


<b>Operational risk analysis overview for operations in the specific category</b> <b>PDRA – G02 Version 1.1: AMC 3 to Article 11 IR (EU) 2019/947</b>		
Data of authorised UAS and operation		
1. UAS Operator Identification (eID)		
2. Manufacturer or type certificate holder		
3. Model name		
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:	
5. Is the UAS tethered during the operation?	<input type="checkbox"/> Yes <input type="checkbox"/> No	
6. Maximum characteristic dimension (including propellers)		
7. Maximum take-off mass (MTOM) (indicated by the operator equal to or less than the manufacturer's specification)		
8. Maximum operational speed		
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:	
10. Number of type certificate or design verification report (if available)		
11. Certificate of airworthiness (if available)		
12. Number of noise certificate (if available)		
13. Short description of proposed operation including the locations	Please provide the geo-coordinates for the 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 name: _____	
Short description of proposed operation		
Place, Date	Name and Signature	

## Compliance Matrix for PDRA – G02 Version 1.1

PDRA characterisation and conditions				
Topic	Method of proof	Condition	Reference to documentation	Proof
<b>1. Operational characterisation (scope and limitations)</b>				
<b>Level of human intervention</b>	Self-declaration	1.1 No autonomous operations: the remote pilot should have the ability to maintain control of the UA, except in case of a loss of the command-and-control (C2) link.	Document name: Page number:	<input type="checkbox"/> "I declare compliance."
		1.2 The remote pilot should operate only one UA at a time.	Document name: Page number:	<input type="checkbox"/> "I declare compliance."
		1.3 The remote pilot should not operate the UA from a moving vehicle.	Document name: Page number:	<input type="checkbox"/> "I declare compliance."
		1.4 The remote pilot should not hand the control of the UA over to another command unit.	Document name: Page number:	<input type="checkbox"/> "I declare compliance."
<b>UA range limit</b>	Self-declaration	1.5 Launch/recovery: At VLOS distance from the remote pilot, if not operating from a safe prepared area.  <i>Note: 'safe prepared area' means a controlled ground area that is suitable for the safe launch/recovery of the UA.</i>	Document name: Page number:	<input type="checkbox"/> "I declare compliance."
		1.6 <u>In flight</u> : The range limit should be within the coverage of the direct C2 (radio line of sight), which ensures the safe conduct of the flight.	Document name: Page number:	<input type="checkbox"/> "I declare compliance." <input type="checkbox"/> n/a

PDRA characterisation and conditions				
Topic	Method of proof	Condition	Reference to documentation	Proof
Areas overflown	Declaration supported by data	1.7 UAS operations should be conducted over sparsely populated areas.	Document name: Page number:	<input type="checkbox"/> "I declare compliance."  <i>Please describe how population density data is identified</i>
UA limitations	Self-declaration	1.8 Maximum characteristic dimension (e.g. wingspan, rotor diameter/area or maximum distance between rotors in case of a multirotor): 3 m	Document name: Page number:	<input type="checkbox"/> "I declare compliance."
		1.9 Typical kinetic energy (as defined in paragraph 2.3.1(k) of AMC1 to Article 11 of the UAS Regulation: up to 34 kJ	Document name: Page number:	<input type="checkbox"/> "I declare compliance."
Flight height limit	Self-declaration	1.10 The maximum height of the operation volume is limited by the size of the reserved or segregated airspace.  <i>Note: In addition to the vertical limit of the operational volume, an air risk buffer is to be considered (see 'Air risk' under point 3 of this table).</i>	Document name: Page number:	<input type="checkbox"/> "I declare compliance."
Airspace	Self-declaration	1.11 Operations should only be conducted in airspace that is reserved or segregated for the purpose of conducting UAS operations (corresponding to an air risk that can be classified as ARC-a).	Document name: Page number:	<input type="checkbox"/> "I declare compliance."
Visibility	Self-declaration	1.12 If take-off and landing are conducted in VLOS of the remote pilot, the visibility should be sufficient to ensure that no people are in danger during the take-off/landing phase. The remote pilot should abort the take-off or landing in case people on the ground are in danger.	Document name: Page number:	<input type="checkbox"/> "I declare compliance." <input type="checkbox"/> n/a

PDRA characterisation and conditions					
Topic	Method of proof	Condition	Reference to documentation	Proof	
Others	Self-declaration	1.13 The UA should not be used to drop material or to carry dangerous goods, except for dropping items in connection with agricultural, horticultural or forestry activities where the carriage of such items does not contravene any other applicable regulations.	Document name: Page number:	<input type="checkbox"/> "I declare compliance."	
<b>2. Operational risk classification (according to the classification defined in AMC1 to Article 11 of the UAS Regulation)</b>					
Final GRC	3	Final ARC	ARC-b	SAIL	II
<b>3. Operational mitigations</b>					
Operational volume	Self-declaration	3.1 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).	Document name: Page number:	<input type="checkbox"/> "I declare compliance."	
		3.2 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.	Document name: Page number:	<input type="checkbox"/> "I declare compliance."	
		3.3 The remote pilot should apply the emergency procedures as soon as there is an indication that the UA may exceed the limits of the operational volume.	Document name: Page number:	<input type="checkbox"/> "I declare compliance."	
Ground risk	Self-declaration	3.4 The UAS operator should establish a ground risk buffer to protect third parties on the ground outside the operational volume. 3.4.1 The minimum criterion should be the use of the '1:1 rule' (e.g. if the UA is planned to operate at a height of 150 m, the ground risk buffer should at least be 150 m).	Document name: Page number:	<input type="checkbox"/> "I declare compliance."	

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		3.5 The operational volume and the ground risk buffer should be all contained in a sparsely populated area.	Document name: Page number:	<input type="checkbox"/> "I declare compliance."
		3.6 The applicant should evaluate the area of operations typically by means of an on-site inspection or appraisal, and should be able to justify reduced density of people at risk in the operational area and the ground risk buffer.	Document name: Page number:	<input type="checkbox"/> "I declare compliance."
Air risk	Self-declaration	3.7 The operational volume, including the air risk buffer, if applicable, should be entirely contained in the reserved or segregated airspace.	Document name: Page number:	<input type="checkbox"/> "I declare compliance."
4. UAS operator and UAS operations conditions				
UAS operator and UAS operations	Declaration supported by data	4.1 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));	Document name: Page number:	<input type="checkbox"/> "I declare compliance and that supporting evidence is included in the OM."
		4.1.2 develop procedures to ensure that the security requirements applicable to the area of operations are complied during the intended operation;	Document name: Page number:	<input type="checkbox"/> "I declare compliance and that supporting evidence is included in the OM."
		4.1.3 develop measures to protect the UAS against unlawful interference and unauthorised access;	Document name: Page number:	<input type="checkbox"/> "I declare compliance and that supporting evidence is included in the OM."

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		4.1.4 develop procedures to ensure that all operations comply with Regulation (EU) 2016/679 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data; in particular, the UAS operator should carry out a data protection impact assessment, when this is required by the data protection national authority of the Member State with regard to the application of Article 35 of that Regulation;	Document name: Page number:	<input type="checkbox"/> "I declare compliance and that supporting evidence is included in the OM."
		4.1.5 develop guidelines for its remote pilots to plan UAS operations in a manner that minimises nuisance, including noise and other emissions-related nuisance, to people and animals;	Document name: Page number:	<input type="checkbox"/> "I declare compliance and that supporting evidence is included in the OM."
		4.1.6 develop an emergency response plan (ERP) in accordance with the conditions for a 'medium' level of robustness (please refer to AMC3 UAS.SPEC.030(3)(e);	Document name: Page number:	<input type="checkbox"/> "I declare compliance and that the ERP is available to the competent authority for review."
		4.1.7 validate the operational procedures in accordance with the conditions for a 'medium' level of robustness, which are included in AMC2 UAS.SPEC.030(3)(e);	Document name: Page number:	<input type="checkbox"/> "I declare compliance and that the ERP is available to the competent authority for review."

PDRA characterisation and conditions				
Topic	Method of proof	Condition	Reference to documentation	Proof
		4.1.8 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; and	Document name: Page number:	<input type="checkbox"/> "I declare compliance and that the description for meeting this condition is available to the competent authority for review."
		4.1.9 have a policy that defines how the remote pilot and any other personnel in charge of duties essential to the UAS operation can declare themselves fit to operate before conducting any operation.	Document name: Page number:	<input type="checkbox"/> "I declare compliance and that the description for meeting this condition is available to the competent authority for review."
		4.1.10 designate for each flight a remote pilot with adequate competency and other personnel in charge of duties essential to the UAS operation if needed;	Document name: Page number:	<input type="checkbox"/> "I declare compliance and that supporting evidence is included in the OM."
		4.1.11 ensure that the UAS operation effectively uses and supports the efficient use of the radio spectrum in order to avoid harmful interference;	Document name: Page number:	<input type="checkbox"/> "I declare compliance and that supporting evidence is included in the OM."
		4.1.12 keep for a minimum of 3 years and maintain up to date a record of the information on UAS operations, including any unusual technical or operational occurrences and other data as required by the declaration or by the operational authorisation;	Document name: Page number:	<input type="checkbox"/> "I declare compliance and that record-keeping data is available to the competent authority."

PDRA characterisation and conditions				
Topic	Method of proof	Condition	Reference to documentation	Proof
		<p>4.1.13 As part of the procedures contained in the OM (point 4.1.1 above), include the description of the following:</p> <p>(a) The method and means of communication with the authority or entity responsible for the management of the airspace during the entire period of the reserved or segregated airspace being active, as mandated by the authorisation.</p> <p><i>Note: The communication method should be published in the notice to airmen (NOTAM), which activates the reserved airspace to also allow coordination with manned aircraft.</i></p> <p>(b) The member(s) of personnel in charge of duties essential to the UAS operation, who are responsible for establishing that communication.</p>	<p>Document name:</p> <p>Page number:</p>	<p><input type="checkbox"/> "I declare compliance and that evidence is available to the competent authority for review."</p>
UAS maintenance	Self-declaration	4.2 The UAS operator should:		
		4.2.1 ensure that the UAS maintenance instructions that are defined by the UAS operator are included in the OM and cover at least the UAS manufacturer's instructions and requirements when applicable.; and	<p>Document name:</p> <p>Page number:</p>	<p><input type="checkbox"/> "I declare compliance."</p>
		4.2.2 ensure that the maintenance staff follow the UAS maintenance instructions when performing maintenance;	<p>Document name:</p> <p>Page number:</p>	<p><input type="checkbox"/> "I declare compliance."</p>
		4.2.3 keep for a minimum of 3 years and maintain up to date a record of the maintenance activities conducted on the UAS;	<p>Document name:</p> <p>Page number:</p>	<p><input type="checkbox"/> "I declare compliance."</p>



PDRA characterisation and conditions				
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		4.2.4 establish and keep up to date a list of the maintenance staff employed by the operator to carry out maintenance activities;	Document name: Page number:	<input type="checkbox"/> "I declare compliance."
		4.2.5 comply with point UAS.SPEC.100, if the UAS uses certified equipment.	Document name: Page number:	<input type="checkbox"/> "I declare compliance." <input type="checkbox"/> n/a
External services	Self-declaration	4.3 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.	Document name: Page number:	<input type="checkbox"/> "I declare compliance."
		4.5 The UAS operator should define and allocate the roles and responsibilities between the UAS operator and the external service provider(s), if applicable.	Document name: Page number:	<input type="checkbox"/> "I declare compliance."
Conditions for the personnel in charge of duties essential to the UAS operation				
Remote pilot	Self-declaration	5.4 The remote pilot should:		
		5.4.1 not perform duties under the influence of psychoactive substances or alcohol, or when they are unfit to perform their tasks due to injury, fatigue, medication, sickness or other causes;	Document name: Page number:	<input type="checkbox"/> "I declare compliance."
		5.4.2 be familiar with the manufacturer’s instructions provided by the manufacturer of the UAS;	Document name: Page number:	<input type="checkbox"/> "I declare compliance."
		5.4.3 ensure that the UA remains clear of clouds;	Document name: Page number:	<input type="checkbox"/> "I declare compliance."

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		5.4.4 perform unaided visual scan of the airspace, as required, to avoid any potential collision hazard;	Document name: Page number:	<input type="checkbox"/> "I declare compliance."
		5.4.5 obtain updated information relevant to the intended operation about any geographical zones defined in accordance with Article 15; and	Document name: Page number:	<input type="checkbox"/> "I declare compliance."
		5.4.6 ensure that the UAS is in a safe condition to complete the intended flight safely and, if applicable, check whether the direct remote identification is active and up to date.	Document name: Page number:	<input type="checkbox"/> "I declare compliance."
Multi-crew coordination (MCC)	Self-declaration	Where multi-crew coordination (MCC) may be required, the UAS operator should:		
		5.5 designate a remote pilot-in-command to be responsible for each flight;	Document name: Page number:	<input type="checkbox"/> "I declare compliance." <input type="checkbox"/> n/a
		5.6 include procedures to ensure coordination between the remote crew members through robust and effective communication channels; those procedures should cover, as a minimum: 5.6.1 the assignment of tasks to the remote crew members; and 5.6.2 the establishment of step-by-step communication;	Document name: Page number:	<input type="checkbox"/> "I declare compliance." <input type="checkbox"/> n/a
		5.7 ensure that the training of the remote crew covers MCC.	Document name: Page number:	<input type="checkbox"/> "I declare compliance." <input type="checkbox"/> n/a

PDRA characterisation and conditions				
Topic	Method of proof	Condition	Reference to documentation	Proof
Maintenance staff	Declaration supported by data	5.8 Any staff member that is authorised by the UAS operator to perform maintenance activities should have been adequately trained in the documented maintenance procedures.	Document name: Page number:	<input type="checkbox"/> "I declare compliance and that supporting evidence is included in the OM."  <i>Evidence of training is available at the request of the competent authority.</i>
Personnel in charge of duties essential to the UAS operation are fit to operate	Self-declaration	5.9 The personnel in charge of duties essential to the UAS operation should declare that they are fit to operate before conducting any operation, based on the policy that is defined by the UAS operator.	Document name: Page number:	<input type="checkbox"/> "I declare compliance."
Technical conditions				
General	Self-declaration	6.1 The UAS should be equipped with means to monitor the critical parameters of a safe flight, in particular the following:		
		6.1.1 the UA position, height or altitude, ground speed or airspeed, attitude, and trajectory;	Document name: Page number:	<input type="checkbox"/> "I declare compliance."
		6.1.2 the UAS energy status (fuel, battery charge, etc.); and	Document name: Page number:	<input type="checkbox"/> "I declare compliance."
		6.1.3 the status of critical functions and systems; as a minimum, for services based on RF signals (e.g. C2 link, GNSS, etc.), means should be provided to monitor the adequate performance and trigger an alert when the performance level becomes too low.	Document name: Page number:	<input type="checkbox"/> "I declare compliance."

PDRA characterisation and conditions				
Topic	Method of proof	Condition	Reference to documentation	Proof
Human-machine interface (HMI)	Self-declaration	6.2 The UAS information and control interfaces should be clearly and succinctly presented and should not confuse, cause unreasonable fatigue, or contribute to causing any disturbance to the personnel in charge of duties essential to the UAS operation in such a way that could adversely affect the safety of the operation.	Document name: Page number:	<input type="checkbox"/> "I declare compliance."
		6.3 The UAS operator should conduct a UAS evaluation that considers and addresses human factors to determine whether the HMI is appropriate for the operation.	Document name: Page number:	<input type="checkbox"/> "I declare compliance."
C2 links and communication	Self-declaration	6.4 The UAS should comply with the applicable requirements for radio equipment and the use of the RF spectrum.	Document name: Page number:	<input type="checkbox"/> "I declare compliance."
		6.5 Protection mechanisms against interference should be used, especially if unlicensed bands (e.g. ISM) are used for the C2 link (mechanisms such as FHSS, DSSS or OFDM technologies, or frequency deconfliction by procedure).	Document name: Page number:	<input type="checkbox"/> "I declare compliance."
		6.6 The UAS should be equipped with a C2 link that is protected against unauthorised access to the command-and-control functions.	Document name: Page number:	<input type="checkbox"/> "I declare compliance."
		6.7 In case of loss of the C2 link, the UAS should have a reliable and predictable method to recover the command-and-control link of the UA or to terminate the flight in a way that reduces any undesirable effect on third parties in the air or on the ground.	Document name: Page number:	<input type="checkbox"/> "I declare compliance."

PDRA characterisation and conditions				
Topic	Method of proof	Condition	Reference to documentation	Proof
		6.8 The UAS operator should ensure that reliable and continuous means of two-way communication for the purpose that is indicated in point 4.13(a) above are available.	Document name: Page number:	<input type="checkbox"/> "I declare compliance."
Containment	Declaration supported by data	<p>6.9 To ensure a safe recovery from a technical issue that involves the UAS or an external system that supports the operation, the UAS operator should ensure that:</p> <p>6.9.1 no probable failure of the UAS or of any external system that supports the operation would lead to operation outside the operational volume; and</p> <p>6.9.2 it is reasonably expected that a fatality will not occur due to any probable failure of the UAS or of any external system that supports the operation.</p> <p><i>Note: The term 'probable' should be understood in its qualitative interpretation, i.e. 'anticipated to occur one or more times during the entire system/operational life of an item'.</i></p>	Document name: Page number:	<p><input type="checkbox"/> "I declare compliance."</p> <p><i>A design and installation appraisal is available and it covers at least:</i></p> <p>—the design and installation features (independence, separation, and redundancy); and</p> <p>—the particular risks (e.g. hail, ice, snow, electromagnetic interference, etc.) relevant to the type of operation.</p>
	Declaration supported by data	<p>6.10 The following additional conditions should apply if the adjacent area includes an assembly of people or if the adjacent airspace is classified as ARC-d (in accordance with the SORA).</p> <p>6.10.1 The UAS should be 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 competent authority such that:</p>	Document name: Page number:	<p><input type="checkbox"/> "I declare compliance." <input type="checkbox"/> n/a</p> <p><i>Analysis and/or test data with supporting evidence is available.</i></p>

PDRA characterisation and conditions				
Topic	Method of proof	Condition	Reference to documentation	Proof
		<p>6.10.1.1 the probability of the UA leaving the operational volume should be less than <math>10^{-4}</math>/FH; and</p> <p>6.10.1.2 no single failure of the UAS or of any external system that supports the operation should lead to operation outside the ground risk buffer.</p> <p><i>Note: The term 'failure' should be understood as an occurrence that affects the operation of a component, part, or element in such a way 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.</i></p> <p>6.10.2 SW and AEH whose development error(s) could directly lead to operations outside the ground risk buffer should be developed according to an industry standard or methodology that is recognised as adequate by the competent authority.</p> <p><i>Note 1: The proposed additional safety conditions cover both the integrity and the assurance levels.</i></p>		

PDRA characterisation and conditions				
Topic	Method of proof	Condition	Reference to documentation	Proof
		<i>Note 2: The proposed additional safety conditions do not imply a systematic need to develop the SW and AEH according to an industry standard or methodology that is recognised as adequate by the competent authority. For instance, if the UA design includes an <u>independent</u> engine shutdown function that systematically prevents the UA from exiting the ground risk buffer due to single failures or an SW/AEH error of the flight controls from occurring, the intent of the conditions of point 6.10.1 above could be considered met.</i>		
<b>Remote identification<sup>1</sup></b>	Self-declaration	6.11 The UAS has a unique serial number compliant with standard ANSI/CTA-2063-A-2019, <i>Small Unmanned Aerial Systems Serial Numbers</i> , 2019, according to Article 40(4) of Regulation (EU) 2019/945.	Document name: Page number:  <i>Please describe how this condition is met.</i>	<input type="checkbox"/> "I declare compliance."
		6.12 The UAS is equipped with a remote identification system according to Article 40(5) of Regulation (EU) 2019/945.	Document name: Page number:  <i>Please describe how this condition is met.</i>	<input type="checkbox"/> "I declare compliance."
<b>Lights<sup>1</sup></b>	Self-declaration	6.13 If the UAS is operated at night, it is equipped with at least one green flashing light according to point UAS.SPEC.050(1)(l)(i) of the UAS Regulation.	Document name: Page number:  <i>Please describe how this condition is met.</i>	<input type="checkbox"/> "I declare compliance." <input type="checkbox"/> n/a
<b>Place, Date</b>			<b>Name and Signature</b>	

<sup>1</sup> Applicable from 1 July 2022.