operational volume (flight geography and contingency volume), the ground risk buffer and the air risk buffer (if available) as a separate file using either .txt; .kmz or .kml. Give reference to the file: _____ • If location-independent: Please provide a reference to the documented process for the determination of volumes and buffers and the assessment of the local conditions and their compliance limitations. Give reference to the file: <u>Chapter C within the Operators OM</u> _____ <p><i>Please provide a list with the information if there are multiple locations.</i></p>
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Short description of proposed operation:
e.g., transport, inspection, filming, testing, etc...

#1.2 Dimensions of the operational volume and the adjacent volume (Rounded up to first decimal place)	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">Height of the flight geography</td> <td style="width: 15%;">H_{FGmax}</td> <td style="width: 10%; text-align: center;">*</td> <td style="width: 15%; text-align: right;">m</td> </tr> <tr> <td>Height of the contingency volume</td> <td>H_{CVmax}</td> <td style="text-align: center;">*</td> <td style="text-align: right;">m</td> </tr> <tr> <td>Width of the contingency volume</td> <td>SCV_{max}</td> <td style="text-align: center;">*</td> <td style="text-align: right;">m</td> </tr> <tr> <td>Width of the ground risk buffer</td> <td>S_{GRBmax}</td> <td style="text-align: center;">*</td> <td style="text-align: right;">m</td> </tr> <tr> <td colspan="4"> </td> </tr> <tr> <td>Height of the adjacent volume</td> <td>H_{AV}</td> <td style="text-align: center;">*</td> <td style="text-align: right;">m</td> </tr> <tr> <td>Width of the adjacent volume</td> <td>S_{AV}</td> <td style="text-align: center;">6300</td> <td style="text-align: right;">m</td> </tr> </table> <p><i>Please provide a list with this information if there are multiple locations.</i></p> <p>* - information about the operational volume can be found in chapter C of the OM</p>	Height of the flight geography	H _{FGmax}	*	m	Height of the contingency volume	H _{CVmax}	*	m	Width of the contingency volume	SCV _{max}	*	m	Width of the ground risk buffer	S _{GRBmax}	*	m					Height of the adjacent volume	H _{AV}	*	m	Width of the adjacent volume	S _{AV}	6300	m
Height of the flight geography	H _{FGmax}	*	m																										
Height of the contingency volume	H _{CVmax}	*	m																										
Width of the contingency volume	SCV _{max}	*	m																										
Width of the ground risk buffer	S _{GRBmax}	*	m																										
Height of the adjacent volume	H _{AV}	*	m																										
Width of the adjacent volume	S _{AV}	6300	m																										

Step #2 UAS intrinsic ground risk class

#2.1 Type of operational areas on the ground (including flight geography, contingency volume and ground risk buffer)	<input type="checkbox"/> Controlled ground area <input type="checkbox"/> < 5 People/km ² (remote) <input checked="" type="checkbox"/> < 50 People/km ² (lightly populated) <input type="checkbox"/> < 500 People/km ² (sparsely populated) <input type="checkbox"/> < 5000 People/km ² (suburban/low density metropolitan) <input type="checkbox"/> < 50.000 People/km ² (high density metropolitan) <input type="checkbox"/> > 50.000 People/km ² (assemblies of people)
#2.2 Specify the intrinsic ground risk class	4

Remarks/Reasoning for Step #2 (optional)

Step #3 Final ground risk class determination	
#3.1 Specify the applied ground risk mitigations (if applicable)	M1 (A) strategic mitigation - sheltering Specify the level of robustness: <input type="checkbox"/> None <input checked="" type="checkbox"/> Low
	M1 (B) strategic mitigation – operational restrictions Specify the level of robustness: <input checked="" type="checkbox"/> None <input type="checkbox"/> Medium <input checked="" type="checkbox"/> High
	M1 (C) tactical mitigation – ground observation Specify the level of robustness: <input checked="" type="checkbox"/> None <input type="checkbox"/> Low
	M2 Effects on UA impact dynamics are reduced Specify the level of robustness: <input checked="" type="checkbox"/> None <input type="checkbox"/> Medium <input type="checkbox"/> High
#3.2 Specify the final ground risk class	3
Remarks/Reasoning for Step #3 (optional)	
Step #4 Initial air risk class	
#4.1 Classification of the airspace where the operation is intended to be conducted (multiple answers possible)	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D <input type="checkbox"/> E <input type="checkbox"/> F <input type="checkbox"/> G
	<input type="checkbox"/> Restricted area (ED-R) <input type="checkbox"/> Danger area (ED-D)
	<input type="checkbox"/> TMZ <input type="checkbox"/> RMZ <input type="checkbox"/> ATZ
#4.2 Specify the initial air risk class and the reasoning for choosing it	Operational volume
	<input checked="" type="checkbox"/> ARC-a <input type="checkbox"/> ARC-b <input type="checkbox"/> ARC-c <input type="checkbox"/> ARC-d
	Adjacent airspace
	<input type="checkbox"/> ARC-a <input type="checkbox"/> ARC-b <input type="checkbox"/> ARC-c <input type="checkbox"/> ARC-d
Remarks/Reasoning for Step #4 (optional)	
(eg. Explanations why the flight area is initially ARC-a)	
Step #5 Strategic air risk mitigations and final air risk class	
#5.1 Specify, if strategic mitigations of the air risk class were applied	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
#5.2 Residual air risk class (after strategic mitigation)	<input checked="" type="checkbox"/> ARC-a <input type="checkbox"/> ARC-b <input type="checkbox"/> ARC-c <input type="checkbox"/> ARC-d
Remarks/Reasoning for Step #5 (optional)	

Step #6 TMPR and robustness level			
#6	Tactical mitigations performance Requirements	<input type="checkbox"/> VLOS <input checked="" type="checkbox"/> BVLOS <input checked="" type="checkbox"/> No requirement (ARC-a) <input type="checkbox"/> Low (ARC-b) <input type="checkbox"/> Medium (ARC-c) <input type="checkbox"/> High (ARC-d)	
Remarks/Reasoning for Step #6 (optional)			
Step #7 SAIL determination			
#7	Specific Assurance and Integrity Level	<input type="checkbox"/> SAIL I <input checked="" type="checkbox"/> SAIL II <input type="checkbox"/> SAIL III <input type="checkbox"/> SAIL IV <input type="checkbox"/> SAIL V <input type="checkbox"/> SAIL VI	
Step #8 Determination of containment requirements			
#8	Containment	<input checked="" type="checkbox"/> Low	<input type="checkbox"/> Medium
Remarks/Reasoning for Step #8 (optional)			
Step #9 Identification of operational safety objectives (OSOs)			
#9	Operational safety objectives	As per identified SAIL from Step #7	
Confirmation			
Place, date		Name and signature	

61 **4. Reference to BOM & modules**

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63 To write an Operations Manual for the Operation described above it is possible to use the Basic Operations
64 Manual (BOM) and extend or change it as necessary using the listed modules.

65 The BOM is common to all PDRA's and therefore not complete and will not work as a standalone document
66 without the required additions.

67 For this PDRA the following documents are required to complete a full Operations Manual addressing all
68 necessary topics:

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70 • BOM (basic operations manual)

71 • modules

72 ○ BVLOS / TMRP (ARC-a)

73 ○ Flight Area 02

74 (generic, lightly populated area, segregated airspace, low containment)

75 ○ M1(A)

76 Strategic mitigation - Sheltering

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80 **5. Compliance Matrix**

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82 If you stick to the recommended structure from Annex A (A3) you can use the following Compliance Matrix to
83 give the competent authority the reference where to find the evidence needed for the requirements derived
84 from this PDRA. The red shaded boxes shall not be adjusted as they are derived from the Risk Assessment
85 made. However, the location of the evidence can be adjusted to match the actual location in the Operation
86 Manual handed in for authorisation.

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Compliance Matrix

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Requirement	Level of robustness	Reference to documentation
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Ground risk mitigations		
M1 (A) Strategic mitigations - Sheltering	<input type="checkbox"/> None <input checked="" type="checkbox"/> Low	Document name: <u>OperationsManual.pdf</u> Chapter or Page number: <u>Chapter C, 3.2.3.2</u> <u>Annex 8.1.3 (if >25kg)</u>
M1 (B) Strategic mitigations - Operational restrictions	<input checked="" type="checkbox"/> None <input type="checkbox"/> Medium <input type="checkbox"/> High	Document name: _____ Chapter or Page number: _____
M1 (C) Tactical mitigations - Ground observation	<input checked="" type="checkbox"/> None <input type="checkbox"/> Low	Document name: _____ Chapter or Page number: _____
M2 – Effects of UA impact dynamics are reduced	<input checked="" type="checkbox"/> None <input type="checkbox"/> Medium <input type="checkbox"/> High	Document name: _____ Chapter or Page number: _____

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Strategic air risk mitigations		
Air risk class mitigation	<input type="checkbox"/> ARC-d (AEC 1 or 2) → ARC-c <input type="checkbox"/> ARC-d (AEC 1 or 2) → ARC-b <input type="checkbox"/> ARC-d (AEC 3) → ARC-c <input type="checkbox"/> ARC-d (AEC 3) → ARC-b <input type="checkbox"/> ARC-c (AEC 4) → ARC-b <input type="checkbox"/> ARC-c (AEC 5) → ARC-b <input type="checkbox"/> ARC-c (AEC 6,7,8) → ARC-b <input type="checkbox"/> ARC-c (AEC 9) → ARC-b	Document name: _____ Chapter or Page number: _____

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Tactical mitigations performance requirements		
TMPR level	<input type="checkbox"/> VLOS (deconfliction scheme) <input checked="" type="checkbox"/> BVLOS <input checked="" type="checkbox"/> No requirement (ARC-a) <input type="checkbox"/> Low requirement (ARC-b) <input type="checkbox"/> Medium requirement (ARC-c) <input type="checkbox"/> High requirement (ARC-d)	Document name: _____ Chapter or Page number: _____
TMPR function	Detect	Document name: _____ Chapter or Page number: _____
	Decide	Document name: _____ Chapter or Page number: _____
	Command	Document name: _____ Chapter or Page number: _____
	Execute	Document name: _____ Chapter or Page number: _____
	Feedback loop	Document name: _____ Chapter or Page number: _____
TMPR robustness	TMPR integrity and assurance objectives	Document name: _____ Chapter or Page number: _____

Containment requirements

Containment	<input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	Document name: <u>OperationsManual.pdf</u> Chapter or Page number: <u>Chapter T, 6.1.6</u>
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Operational Safety Objectives

OSO #01 Ensure that the UAS operator is competent and/or proven	<input type="checkbox"/> NR <input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	Document name: <u>OperationsManual.pdf</u> Chapter or Page number: <u>Chapter A,</u> <u>...Chapter D</u>
OSO #02 UAS manufactured by competent and/or proven entity	<input checked="" type="checkbox"/> NR <input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	Document name: _____ Chapter or Page number: _____:
OSO #03 UAS maintained by competent and/or proven entity	<input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	Document name: <u>OperationsManual.pdf</u> Chapter or Page number: <u>Chapter A, 1.7</u> <u>Annex 8.1.1.2</u>
OSO #04 UAS components essential to safe operations are designed to an Airworthiness Design Standard (ADS)	<input checked="" type="checkbox"/> NR <input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	Document name: _____ Chapter or Page number: _____:
OSO #05 UAS is designed considering system safety and reliability	<input checked="" type="checkbox"/> NR <input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	Document name: _____ Chapter or Page number: _____:
OSO #06 C3 link characteristics (e.g. performance spectrum use) are appropriate for the operation	<input type="checkbox"/> NR <input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	Document name: <u>OperationsManual.pdf</u> Chapter or Page number: <u>Chapter T, 6.2.3</u> <u>Annex 8.1.3</u>

OSO #07 Conformity check of the UAS configuration	<input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	Document name: <u>OperationsManual.pdf</u> Chapter or Page number: <u>Chapter B, 2.8.1</u> <u>Chapter D,</u> <u>Annex 8.2.61</u>
OSO #08 Operational procedures are defined, validated and adhered to	<input type="checkbox"/> Low <input checked="" type="checkbox"/> Medium <input type="checkbox"/> High	Document name: <u>OperationsManual.pdf</u> Chapter or Page number: <u>Chapter B,</u> <u>Chapter D,</u> <u>Annex 8.3</u>
OSO #09 Remote crew trained and current	<input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	Document name: <u>OperationsManual.pdf</u> Chapter or Page number: <u>Chapter A, 1.7</u> <u>Chapter D</u>
OSO #13 External services supporting UAS operations are adequate for the operation	<input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	Document name: <u>OperationsManual.pdf</u> Chapter or Page number: <u>Chapter B, 2.3</u> <u>Chapter B2.3</u> <u>Annex 8.1.2.4</u>
OSO #16 Multi-crew coordination	<input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	Document name: <u>OperationsManual.pdf</u> Chapter or Page number: <u>Chapter B, 2.1</u> <u>Chapter D,</u> <u>Annex 8.1.2.3</u>
OSO #17 Remote crew is fit to operate	<input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	Document name: <u>OperationsManual.pdf</u> Chapter or Page number: <u>Chapter A, 1.9</u>
OSO #18 Automatic protection of the flight envelope from human errors	<input checked="" type="checkbox"/> NR <input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	Document name: _____ Chapter or Page number: _____

OSO #19 Safe recovery from human error	<input checked="" type="checkbox"/> NR <input type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	Document name: _____ Chapter or Page number: _____
OSO #20 A human factors evaluation has been performed and the human machine interface (HMI) found appropriate for the mission	<input type="checkbox"/> NR <input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	Document name: <u>OperationsManual.pdf</u> Chapter or Page number: <u>Chapter T, 6.1.7</u> <u>Annex 8.1.3.1</u>
OSO #23 Environmental conditions for safe operations are defined, measurable and adhered to	<input checked="" type="checkbox"/> Low <input type="checkbox"/> Medium <input type="checkbox"/> High	Document name: <u>OperationsManual.pdf</u> Chapter or Page number: <u>Chapter C, 3.1</u> <u>Chapter B 2.4</u> <u>Annex 8.1.2.3</u>
OSO #24 UAS is designed and qualified for adverse environmental conditions	<input checked="" type="checkbox"/> NR <input type="checkbox"/> Medium <input type="checkbox"/> High	Document name: _____ Chapter or Page number: _____

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Confirmation	
Have all safety requirements been described and met?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Place, date	Name and signature

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