



Explanatory Note to Decision 2020/022/R

Regular update of the Acceptable Means of Compliance and Guidance Material to Regulation (EU) 2019/947

RELATED NPA 2020-07 & NPA 2020-03 DP— RMT.0730

EXECUTIVE SUMMARY

The objective of this Decision is to update the Acceptable Means of Compliance (AMC) and Guidance Material (GM) to Commission Implementing Regulation (EU) 2019/947 (the 'UAS Regulation') and to the Annex (Part-UAS) thereto, as published with Decision 2019/021/R.

The European Union Aviation Safety Agency (EASA) developed this Decision under rulemaking task (RMT).0730, which is divided into the following two subtasks:

- Subtask 1a clarifies the conditions under which unmanned aircraft system (UAS) operations over populated areas and assemblies of people can be authorised in the 'specific' category; and
- Subtask 1b ensures the interoperability of the national registration systems, which are established and maintained by the EASA Member States (MSs), for UAS operators and for certified UAS that require registration, introduces new predefined risk assessments (PDRAs), and improves the existing PDRA.

The amendments are expected to increase safety, improve harmonisation among EASA MSs, and facilitate societal acceptance of UAS operations in the 'specific' category.

Action area:	Unmanned aircraft systems (UAS)		
Related rules:	AMC & GM to Regulation (EU) 2019/947 and to Part-UAS		
Affected stakeholders:	UAS operators (private and commercial); competent authorities; EASA; remote pilots; UAS manufacturers; continuing-airworthiness organisations; design and production organisations; other airspace users (manned aircraft); general public		
Driver:	Safety	Rulemaking group:	No
Impact assessment:	Subtask 1a: Yes Subtask 1b: No	Rulemaking Procedure:	Subtask 1a: Standard Subtask 1b: Direct

EASA rulemaking process

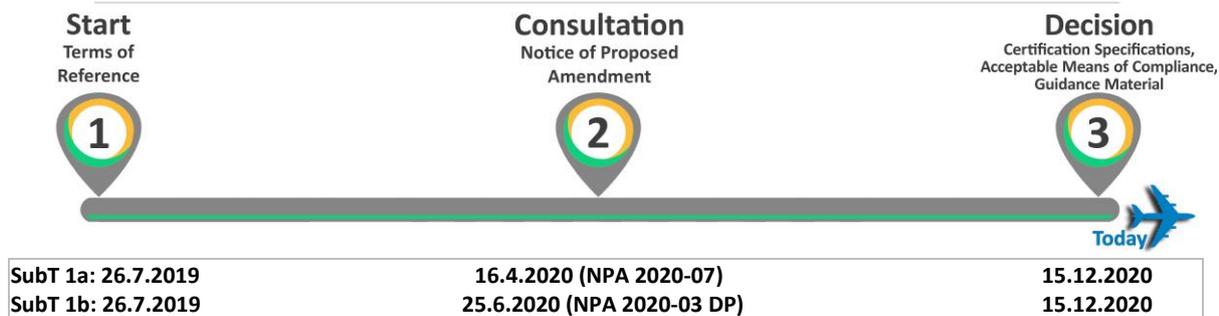


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1. About this Decision

The European Union Aviation Safety Agency (EASA) developed Executive Director (ED) Decision 2020/022/R in line with Regulation (EU) 2018/1139¹ (the ‘Basic Regulation’) and the Rulemaking Procedure².

This rulemaking activity is included in the [European Plan for Aviation Safety \(EPAS\) 2020–2024](#) under rulemaking task (RMT).0730 and divided into Subtasks 1a and 1b. The scope and timescales of the task were defined in the related Terms of Reference³.

The draft text of this Decision has been developed by EASA. It consists of two parts:

- (a) The first part (Subtask 1a) on the evaluation of the ground risk for operations over populated areas and assemblies of people was consulted with all the interested parties through Notice of Proposed Amendment (NPA) 2020-07⁴. 720 comments were received from all the interested parties, including industry, national aviation authorities (NAAs), European organisations, research centres. The comments received and EASA’s responses to them will be presented in Comment-Response Document (CRD) 2020-07⁵, which will be published in 2021.
- (b) The second part (Subtask 1b) focuses on:
 - (1) the format of registration of unmanned aircraft system (UAS) operators and of certified UAS;
 - (2) the requirements for ensuring the interoperability of the national registration systems; and
 - (3) the development of new predefined risk assessments (PDRAs) to cover UAS operations that are proposed by EASA Member States (MSs).

¹ 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/?qid=1535612134845&uri=CELEX:32018R1139>).

² EASA is bound to follow a structured rulemaking process as required by Article 115(1) of Regulation (EU) 2018/1139. Such a process has been adopted by the EASA Management Board (MB) and is referred to as the ‘Rulemaking Procedure’. See MB Decision No 18-2015 of 15 December 2015 replacing Decision 01/2012 concerning the procedure to be applied by EASA for the issuing of opinions, certification specifications and guidance material (<http://www.easa.europa.eu/the-agency/management-board/decisions/easa-mb-decision-18-2015-rulemaking-procedure>).

³ <https://www.easa.europa.eu/document-library/terms-of-reference-and-group-compositions/tor-rmt0730>

⁴ In accordance with Article 115 of Regulation (EU) 2018/1139 and Articles 6(3) and 7 of the Rulemaking Procedure.

⁵ <https://www.easa.europa.eu/document-library/comment-response-documents>



This part was consulted with the EASA Advisory Bodies (ABs) under the special rulemaking procedure ('Direct publication') of Article 15 of EASA MB Decision No 18-2015⁶. EASA reviewed the comments received on NPA 2020-03 **DP**⁷ during the AB consultation. The comments received and EASA's responses to them are summarised under Section 2.4 below.

The final text of this Decision with the acceptable means of compliance (AMC) and guidance material (GM) to Commission Implementing Regulation (EU) 2019/947⁸ (the 'UAS Regulation') and to the Annex (Part-UAS) thereto has been developed by EASA.

The major milestones of this rulemaking activity are presented on the title page.

⁶ See footnote No 2.

⁷ Please note that this special procedure NPA underwent a two-phased JARUS consultation, the second phase of which was accessible to all stakeholders and widely promoted through the JARUS members, the JARUS Stakeholder Consultation Body (SCB), and social media, to reach the widest audience possible. The JARUS working group responsible for the document evaluated the comments received, produced a comment-response document (CRD), and communicated it to the commentators. In that context, EASA considered appropriate to use the 'direct publication' special rulemaking procedure. Therefore, NPA 2020-03 **DP** was not publicly consulted and was not published on the EASA website.

⁸ Commission Implementing Regulation (EU) 2019/947 of 24 May 2019 on the rules and procedures for the operation of unmanned aircraft (OJ L 152, 11.6.2019, p. 45) (<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019R0947>).



2. In summary — why and what

2.1. Why we need to amend the AMC & GM — issue/rationale

2.1.1 UAS operations over populated areas and assemblies of people — Subtask 1a

AMC1 to Article 11 ‘Rules for conducting an operational risk assessment’ of the UAS Regulation, as published in Annex I to ED Decision 2019/021/R⁹, do not define the intrinsic unmanned aircraft system (UAS) ground risk classes (GRCs) for the following operational scenarios:

- beyond visual line of sight (BVLOS) operations over populated areas; and
- BVLOS operations over assemblies of people.

Without the intrinsic GRCs, the operational risk assessment cannot be carried out.

Moreover, additional guidance is needed to harmonise the operators’ application of the risk mitigation means.

2.1.2 UAS operator registration number and new predefined risk assessments (PDRAs) — Subtask 1b

UAS operator registration number

Article 14(4) of the UAS Regulation gives the responsibility to EASA MSs to establish a registration system for UAS operators and certified UAS, and mandates the exchange of such registration information among the EASA MSs through the repository that is referred to in Article 74 ‘Repository of information’ of the Basic Regulation. To comply with that article, EASA, with the support of a dedicated Repository Task Force¹⁰, is developing a proposal for a new regulation to establish a repository that facilitates the exchange between competent authorities of all certificates, declarations, and other information issued. The repository will also include the information on the registration of UAS operators and certified UAS.

As the UAS regulation will become applicable on 31 December 2020, before the publication of the regulation on the establishment of the repository, a coordinated solution needs to be developed, which will facilitate the interoperability of the national registration systems and be available to stakeholders by the applicability date of the UAS regulation. For this reason, during EASA Management Board (MB) meeting 2018-03, the EASA MB decided that EASA, with the support of the Repository Task Force, should develop a temporary solution. That ‘broker solution’ ensures the interoperability of the national systems for the registration of UAS operators and certified UAS until the regulation on the establishment of a repository is developed and published.

During the EASA Member States’ Advisory Body (MAB) meeting 2020-01, it was decided to propose to the EASA MSs that are willing to participate in the temporary technical solution to sign a ‘letter of

⁹ Executive Director Decision 2019/019/R of 16 September 2019 amending the Guidance Material to Regulation (EU) No 965/2012 and the Acceptable Means of Compliance and Guidance Material to Annex I (Definitions for terms used in Annexes II to VIII), Annex II (Part-ARO), Annex III (Part-ORO), Annex IV (Part-CAT), Annex V (Part-SPA), Annex VI (Part-NCC), Annex VII (Part-NCO), and Annex VIII (Part-SPO) to Commission Regulation (EU) No 965/2012 (<https://dms.easa.europa.eu/case/sfprg/Admin/Forms/AllItems.aspx>).

¹⁰ The members of the Repository Task Force were nominated by the EASA Member States’ Advisory Body (MAB) during MAB Strategy Group (MAB SG) meeting SG3-2018 and were required to report periodically to the MAB SG on the progress made. The Repository Task Force comprises representatives of some EASA MSs.

commitment'. The letter should be prepared by EASA and describe the 'broker solution' and the data protection requirements. However, for those MSs that are already part of the 'Partnership agreement', the 'letter of commitment' is replaced by incorporating its content to Annex 7 to the 'Partnership agreement'.

As MAB closely monitored the progress of this RMT and the related activities, it was considered appropriate to use the special rulemaking procedure ('Direct publication') of Article 15 of MB Decision No 18-2015.

New PDRAs

With ED Decision 2019/021/R, EASA published the first PDRA as part of the AMC & GM to the UAS Regulation.

A PDRA is a set of provisions that results from the pre-application of the specific operations risk assessment (SORA) methodology to a type of UAS operations. It helps both UAS operators to develop the package to support the application for the operational authorisation and competent authorities to assess the application.

PDRAs are means to facilitate operational authorisation for types of operations that can be considered common across the EASA MSs. Therefore, EASA is developing more PDRAs to cover further types of common operations, with the intent to publish them as soon as they are mature.

This Decision introduces three new PDRAs: one that was developed based on the Joint Authorities for Rulemaking on Unmanned Systems (JARUS), JARUS Standard Scenario (STS)-02, and two derived from the STSs that were introduced by Regulation (EU) 2020/639¹¹.

The JARUS-developed PDRA underwent a two-phased JARUS consultation: a first phase of internal consultation among the JARUS members, and a second phase of external consultation. The latter was accessible to all stakeholders and widely promoted through the JARUS members (e.g. NAAs, EASA, the European Organisation for the Safety of Air Navigation (Eurocontrol)), the JARUS Stakeholder Consultation Body (SCB), and social media channels (e.g. LinkedIn), to reach the widest audience possible. A working group within JARUS evaluated the comments received, produced a CRD, and communicated it to the commenters. Therefore, it was considered appropriate to use also for this PDRA the special rulemaking procedure ('Direct publication') of Article 15 of MB Decision No 18-2015.

The provisions that were included in the two STS-derived PDRAs and in EASA Opinion No 05/2019¹², mirror the provisions that were established in those STSs. Those provisions were developed to facilitate a simpler and faster operational authorisation process for those UAS operators that intend to conduct an operation within the same limits of the corresponding STS but using UAS without a CE class marking (e.g. privately built UAS).

Moreover, PDRA 01, which was published with the AMC & GM to the UAS Regulation on 9 October 2019 (annexed to ED Decision 2019/021/R), is slightly adapted to the amended EU

¹¹ Commission Implementing Regulation (EU) 2020/639 of 12 May 2020 amending Implementing Regulation (EU) 2019/947 as regards standard scenarios for operations executed in or beyond the visual line of sight (OJ L 150, 13.5.2020, p. 1) (<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32020R0639>)

¹² Opinion No 05/2019 'Standard scenarios for UAS operations in the 'specific' category' (<https://www.easa.europa.eu/document-library/opinions/opinion-052019>).



regulations on UAS and made consistent to the newly developed PDRAs. Those revisions did not result in any fundamental amendments that would require consultation. For this reason, the special rulemaking procedure ('Direct publication') of Article 15 of MB Decision No 18-2015 was also used in this case.

A new set of AMC & GM to the UAS Regulation will be proposed in a future NPA (planned for 2021/Q3) to reflect the amendments that were introduced to the UAS Regulation by Regulation (EU) 2020/639.

An overview of the PDRAs that are included in the AMC & GM published in Annex I to this Decision is provided in Section 2.3.

2.2. What we want to achieve — objectives

The overall objectives of the EASA system are defined in Article 1 of the Basic Regulation. This proposal will contribute to the achievement of the overall objectives by addressing the issues outlined in Section 2.1.

The specific objectives of this proposal are to:

- increase the number of types of operations that are covered under PDRAs, to facilitate the corresponding operational authorisations in a harmonised manner across the EASA MSs;
- facilitate the interoperability of the national registration systems, which are referred to in Article 14 of the UAS Regulation;
- allow for mutual access to, and exchange of, information through a 'broker solution' until the repository that is referred to in Article 74 of the Basic Regulation is established;
- increase safety, efficiency, and harmonisation in the application of the UAS Regulation;
- foster the development of the EU UAS market;
- clarify the conditions under which UAS operations over populated areas and assemblies of people can be authorised in the 'specific' category'; and
- achieve an acceptable level of safety and harmonisation among EASA Member States, as well as facilitate societal acceptance of UAS operations in the 'specific' category.

2.3. How we want to achieve it — overview of the amendments

2.3.1 UAS operations over populated areas and assemblies of people — Subtask 1a

The intrinsic GRC that is defined in Table 2 of AMC1 Article 11 'Rules for conducting an operational risk assessment' is replaced with the GRC that is proposed by JARUS in SORA version 2.0: the 'TBD' for UAS operations over populated areas and assemblies of people is removed.

The term 'populated area' is clarified for a more harmonised implementation. Although the term 'populated area' is not defined in the UAS Regulation, Table 2 of AMC1 Article 11 provides four categories of areas of operations: 'controlled ground area', 'sparsely populated area', 'populated area' and 'assemblies of people', where:

- 'controlled ground area' is defined in Article 2(21) of the UAS Regulation;



- ‘assemblies of people’ is defined in Article 2(3) of the UAS Regulation, which is complemented by the related GM Article 2(3) ‘Definitions’;
- ‘sparsely populated area’ is now defined by leveraging the definition of ‘congested area’ that is provided by Regulation (EU) No 965/2012¹³ (the ‘Air OPS Regulation’); the definition requires that sparsely populated areas are not present in the volume that is used to classify the operation; and
- ‘populated areas’ follow as a consequence.

The above approach is qualitative. A full quantitative approach may be used when JARUS publishes SORA Annex F, which is under development. EASA may adopt that document with possible adaptations that are necessary for the European setting. It is recognised that a qualitative approach may not allow to properly evaluate the risk of an operation. To support a gradual transition to a quantitative approach and correct risk estimation, EASA will publish additional GM as soon as possible.

Regarding the application of mitigation means, EASA clarified that, in order to receive the approval for the reduction of the intrinsic GRC by one point, the UAS operator should demonstrate that the risk of the operation is reduced to approximately a factor of 10 (90 % reduction) compared to the risk that had been assessed before the mitigation means were applied.

SORA guides UAS operators on how to assess the risk of the operation and how to identify the specific assurance and integrity level (SAIL) of the operation. Based on that, UAS operators should determine the level of robustness to be applied to verify the operational safety objectives (OSOs). Mitigation means may also be applied with a different level of robustness, resulting in different reductions of the risk. A robustness level may be low (for the assurance, a declaration by the UAS operator is sufficient), medium (the UAS operator needs to supplement the declaration with some data to be made available to the competent authority) or high (a third-party verification is required).

The 24 OSOs and the mitigation means cover provisions for the UAS operator, the competency of the remote pilot, and the design of the UAS.

The EU regulatory framework for aviation, as defined by the Basic Regulation, outlines the division of competences between the European Union and the MSs. According to Article 77 of said regulation, the European Union, through EASA, carries out the functions of the State of design for all types of aircraft¹⁴, including UAS. Therefore, 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 EASA MS is competent to verify compliance with the operational requirements and compliance of the personnel’s competency with those rules.

The following is a list of the UAS design elements that are identified in the AMC & GM to the UAS Regulation:

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

¹³ Commission Regulation (EU) No 965/2012 of 5 October 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (OJ L 296, 25.10.2012, p. 1) (<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32012R0965&qid=1607072856448>).

¹⁴ Except those manned aircraft that are listed in Annex 1 to the Basic Regulation.



- M1 mitigation (tethered operations): criterion #1, and M2 mitigation: criterion #1; and
- verification of the system to contain the UAS within the operational volume in accordance with Step #9 of the SORA process ('containment verification').

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 SAIL VI), a third-party verification by EASA is required according to Article 40(1)(d) of Regulation (EU) 2019/945¹⁵. The same applies to the verification of the 'enhanced containment' that is defined in point 2.5.3 (c) 'Step #9' of AMC1 Article 11, when the UAS operation meets the applicability conditions that are defined in said point. For the other OSOs and mitigation means, the competent authority defines which third party is able to verify compliance with them.

Comparing the risk that is mitigated by the design of UAS that are used at SAIL V and SAIL VI, with the risk that is mitigated by the design of aircraft used in manned aviation, we may relate those UAS with aircraft that exceed the definition of 'European light aircraft' (ELA2). For these aircraft, certification in accordance with Annex I (Part 21) to Regulation (EU) No 748/2012¹⁶ is required. This includes the requirement for a design organisation approval (DOA) and a production organisation approval (POA).

For this reason, for UAS that are intended to be operated at SAIL V and SAIL VI, EASA will issue a type certificate (TC), or a restricted type certificate (RTC), in accordance with the certification process that is defined in Part 21. The (R)TC will cover all design-related OSOs, the design-related mitigation means, and the enhanced containment verification in accordance with Step #9, if applicable. EASA believes that Part 21 requirements can apply to UAS that are operated at SAIL V and above; however, Part 21 may be slightly amended to better fit UAS. EASA will publish a related NPA in the coming years, within its rulemaking activities for the UAS certified category.

As a(n) (R)TC will be issued for UAS operations classified at SAIL V and SAIL VI, which cover all design-related OSOs, the following three changes are introduced:

- OSO #02 (UAS that are manufactured by a competent and/or proven entity) for SAIL V and SAIL VI is updated to add references to relevant subparts of Part 21 (e.g. Subpart J for design organisations and Subpart G for production organisations);
- the level of assurance for SAIL V of OSO #4 'UAS developed to authority recognised design standards', of Criterion #3 of OSO #19 'Safe recover from human error', and of OSO #20 'Human Factors evaluation' is increased, thus requiring an EASA verification, while keeping the level of integrity unchanged (i.e. 'medium'); and
- for OSO #4, a note is added to allow manufacturers that develop experimental UAS that use new technologies not to comply with design standards.

¹⁵ 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>).

¹⁶ Commission Regulation (EU) No 748/2012 of 3 August 2012 laying down implementing rules for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations (OJ L 224, 21.8.2012, p. 1) (<https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1473415871666&uri=CELEX%3A32012R0748>).

When a UAS operation is classified at a SAIL lower than V or when a mitigation means is claimed at a medium or low level of assurance, SORA does not require a third-party verification of compliance with the OSOs or with the integrity of the mitigation means. However, in such a case, Article 40(1)(d) of Regulation (EU) 2019/945 allows the competent authority that issues the operational authorisation to require the UAS operator to use a certified UAS if the associated risk is not sufficiently mitigated. EASA does not believe that the competent authority should require the use of a certified UAS when the UAS is operated at SAIL I and SAIL II. However, if a mitigation means that relies on a technical function or equipment of the UAS (e.g. a parachute) is used, the competent authority may require the UAS operator to use certified equipment. If the UAS is operated at a SAIL higher than II, the competent authority may require the use of a certified UAS, which should always be required when the SAIL is higher than IV. The competent authority should also specify in the terms of approval of the light UAS operator certificate (LUC) the need to use a UAS with an EASA TC, when conducting operations at SAIL V and VI. For operations that are conducted at SAIL III and IV, the competent authority should specify if the LUC holder is required to use a UAS with an EASA TC. However, EASA recommends that in order to facilitate harmonisation among EASA Member States, competent authorities should always require LUC holders to use UAS with an EASA TC, when operating at SAIL III and IV.

In that case, EASA will verify if the design integrity level achieved is appropriate to the related SAIL and mitigation means, and, if applicable, will issue a TC (or an 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. In addition, a manufacturer may voluntarily apply to EASA for the certification of a UAS, either to avoid sharing technical data of the UAS with the operator or for business reasons. When a UAS is issued an EASA TC, the UAS operator will rely on EASA's TC and, in this case, does not need to provide to the competent authority evidence of compliance for all design-related aspects. The competent authority will address the verification of compliance of the remaining (non-design related) OSOs and mitigation means. For operations at a SAIL lower than V, if the competent authority does not require to use a certified UAS, the UAS operator must declare that the UAS complies with the design-related OSOs and mitigation means. In that case, the competent authority is satisfied with the declaration of compliance and the operator will assume responsibility for compliance of the UAS with the associated design requirements.

EASA is aware that the Part 21 provisions on the organisational and certification processes are not appropriate for UAS that are operated in the specific category at a SAIL lower than V. Comparing the risk that is mitigated by the design of UAS that are used at SAIL III and IV, with the risk that is mitigated by the design of aircraft used in manned aviation, we may relate those UAS with aircraft that meet the definition of ELA2. For these manned aircraft, EASA is developing a new annex to Regulation (EU) No 748/2012, Part 21 Light¹⁷. Part 21 Light will provide for a simplified process for the certification of manned aircraft up to the ELA2 category and for the acceptability of design and production organisations that declare their compliance with the organisational requirements. A related Opinion is planned to be published by 2021/Q1. EASA intends to propose the development of a new regulation in 2021, which will use a similar approach for the certification of UAS that are operated in the specific category at SAIL III and SAIL IV.

¹⁷ <https://www.easa.europa.eu/domains/general-aviation/general-aviation-road-map/part-21-light-making-design-manufacturing-easier>

Some consideration was also given to the continuing airworthiness of certified UAS. This is covered by some high-level provisions of OSO #03. As required by Article 40(2) of Regulation (EU) 2019/945, when the competent authority requires the certification of a UAS that is operated in the specific category, then the continuing airworthiness of that UAS needs to comply with the applicable requirements of Regulation (EU) No 1321/2014¹⁸. However, said regulation was not originally developed for UAS, and in accordance with Article 58 of the Basic Regulation, the continuing airworthiness of UAS should be regulated by a delegated regulation, while Regulation (EU) No 1321/2014 is an implementing regulation.

Therefore, EASA decided to regulate the continuing airworthiness of certified UAS that are operated in the specific categories at SAIL III and SAIL IV together with the initial airworthiness of these UAS, as mentioned above. Such delegated regulation is expected to comprise three annexes:

— Annex I

Annex I on initial airworthiness will be based on the light certification process that is proposed in Part 21 Light. It will follow a more proportionate approach, taking into consideration the potential smaller UAS that are operated in this category, thus allowing small start-ups to enter the business (e.g. allow limited commercial operations only with a permit to fly). According to Annex I, EASA will be the competent authority for design.

— Annex II

Annex II will introduce standards for continuing airworthiness, building on Part-ML (Annex Vb to Regulation (EU) No 1321/2104) standards and adapting them to UAS.

— Annex III

Annex III will include requirements for combined-airworthiness organisations, building on and adapting Part-CAO (Annex Vd to Regulation (EU) No 1321/2104) to allow such organisations to declare their capability (i.e. declared organisations). Such declared organisations could be involved in the continuing airworthiness management of UAS, their maintenance, or production, or a combination of those, by issuing a single declaration and being subject to single oversight.

EASA intends to develop internally a draft delegated regulation and consult the affected stakeholders before the publication of the related opinion. The delegated regulation will be accompanied by an implementing regulation that will include the competent authority requirements. The related EASA opinion is expected to be published in 2021, using the special rulemaking procedure ('Accelerated procedure') of Article 16 of EASA MB Decision No 18-2015. In the meantime, regulatory material or guidelines will be published by the end of 2020 to clarify how proportionate requirements may already apply to the certification process and to initial- and continuing-airworthiness organisations.

The safety of UAS operations at SAIL I and SAIL II is mostly guaranteed through operational mitigations, which ensure that the UAS operate in volumes that pose a low risk. In that case, SORA

¹⁸ Commission Regulation (EU) No 1321/2014 of 26 November 2014 on the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and on the approval of organisations and personnel involved in these tasks (OJ L 362, 17.12.2014, p. 1) (<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv%3AOJ.L.2014.362.01.0001.01.ENG&toc=OJ%3AL%3A2014%3A362%3AFULL>).

does not even mandate operators to use UAS that are designed in accordance with accepted standards. However, if the risk of the adjacent area is higher, Step #9 stipulates that ‘enhanced containment’ verification must be applied and defines three safety provisions. In that case, compliance with an accepted standard is required.



2.3.2 UAS operator registration number and new PDRAs — Subtask 1b

UAS operator registration number

The business specifications of the ‘broker solution’ (exchange of information on registration of UAS operators and of certified UAS), which was prepared by the Repository Task Force, identify the requirements for EASA MSs to develop an interoperable registration system and for EASA to allow the exchange of information. Those specifications, which were shared with the MSs in January 2020, define the format of the messages to be exchanged between EASA MSs to ensure interoperability, as well as the format of the UAS operator registration number. The information on the format of the messages was introduced through the ‘letter of commitment’ and ‘partnership agreement’, sent to all EASA MSs. However, the format of the UAS operator registration number is introduced through this Decision as AMC1 Article 14(6) ‘Registration of UAS operators and ‘certified’ UAS’. According to Regulation (EU) 2019/945, UAS manufacturers are required to develop UAS that are capable of checking the validity of the UAS registration number. The new AMC & GM focus mainly on:

- the structure of the UAS operator registration number that is issued by an EASA MS; and
- the additional information to be provided by the EASA MS at the time of registration.

Moreover, this Decision amends the existing AMC1 Article 14(8) ‘Registration of UAS operators and ‘certified’ UAS’ to keep the terminology harmonised and introduces a new GM1 to AMC1 Article 14(6) ‘Registration of UAS operators and ‘certified’ UAS’ to provide examples of the meaning of ‘accuracy’ in the national registration systems.

New PDRAs

This Decision introduces two new PDRAs that are derived from the published STSs. To distinguish between them and those that are not derived from an STS, the letter ‘S’ is inserted to the PDRA identifier (e.g. PDRA-S01) while the letter ‘G’ (‘generic’) is inserted to the identifier of any other PDRA (e.g. PDRA-G01). The PDRAs included in this Decision are described below. GM1 to AMC1 Article 11 ‘Rules for conducting an operational risk assessment’ is amended to explain the two types of PDRA (i.e. generic PDRAs and those resulting from an STS) and update its list of published PDRAs.

PDRA-S01, which mirrors STS-01, addresses UAS operations that:

- are conducted in visual line of sight (VLOS) of the remote pilot, over a controlled ground area that might be located in a populated area, not higher than 120 m above the surface overflow (except when close to obstacles), and in controlled or uncontrolled airspace, provided that there is a low probability of encountering manned aircraft¹⁹;
- are conducted by a remote pilot with a level of competency equivalent to the one defined in STS-01; and
- use UAS with a maximum characteristic dimension²⁰ of up to 3 m and take-off mass (including payload) of up to 25 kg, which comply with the technical requirements that are listed for Class C5 in Regulation (EU) 2019/945, except that:

¹⁹ A low probability of encountering manned aircraft means that classifying the air risk as not higher than air risk class ARC-b can be considered appropriate for the airspace where operations are intended to be conducted in accordance with the rules of the EASA MS of operations.

²⁰ E.g. wingspan, rotor diameter/area, or maximum distance between the rotors in case of multirotor.

- the UAS does not need to be marked as Class C5 (e.g. it may be privately built);
- the UAS does not need to 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;
- the remote identification system does not need to be direct (it may be a network-based one) and embedded in the UAS (e.g. it may be an add-on); one of the two options of the remote identification system is always required, and the competent authority mandates the appropriate one through the operational authorisation;
- no information notice that is published by EASA and provides the applicable limitations and obligations is required; and
- if the UAS is privately built, manufacturer's instructions for the UAS are not required, but all the relevant information for its operation and maintenance should be included in the operations manual (OM).

PDRA-S02, which mirrors STS-02, addresses UAS operations that:

- are conducted up to 2 km from the remote pilot if airspace observers are employed, or otherwise up to 1 km, over a controlled ground area that is entirely located in a sparsely populated area, not higher than 120 m above the surface overflown (except when close to obstacles), and in controlled or uncontrolled airspace, provided that there is a low probability of encountering manned aircraft;
- are conducted by a remote pilot with a level of competency equivalent to the one defined in STS-02; and
- use UAS with a maximum characteristic dimension of up to 3 m and take-off mass (including payload) of up to 25 kg, which comply with the technical requirements that are listed for Class C6 in Regulation (EU) 2019/945, except for the above-indicated aspects for PDRA-S01 (where class C6 is to be considered instead of class C5, with regard to the CE marking).

PDRA-G02, resulting from JARUS STS-02 that was slightly amended to adapt to the EU regulatory framework, addresses UAS operations that:

- are conducted beyond visual line of sight (BVLOS) of the remote pilot, over sparsely populated areas, in airspace that is reserved for UAS operations; and
- use a UAS with a maximum characteristic dimension of up to 3 m and typical kinetic energy of up to 34 kJ.

PDRA-G01 (former PDRA-01 in ED Decision 2019/021/R) is amended to correct some errors and ensure consistency with the new PDRAs:

- indicating the responsible party (e.g. UAS operator) in provisions where it was not explicit;
- allowing to not operate in VLOS of the remote pilot when launching or recovering the UAS, if the UAS is operated from a safe prepared area as under PDRA-G02;
- updating it based on the amendments that are introduced by Regulation (EU) 2020/639 (e.g. a number of requirements for personnel records and maintenance are now included in point



- UAS.SPEC.050 of the Annex to the UAS Regulation; ‘visual observer’ (VO) is renamed ‘airspace observer’ (AO);
- modifying the current provision for the activation of emergency procedures if the UAS flies outside the operational volume by stating that such activation should take place as soon as there is an indication that the UAS may exceed the limits of the operational volume (in line with the corresponding requirement in the STS);
 - moving provisions for the UAS operator on the AOs from the ‘Observers’ section of point 3 ‘Operational mitigations’ to the ‘UAS operator and UAS operations’ section of point 4 ‘UAS operator and UAS operation provisions’, for consistency;
 - assigning to the UAS operator, instead of the remote pilot, the responsibility to ensure the correct placement and number of AOs, when employed; this is in line with STS-02, for which, following consultation, it was concluded that the responsibility should be on the UAS operator, who may decide to delegate it to the remote pilot;
 - replacing ‘applicant’ by ‘UAS operator’ in several instances (legacy term from the JARUS document) to avoid confusion; the authorisation for the operation is granted to the UAS operator that is responsible for the UAS operation (however, the UAS operator may contract another organisation to satisfy all the requirements that are imposed by the competent authority);
 - replacing ‘remote crew’ (not defined in the regulations) by ‘remote pilot and any other personnel in charge of duties essential to the UAS operation’ (defined in Regulation (EU) 2020/639); and
 - amending one of the provisions for the AOs’ main responsibilities in Appendix A²¹ to this PDRA, to align the wording with the corresponding provision in PDRA-S02 (thus, aligning it with STS-02 of Regulation (EU) 2020/639).

2.3.3 Additional amendments

Based on some comments received during the publication consultation of NPA 2020-07 and the AB consultation of NPA 2020-03 **DP**, the following additional amendments to AMC1 Article 11 are introduced. They include minor adjustments, clarifications of notions, harmonisation of wording, and corrections of word omissions or picture duplications.

- Figure 3 ‘The SORA process’ of point 2.2 is amended to replace the content of the last box to better specify the outcome of the SORA process. It does not address the risk of damage to critical infrastructure; therefore, an additional risk assessment of the critical infrastructure needs to be performed.
- The term ‘area of operation’ that is used in Section 2.3.1(h) is not explicitly defined (however, this is implicitly done in Section 2.3.1(c)). Section 2.3.1(c) is thus amended to clarify that the ‘area at risk when conducting the operation’ can also be called the ‘area of operation’. Section 2.3.1(h) is also amended to introduce a reference to Section 2.3.1(c), where the term ‘area of operation’ is defined.

²¹ Appendix A to AMC2 Article 11 ‘The personnel in charge of duties essential to the UAS operation’.

- In Section 2.3.1(h), the word ‘no’ is missing from the sentence ‘the assurance that there will be uninvolved persons in the area of operation is under the full responsibility of the UAS operator’. This is a significant omission as the intended meaning of the sentence is the opposite. Hence, Section 2.3.1(h) is modified by adding the word ‘no’ before ‘uninvolved persons’.
- In Section 2.5.2, the existing footnote 1 refers to Section 3.2.11(a), which does not exist. The footnote is replaced by specifying in the rule text that in case of experimental operation, the use of standards for the design may not be required.
- In Section 2.5.3, the footnote related to ‘single failure’ is incorrect. It is updated to reflect the one that is defined in the JARUS SORA.
- In Annex E, the text on the high level of assurance for design-related OSOs was not harmonised. Therefore, the following new text is inserted: ‘[...] is demonstrated by the certification of the UAS, which is issued by EASA in accordance with Article 40(1)(d) of Regulation (EU) 2019/945’.
- The term ‘populated environment’ is not used consistently and could lead to misinterpretation. Therefore, it is replaced with ‘populated area’.
- In Annex C, there is a duplication of Figure C.5. Therefore, the duplicate of the figure is deleted.

Finally, the templates for the application and for the issuance of an operational authorisation that are included in AMC1 UAS.SPEC.030(2) ‘Application for an operational authorisation’ and in AMC1 UAS.SPEC.040(1) ‘Operational authorisation’ are updated by:

- adding a field to include, when required by the competent authority, the ‘Type certificate’ number of the UAS, which is issued by EASA, as well as the ‘certificate of airworthiness’ and the ‘noise certificate’ numbers, which are issued by the competent authority;
- adding a field to define the continuing airworthiness requirements that the UAS operator is required to comply with; and
- replacing the ‘4.9 Duration of the authorisation’ field with ‘4.9. Expiry date’ to facilitate and accelerate the validity check of the operational authorisation that will be executed, for example, by the enforcement authority.

2.4. What are the stakeholders’ views

2.4.1 UAS operations over populated areas — Subtask 1a

NPA 2020-07 generated a large number of comments as explained in Chapter 1. The text of AMC1 Article 11 was therefore substantially revised to accommodate those comments. The related CRD 07-2020 that includes the comments received and EASA’s responses to them will be published in 2021.

2.4.2 UAS operator registration number and new PDRAs — Subtask 1b

The parts of AMC1 Article 14 that are related to the UAS operator registration number and to the new PDRAs, as explained in Chapter 1, were consulted with the EASA ABs.



UAS operator registration number

No major comments were received on the text of the AMC & GM to Article 14 of the UAS Regulation. Most comments were on the explanatory part of NPA 2020-03 **DP** requesting to clarify that the ‘broker solution’ is temporary and will be replaced at a later stage by the ‘Repository of information’ that is referred to in Article 74 of the Basic Regulation. No other changes that affect the format of the registration of UAS operators and of certified UAS, as proposed in NPA 2020-03 **DP**, were introduced.

New PDRAs

The main comments received on the new proposed PDRAs are the following:

- A commenter requested to clarify the differences in criteria among the PDRAs as, for example, some PRDAs refer to mass limits and others to kinetic-energy limits. ‘Generic’ PDRAs (whose identifier starts with a G, e.g. G-01) include generic provisions that, in terms of UAS characteristics for GRCs, include the same parameters as in SORA (e.g. kinetic energy). On the contrary, PDRAs that stem from STSs (whose identifier starts with an S, e.g. S-01) include provisions that mirror those in the corresponding STSs, which are therefore as prescriptive as those of the STSs (they were developed taking into account the limitations that are established in EASA MSs for existing UAS operations that will be conducted under STSs).
- The proposed PDRAs were not addressing all potential BVLOS operations, and the use of airspace observers (AOs) is not suitable for many of those operations. EASA reminds the commenters that PDRAs are being developed for the most common operations that are currently conducted in the European Union, as well as for those that have been proposed by EASA MSs, which are expected to be conducted in the near future. More PDRAs are being developed, which also address BVLOS operations without the use of AOs.
- It was requested to clarify the use of the terms ‘reserved airspace’ and ‘restricted airspace’. PDRA-02 includes the same terminology that is used in the corresponding JARUS PDRA (published as JARUS STS-02), where ‘dangerous areas’ are included in the scope of the PDRA, as part of the reserved airspace. However, ‘dangerous areas’ (together with ‘prohibited areas’ and ‘restricted areas’) are part of the ‘restricted airspace’ and not part of the ‘reserved airspace’. In addition, one of the PDRAs that are planned to be published in the next NPA (expected to be published in 2021/Q3) allows to use an airspace that is either reserved or restricted to conduct the intended UAS operation. Since that scope is also deemed appropriate for PDRA-G02, an amendment to that PDRA is planned to be included in the next NPA that will be subject to consultation.
- It was also requested to include a reference to the UAS operator’s responsibility for ensuring the airspace reservation, if applicable, in accordance with a ‘flexible use of airspace’ (FUA), as referred to in the Basic Regulation. EASA reminds the commenter that the UAS Regulation already requires UAS operators to comply with the applicable national regulations and other EU regulations. If the intended UAS operations are planned to be conducted in a reserved or restricted airspace, the applicant must demonstrate compliance with those regulations and relevant procedures, to be granted the operational authorisation.
- A commenter requested to clarify the low risk of encounter with manned aircraft, in particular in relation to airspace associated with aerodromes, and to quantify the classification criteria



for risk of encounter. PDRAs already include clarification when referring to ‘low risk of encounter’. EASA reminds the commenters that point UAS.SPEC.020 of the Annex to the UAS regulation includes airspace requirements that are applicable to all STS. In particular, point UAS.SPEC.020 (1)(b)(ii) indicates that UAS operations may be performed ‘[...]in controlled airspace, in accordance with published procedures for the area of operation, so that a low probability of encountering manned aircraft is ensured’. Furthermore, a new AMC will be included in the next amendment of the AMC & GM to the UAS Regulation, which will associate such ‘low risk of encounter’ with an air risk class (ARC) not higher than ARC-b as per AMC1 Article 11 to the UAS regulation. Regarding the quantification criteria, EASA expects to include them in the AMC & GM as soon as such criteria are available.

- It was also requested to clarify how to establish an adequate air risk buffer. From the analysis of the comment, it was concluded that an air risk buffer should be established if an adjacent airspace is classified as ARC-d (high risk of encounter) or if the competent authority requires it based on the actual risk posed by the intended operation. An amendment of the current PDRAs is planned to be included in the next NPA. At a later stage, EASA may provide guidance on the criteria for establishing an adequate air risk buffer, based on the one hand on the experience of EASA MSs on operational authorisations and on the other hand on the work that is being developed by JARUS in the context of SORA.
- A commenter requested to clarify how flight visibility is to be assessed. EASA will propose GM on this matter in the next NPA on AMC & GM to the UAS regulation.
- EASA was requested to replace the field ‘visibility’ by ‘meteorological conditions’ in the table ‘PDRA characterisation and provisions’ of AMC2 Article 11 ‘Rules for conducting an operational risk assessment’. The meteorological conditions that are required for a safe operation need to be assessed by the UAS operator and be included in the relevant manuals (OM, UAS manufacturer instructions, or flight manual, if applicable). Limitations and particular conditions that are derived from that assessment are expected to vary with the specificities of each UAS operation and, therefore, no such conditions are included in the PDRA table, except for operational limitations on visibility, which are applicable to all operations under the PDRA. For example, a provision on a minimum flight visibility of 5 km may be established for all UAS operations in a PDRA (e.g. as per point 1.14 of Table PDRA-S02.1). However, it does not seem reasonable to establish limitations for maximum wind (e.g. a limit of 10 m/s (cross)wind at take-off may be acceptable for some UAS and too restrictive for others).
- EASA was further requested to include a provision for increasing awareness of the meteorological conditions and mitigating actions in UAS operations within a longer range. EASA reminds the commenter that the conditions that affect the safety of operations, including the meteorological conditions, need to be considered by the UAS operator. The UAS operator should give meteorological conditions special consideration and reflect the necessary measures and procedures in the OM. The AMC & GM for the OM template include these aspects: e.g. existing GM points to ‘environmental and weather conditions’ and ‘procedures to cope with adverse operating conditions’. To be granted the operational authorisation, the UAS operator must prove the adequacy and completeness of such an assessment and OM to the competent authority.



- It was requested to include meteorological training and competence in UAS operations. EASA reminds the commenter that in addition to Appendix A to AMC2 Article 11, which includes a specific point about basic competencies in ‘meteorology’, there is also GM1 UAS.SPEC.050(1)(d) ‘Responsibilities of the UAS operator THEORETICAL KNOWLEDGE SUBJECTS FOR REMOTE PILOT TRAINING FOR THE ‘SPECIFIC’CATEGORY’, which includes more details on this subject. Regarding training and assessment, an update of said Appendix A is planned in the next NPA on AMC & GM to the UAS Regulation, which will provide further guidance that will cover all areas of knowledge and not only meteorology.
- A request to clarify the rationale behind the ‘1:1 rule’ for varying meteorological conditions was received. EASA reminds the commenter that the ‘1:1 rule’ is included in SORA as a ‘low robustness’ criterion for M1 mitigation (‘strategic mitigation for ground risk’) and, as indicated in SORA and the PDRAs, the value to be considered should be ‘at least’ that 1:1 rule/criterion. However, UAS operators, based on the UAS characteristics and external conditions (including meteorological conditions, e.g. wind), may have to consider a larger ground risk buffer. Moreover, such ground risk buffer is for emergencies, whereas for contingencies (e.g. the UAS drifted away due to strong wind/gust), the UAS operator needs to define a contingency volume within the operational volume, to ensure that the UAS is contained in it.
- EASA was further requested to clarify the ‘controlled ground area’ and how it relates to the operational volume and ground risk buffer. EASA reminds the commenter that these concepts are defined in the UAS regulation. However, GM including a notional figure that relates these concepts will be provided in the next amendment of the AMC & GM to the UAS regulation.
- As per PDRA-G02, coordination with manned aviation is assigned to the remote pilot, which may not be feasible. EASA agrees and places on the UAS operator the responsibility to allocate that coordination to the most appropriate actor. Furthermore, the communication method and the allocation of responsibility are moved to point 4.1 ‘UAS operator and UAS operations’ of the PDRA-G02 table, whereas the provision for the means of communication is retained in point 6.7 of the same table.
- A commenter requested to reconsider/amend some of the provisions of PDRA-S01 & PDRA-S02. EASA reminds the commenter that those provisions stem from the corresponding STS-01 & STS-02, which are already approved and published.
- Another commenter requested to amend the provision for privately built UAS in PDRAS-01 & PDRAS-02 to include in the OM the same information as for class C5 and class C6 UAS, which is required for operation, training, and maintenance in the corresponding STS. The amendment is introduced as proposed.
- EASA was requested to include a list of documents that the UAS operator is expected to submit for the operational authorisation. EASA may develop GM on the requested documentation for operational authorisations, based on the EASA MSS’ experience; however, point UAS.SPEC.030 (3) of the Annex to the UAS Regulation and the associated AMC & GM already indicate the main documentation to be provided together with the application for such an authorisation.
- Finally, it was requested to clarify why there is a field for ‘observers’ instead of ‘AOs’ on the PDRA tables. This field of the PDRA tables’ templates is named ‘Observers’, as it may include



provisions for visual observers (VOs) and/or AOs, despite the fact that the provisions included in the PDRAs of this Decision are only for AOs.

2.5. What are the benefits and drawbacks

Based on the amendments to the AMC & GM to the UAS Regulation, the risk assessment of operations that are conducted over populated areas and assemblies of people will be harmonised, thus providing additional guidance for a more uniform application of the mitigation means. AMC1 Article 11 to the UAS regulation reflects better the division of competencies between EASA and the EASA MSs, which is stipulated by the Basic Regulation. The option for EASA MSs to require the use of EASA-certified UAS also for an operation at a SAIL lower than V is now fully clarified.

The introduction of the new AMC to Article 14 of the UAS Regulation is expected to enhance the interoperability of the national registration systems and the exchange of information between EASA MSs. Until now, interoperability is achieved only by establishing a uniform format and structure of the messages exchanged between EASA MSs through the ‘broker solution’.

The addition of three new PDRAs is expected to benefit UAS operators and competent authorities by facilitating operational authorisations for a considerable number of common UAS operations.

The PDRAs that mirror STSs, as their provisions stem from those STSs, have the same level of prescriptiveness as the corresponding STSs. Therefore, despite addressing UAS operations that are subject to operational authorisations (to enable the use of UAS without a class identification label for the verification of the technical requirements), it is expected that those PDRAs will provide an even more simplified authorisation process compared to non-STs-related PDRAs. For UAS operations that are conducted under those PDRAs, the national competent authorities may follow expedited operational-authorisation processes that are based on the review of the documentation submitted by the UAS operator in support of its declaration of compliance that includes the provisions of the PDRA. The national competent authorities should in any case evaluate whether the UAS that is used meets the technical conditions at a satisfactory level.

Additionally, the amendments to the first published PDRA (former PDRA-01) improves harmonisation with the amended UAS Regulation and consistency with the other PDRAs.

No drawbacks were identified.



3. How do we monitor and evaluate the rules

Monitoring is a continuous and systematic process of data collection and analysis about the implementation/application of a rule/activity. It generates factual information for future possible evaluations and impact assessments; it also helps to identify actual implementation problems. The following indicators will be checked:

What to monitor	How to monitor	Who should monitor	How often to monitor
Occurrences, incidents, and accidents involving UAS that conduct BVLOS operations over a populated area and an assembly of people.	European Co-ordination Centre for Accident and Incident Reporting Systems (ECCAIRS).	EASA and/or NAAs.	On a recurrent, e.g. yearly, basis.



4. References

4.1. Related regulations

- Commission Implementing Regulation (EU) 2019/947 of 24 May 2019 on the rules and procedures for the operation of unmanned aircraft (OJ L 152, 11.6.2019, p. 45)
- Commission Implementing Regulation (EU) 2020/639 of 12 May 2020 amending Implementing Regulation (EU) 2019/947 as regards standard scenarios for operations executed in or beyond the visual line of sight (OJ L 150, 13.5.2020, p. 1)

4.2. Related decisions

Executive Director Decision 2019/021/R of 9 October 2019 issuing Acceptable Means of Compliance and Guidance Material to Commission Implementing Regulation (EU) No 2019/947 ‘Rules and procedures for the operation of unmanned aircraft’

4.3. Other reference documents

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)



5. Related document

CRD 2020-07, as explained in Chapter 1 and Section 2.4.1, will be published in 2021.

