

AMC4 Article 11 Rules for conducting an operational risk assessment

PREDEFINED RISK ASSESSMENT PDRA-S01 Version 1.0

EDITION December 2020

(a) Scope

This PDRA addresses the same type of operations that are covered by the standard scenario STS-01 (Appendix 1 to the Annex to the UAS Regulation); however, it provides the UAS operator with the flexibility to use UAS that do not need to be marked as Class C5.

This PDRA addresses UAS operations that are conducted:

- (1) with UA with maximum characteristic dimensions (e.g. wingspan, rotor diameter/area or maximum distance between rotors in case of multirotor) of up to 3 m and MTOM of up to 25 kg;
- (2) in VLOS of the remote pilot;
- (3) over a controlled ground area that might be located in a populated area;
- (4) not higher than 120 m above the surface overflown (except when close to obstacles);
and
- (5) in controlled or uncontrolled airspace, provided that there is a low probability of encountering manned aircraft.

(b) PDRA characterisation and provisions

The characterisation and provisions for this PDRA are summarised in **Table PDRA-S01.1** below:

PDRA characterisation and provisions	
1. Operational characterisation (scope and limitations)	
Level of human intervention	<p>1.1 No autonomous operations: the remote pilot should have the ability to maintain control of the UA, except in case of loss of the command and control (C2) link.</p> <p>1.2 The remote pilot should operate only one UA at a time.</p> <p>1.3 The remote pilot should not operate from a moving vehicle.</p> <p>1.4 The remote pilot should not hand over the control of the UA to another command unit.</p>
UA range limit	1.5 VLOS distance from the remote pilot at all times.
Areas overflown	<p>1.6 UAS operations should be conducted over a controlled ground area.</p> <p>1.7 For the operation of a tethered UA, the area should have a radius equal to the tether length plus 5 m and should be centred on the point of the surface of the Earth where the tether is fixed.</p>
UA limitations	1.8 The UA should have an MTOM of less than 25 kg, including payload.

	<p>1.9 The UA should have a maximum characteristic dimension (e.g. wingspan, rotor diameter/area or maximum distance between rotors in case of multirotor) of less than 3 m.</p>				
Flight height limit	<p>1.10 The remote pilot should maintain the UA within 120 m from the closest point of the surface of the Earth. The measurement of the distances should be adapted according to the geographical characteristics of the terrain, such as plains, hills, and mountains.</p> <p>1.11 When flying a UA within a horizontal distance of 50 m from an artificial obstacle that is taller than 105 m, the maximum height of the UAS operation may be increased up to 15 m above the height of the obstacle, at the request of the entity responsible for the obstacle.</p> <p>1.12 The maximum height of the operational volume should not exceed by 30 m the maximum height that is allowed by points 1.10 and 1.11 above.</p>				
Airspace	<p>1.13 The UA should be operated:</p> <p>1.13.1 in uncontrolled airspace (Class F or G), unless different limitations are provided for by the Member States for their UAS geographical zones in areas where the probability of encountering manned aircraft is not low; or</p> <p>1.13.2 in controlled airspace after coordination and flight authorisation in accordance with the published procedures for the area of operation, to ensure a low probability of encountering manned aircraft.</p> <p><i>Note: An airspace with an air risk that is classified as not higher than ARC-b can be considered having a low probability of encountering manned aircraft.</i></p>				
Visibility	<p>1.14 The flight visibility should allow the remote pilot to conduct the entire flight in VLOS.</p>				
Others	<p>1.15 The UA should not be used to carry dangerous goods, except for dropping items in connection with agricultural, horticultural or forestry activities in which the carriage of the items does not contravene any other applicable regulations.</p>				
<p>2. Operational risk classification (according to the classification defined in AMC1 Article 11 of the UAS Regulation)</p>					
Final GRC	3	Final ARC	ARC-b	SAIL	II

3. Operational mitigations																		
Operational volume (see Figure 2 of AMC1 Article 11)	<p>3.1 The UAS operator should define the operational volume for the intended operation, including:</p> <p>3.1.1 the flight geography; and</p> <p>3.1.2 the contingency volume, with its external limit(s) at least 10 m beyond the limit(s) of the flight geography if the operation is conducted with untethered UA.</p> <p>3.2 To determine the operational volume, the UAS operator should consider the position-keeping capabilities of the UAS in 4D space (latitude, longitude, height, and time).</p> <p>3.3 In particular, the accuracy of the navigation solution, the flight technical error of the UAS, as well as the flight path definition error (e.g. map error) and latencies should be considered and addressed when determining the operational volume.</p> <p>3.4 The remote pilot should apply emergency procedures as soon as there is an indication that the UA may exceed the limits of the operational volume, as per point 5.1.4(d) below.</p>																	
Ground risk	<p>3.5 The UAS operator should establish a ground risk buffer to protect third parties on the ground outside the operational volume.</p> <p>3.6 For the operation of untethered UA, the ground risk buffer should cover a distance beyond the external limit(s) of the contingency area. That distance should be at least as defined below:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">Maximum height above ground</th> <th colspan="2">Minimum distance to be covered by the ground risk buffer for untethered UA</th> </tr> <tr> <th>with an MTOM of up to 10 kg</th> <th>with an MTOM of more than 10 kg</th> </tr> </thead> <tbody> <tr> <td>30 m</td> <td>10 m</td> <td>20 m</td> </tr> <tr> <td>60 m</td> <td>15 m</td> <td>30 m</td> </tr> <tr> <td>90 m</td> <td>20 m</td> <td>45 m</td> </tr> <tr> <td>120 m</td> <td>25 m</td> <td>60 m</td> </tr> </tbody> </table> <p>3.7 For the operation of tethered UA, the ground risk buffer is considered in point 1.7 above.</p>	Maximum height above ground	Minimum distance to be covered by the ground risk buffer for untethered UA		with an MTOM of up to 10 kg	with an MTOM of more than 10 kg	30 m	10 m	20 m	60 m	15 m	30 m	90 m	20 m	45 m	120 m	25 m	60 m
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Air risk	<p>3.8 The operational volume should be outside any geographical zone corresponding to a flight restriction zone of a protected aerodrome or of any other type, as defined by the responsible authority, unless the UAS operator has been granted an appropriate permission.</p> <p>3.9 Prior to the flight, the UAS operator should assess the proximity of the planned operation to manned aircraft activity.</p>																	
Observers	<p>Airspace observers (AOs): N/A.</p> <p>UA observers: refer to point 5.1.4(b) below.</p>																	

4. UAS operator and UAS operations provisions**UAS operator and UAS operations**

- 4.1** In addition to the responsibilities that are defined in point UAS.SPEC.050 of the Annex to the UAS Regulation, and the provisions for UAS operators in previous points of this AMC, the UAS operator should:
- 4.1.1** develop an operations manual (OM) (for the template, refer to AMC1 UAS.SPEC.030(3)(e) and to the complementary information in GM1 UAS.SPEC.030(3)(e));
 - 4.1.2** define the operational volume and ground risk buffer for the intended operation, as per points 3.1 to 3.6 above, and include them in the OM;
 - 4.1.3** ensure the adequacy of the contingency and emergency procedures and prove it through any of the following:
 - (a) dedicated flight tests; or
 - (b) simulations, provided that the representativeness of the simulation means is proven for the intended purpose with positive results; or
 - (c) any other means acceptable to the competent authority;
 - 4.1.4** develop an effective emergency response plan (ERP) that is suitable for the intended operation (see GM1 UAS.SPEC.030(3)(e));
 - 4.1.5** upload updated information into the geo-awareness function, if such system is installed on the UAS, when required by the UAS geographical zone for the intended location of the operation;
 - 4.1.6** ensure that before starting the operation, the controlled ground area is in place, effective, and compliant with the minimum distance that is defined in points 3.1 and 3.5 above and, when required, coordination with the appropriate authorities has been established;
 - 4.1.7** ensure that before starting the operation, all persons that are present in the controlled ground area:
 - (a) have been informed of the risks of the operation;
 - (b) have been briefed on or trained in, as appropriate, the safety precautions and measures that the UAS operator has established for their protection; and
 - (c) have explicitly agreed to participate in the operation; and
 - 4.1.8** ensure that the UAS that is used in the intended operation complies with the technical provisions of point 6 below.
- 4.2** A UAS operation under this PDRA should be conducted:
- 4.2.1** keeping the UA in VLOS of the remote pilot at all times;
 - 4.2.2** in accordance with the OM that is referred to in point 4.1.1 above;
 - 4.2.3** over a controlled ground area that comprises the area of the operational volume that is indicated in point 3.1 above and the ground risk buffer that is indicated in point 3.5 above, both projected on the surface of the Earth;
 - 4.2.4** at a ground speed of less than 5 m/s in case of untethered UA;
 - 4.2.5** by a remote pilot that complies with point 5.1 below; and
 - 4.2.6** with a UA that complies with point 6 below.

UAS maintenance	<p>4.3 The UAS maintenance instructions that are defined by the UAS operator should be included in the OM and should cover at least the UAS manufacturer’s instructions and requirements, when applicable.</p> <p>4.4 The maintenance staff should follow the UAS maintenance instructions when performing maintenance.</p>
External services	<p>4.5 The UAS operator should ensure that the level of performance for any externally provided service that is necessary for the safety of the flight is adequate for the intended operation. The UAS operator should declare that this level of performance is adequately achieved.</p> <p>4.6 The UAS operator should define and allocate the roles and responsibilities between the UAS operator and the external service provider(s), if applicable.</p>

5. Provisions for the personnel in charge of duties essential to the UAS operation**Remote pilot**

- 5.1** In addition to complying with the requirements of point UAS.SPEC.060 of the Annex to the UAS Regulation and with the provisions for remote pilots in previous points of this AMC, a remote pilot who is engaged in operations under this PDRA should:
- 5.1.1** hold a certificate of remote-pilot theoretical knowledge, in accordance with Attachment A to Chapter I of Appendix 1 to the Annex to the UAS Regulation, which is issued by the competent authority or by an entity that is designated by the competent authority of a Member State;
 - 5.1.2** hold an accreditation of completion of a practical-skill training course for this PDRA, in accordance with Attachment A to Chapter I of Appendix 1 to the Annex to the UAS Regulation, which is issued by:
 - (a) an entity that has declared compliance with the requirements of Appendix 3 to the Annex to the UAS Regulation and is recognised by the competent authority of a Member State; or
 - (b) a UAS operator that has declared to the competent authority of the Member State of registration compliance with this PDRA and with the requirements of Appendix 3 to the Annex to the UAS Regulation;
 - 5.1.3** before starting the UAS operation, verify that the means to terminate the flight of the UA as well as the remote identification system are operational; and
 - 5.1.4** during the flight:
 - (a) keep the UA in VLOS and maintain a thorough visual scan of the airspace that is surrounding the UA to avoid any risk of collision with manned aircraft; the remote pilot should discontinue the flight if the operation poses a risk to other aircraft, people, animals, environment or property;
 - (b) for the purpose of point (a) above, be possibly assisted by a UA observer; clear and effective communication should be established between the remote pilot and the UA observer;
 - (c) use the contingency procedures that are defined by the UAS operator for abnormal situations, including situations where the remote pilot has an indication that the UA may exceed the limits of the flight geography; and
 - (d) use the emergency procedures that are defined by the UAS operator for emergencies, including triggering the means to terminate the flight when the remote pilot has an indication that the UA may exceed the limits of the operational volume; the means to terminate the flight should be triggered at least 10 m before the UA reaches the limits of the operational volume.

6. Technical provisions	
UAS	<p>6.1 A UAS that is to be used in operations under this PDRA should comply with the requirements of Part 16 of the Annex to Regulation (EU) 2019/945⁵, except that <u>the UAS does not need to:</u></p> <p>6.1.1 bear a Class C3 UAS or Class C5 UAS identification on itself;</p> <p>6.1.2 be exclusively powered by electricity, if the UAS operator ensures that the environmental impact that is caused by the use of non-electric UAS is minimised;</p> <p>6.1.3 include a notice that is published by EASA and provides the applicable limitations and obligations, as required by the UAS Regulation; and</p> <p>6.1.4 include the manufacturer’s instructions for the UAS if it is privately built; however, information on its operation and maintenance, as well as on the training of the remote pilot, should be included in the OM.</p> <p><i>Note 1: The UAS can comply with point (9) of Part 4 of the Annex to Regulation (EU) 2019/945 by using an add-on that complies with Part 6 of the Annex to said Regulation.</i></p> <p><i>Note 2: If the UA does not have a physical serial number that is compliant with standard ANSI/CTA-2063-A ‘Small Unmanned Aerial Systems Serial Numbers’ and/or does not have an integrated system of direct remote identification, it can comply with point (9) of Part 4 of the Annex to Regulation (EU) 2019/945 by using an add-on that complies with Part 6 of the Annex to said Regulation.</i></p> <p><i>Note 3: If the UAS is privately built, there may be no identification on the UA of its MTOM. In that case, the operator should ensure that the MTOM of the UA, in the configuration of the UA before take-off, does not exceed 25 kg.</i></p>

Table PDRA-S01.1 — Main limitations and provisions for PDRA-S01

⁵ 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%3A32019R0945>).