

# European Common Rules on Drones Become Applicable

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## 1. EU Classes of civil drones

Based on Article 58 of the new EASA Basic Regulation (NBR)(1), the European Commission (EC) on 12 March 2019 adopted the Delegated Regulation 2019/945 (2) for putting small UAS on the European internal market. Key features of this Regulation are:

- a) Small Unmanned Aircraft (UA) are those whose Maximum Take-Off Mass (MTOM), comprising payload (e.g. camera) and batteries is no more than 25 Kg;
- b) Technical specifications for these aircraft will not be published by EASA, but will be (Art. 12) “harmonised standards” or parts thereof, the references of which have been published in the Official Journal of the European Union;
- c) DG-ENTR has given a mandate to ASD-STAN to develop such technical specifications for five “Classes” of drones intended for the civil market (see Table 1);
- d) ASD-STAN is an “Associated Body” of CEN, which is in turn one of the three European Standardisation Organisations (ESO), officially recognized as competent in the area of voluntary technical standardisation by the EU Legislator (3);
- e) Delegated Regulation is not only based on EASA NBR, but also on the Regulation on the internal market (4).

ISO Level	MTOM (Kg)	EU UA Class
<b>I</b>	$0 < \text{mass} \leq 0.250$	<b>C0</b>
<b>II</b>	$0.250 < \text{mass} \leq 0.900$	<b>C1</b>
<b>III</b>	$0.900 < \text{mass} \leq 4$	<b>C2</b>
<b>IV</b>	$4 < \text{mass} \leq 25$	<b>C3 and C4</b>
<b>V</b>	$25 < \text{mass} \leq 150$	Not applicable
<b>VI</b>	$150 < \text{mass}$	Not applicable

**TABLE 1: UA mass classification in ISO 21895 and EU UA “Classes”**

In summary, this Delegated Act allows to regulate not only manufacturers of small drones established in the EU, but also manufactures established anywhere in the world (e.g. China) if wishing to sell their products in the EU internal market. And in fact, the need to address Chinese manufacturers was one the main reasons for departing from the aviation tradition (i.e. Type Certificate – TC, issued by EASA) for small UAS. Other reasons are that a TC jmwould be disproportionate for a small UAS of few kg flying within Visual Line Of Sight (VLOS) from the remote pilot and that it would be unnecessary to overload Authorities for verifying conformity of these small aircraft. Indeed, to verify conformity, the main tool is a declaration signed by the manufacturer and based on one of the processes (“modules”) established by the EU Council (5).

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The views expressed are purely those of the author (and thus may not in any circumstances be regarded as an official position of either EuroUSC or University “Giustino Fortunato”).



**FIGURE 1: CE Mark**

This declaration, which gives the privilege of affixing the “CE” mark on the product and on the packaging, may be backed by a certificate issued not by an aviation authority, but by an independent, competent and accredited third party. DG-ENTR has already accredited thousands of such “notified bodies” (6), although none yet for this specific activity, pending the availability of the “harmonised standards”.

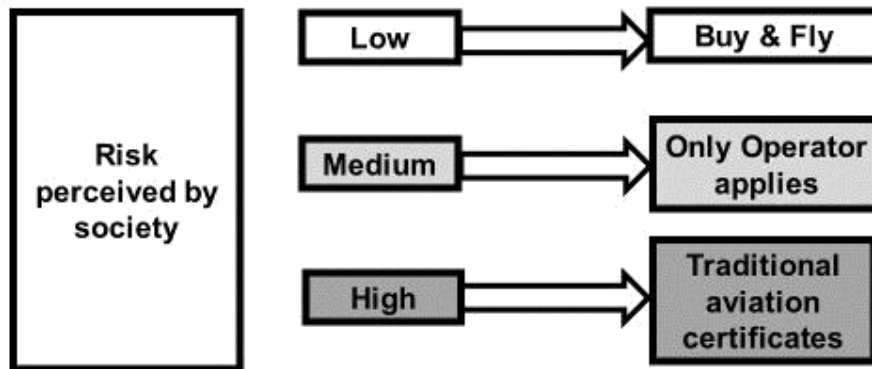
## 2. EU Categories of UA operations

Furthermore, based on Article 57 of EASA NBR, the EC has also adopted, on 24 May 2019 Implementing Act 2019/947 (7) on “operations” of UA. In this act, three “categories” of UA operations are mentioned, not to be confused with the “classes” of the drones in Regulation 2019/945. The categories of operation in fact, are based on the safety risk perceived by the society, which is of course not assessed using mathematical formulas, but through political judgment at the level of the EU Institutions. In this perspective there are three risk categories:

- a) Low risk (“open” category) in which no prior approval by the competent aviation authority is required before flying the UA, since the safety risk perceived by the society is negligible (e.g. a drone of few hundred grams flown in VLOS over urban areas, with shrouds around the propellers, but also a drone of 25 kg flown by a farmer, still in VLOS, over her/his field in rural areas); this category is also labelled by some experts as “buy and fly”; the five “classes” of drones mentioned above are eligible to fly in this category, which is further subdivided in sub-categories;
- b) Medium risk, alias “specific” category, like a drone of 10 kg over urban areas or flying Beyond VLOS, in which case an assessment of the safety risk and demonstration of implementation of the identified mitigations is always necessary; the five “classes” of drones are not intended to fly in this category, although the risk assessment may demonstrate that in some cases this could be feasible;
- c) High risk, alias “certified” category, like air-taxis for Urban Air Mobility (UAM), which consist in rotorcraft carrying on-board few paying passengers, in which case all the traditional aviation approvals would be required (namely licence for the remote pilot; certificate of airworthiness for the aircraft and certificate for the organisation of the operator, being the latter usually a commercial company).

## Risk-Based Regulation

Administrative procedures proportional to risks perceived by society



**FIGURE 2: Safety risk and categories of UA operations**

The purpose of these notes is not however to present in detail the EC acts 2019/945 and 947, but instead to discuss, in the following paragraphs, the transition from the present situation, largely based on national rules in each of the individual EU Member States, towards the full applicability of these two Regulations.

### 3. What will happen on 1<sup>st</sup> of July 2020?

In fact, both Regulations 2019/945 and 947 have been published in the Official Journal of the EU on the 11<sup>th</sup> June of 2019, so entering into force on the 1<sup>st</sup> of July of that year.

As soon as the “harmonised standard”, in the form of EN adopted by CEN would be published in the Official Journal of the EU, which is expected around end of 2020, Regulation 2019/945 could be voluntarily applied by UAS manufacturers all over the world, allowing them, and their importers and distributors, to affix the CE mark and sell their drones on the EU internal market. No specific transition provisions are in fact contained in this Regulation.

Conversely, Implementing Act 2019/947 contains four Articles (i.e. from 20 to 23) on the transition period which will cover a time span from 1<sup>st</sup> July 2020 until 1<sup>st</sup> of July 2022, which means one, two or three years after entry into force.

In summary on 1<sup>st</sup> July 2020:

- a) Registration (Art. 14 2019/947) will become mandatory for all UA in the certified category and for all operators carrying out operations in the open and specific category with the exception of drones below 250 kg not equipped with cameras or similar sensors, and with the exception of “toy” (8) aircraft even if equipped with

- cameras; it should be clarified that registration is not relevant for safety, but the EU institutions have considered it essential for security and privacy concerns;
- b) Operations in the “open” category will be possible, even with drones not carrying the CE Mark and not accompanied by a Declaration of Conformity with the “harmonised standards” based on Regulation 2019/945, but limited to drones of less than 500 g (instead of 900) in the subcategory A1/C1 and to drones of less than 2 kg (instead than 4) in subcategory A2, or up to 25 kg in subcategory A3;
  - c) Operations in the certified category will still be subject to case-by-case assessment, including air-taxis, until specific common rules would be available (the EASA NPA on the subject is expected early in 2021);
  - d) Conversely operations in the specific category will be subject to the common rules in Regulation 2019/945, which basically mean carrying out a risk assessment based on Article 11 therein.

#### 4. Specific category from 1<sup>st</sup> July 2020 onwards

In the specific category there will be three possibilities:

- a) Simple submission of a declaration signed by the Accountable Manager of the operator company, where a “standard scenario” allowing this possibility exists; presently there are no standard scenarios adopted at EU level, although this is in progress (9); the declaration does not exempt the operator to provide attached evidence, when the required level of safety assurance is medium or high;
- b) In case of medium assurance level the evidence could be e.g. a Manual used by the operator;
- c) In case of high assurance, the evidence must be an attestation issued by a competent, independent and accredited third party, which could be a “notified body” listed by DG-ENTR or a “qualified entity” accredited by an aviation authority based on Art. 69 NBR;
- d) Where no standard scenario exists, the operator shall apply to the national aviation authority (never EASA for operators established in the EU) to obtain a prior authorisation before the flight(s); the application shall be accompanied by a risk assessment (and evidence of implemented mitigations, like in b) and c) above); for this risk assessment EASA in the published Acceptable Means of Compliance (AMC) recommend to use the SORA methodology developed by JARUS; web-based tools exist on the market to facilitate its implementation (10);
- e) Finally, the operator company may apply for a “Light UAS Operator Certificate” (LUC) on a voluntary basis, which would give the operator the privilege of authorising inside its organisation the specific operations; this of course required an independent safety management function inside the company and in any case it exempts from “showing” the risk assessment to the Authority before the operation, but it does not exempt from carrying out such an assessment and keeping record of it, including evidence of the implemented mitigations as in b) and c) above.

In conclusion on 1st July 2020 registration and operations in the specific category will be no longer regulated at national level in the EU, but based on the common rules in Regulation 2019/947.

## 5. What will happen on 1<sup>st</sup> of July 2021?

After 1st of July 2020, common EU standard scenarios will be adopted by the EC and published, based on EASA Opinion 05/2019.

Furthermore, on 1st July 2021:

- a) Certificates, licences or attestations issued to remote pilots based on national rules, shall be converted into attestations compliant with Regulation 2019/947, which means only theoretical knowledge in the open category and in specific category, also the practical skill required by the risk assessment (and the associated evidence determined by the required level of assurance);
- b) Equally any declaration or authorisation to UAS operators shall be converted into an authorisation compliant with Regulation 2019/947; and
- c) States shall not only define specific volumes where drone operations are allowed, prohibited or allowed under certain conditions based on Art. 15 of Regulation 2019/947, but States shall also distribute this information through digital means (e.g. app on the mobile telephone) or designate one or more U-Space Service Providers to disseminate the information to operators.

## 6. What will happen on 1<sup>st</sup> of July 2022?

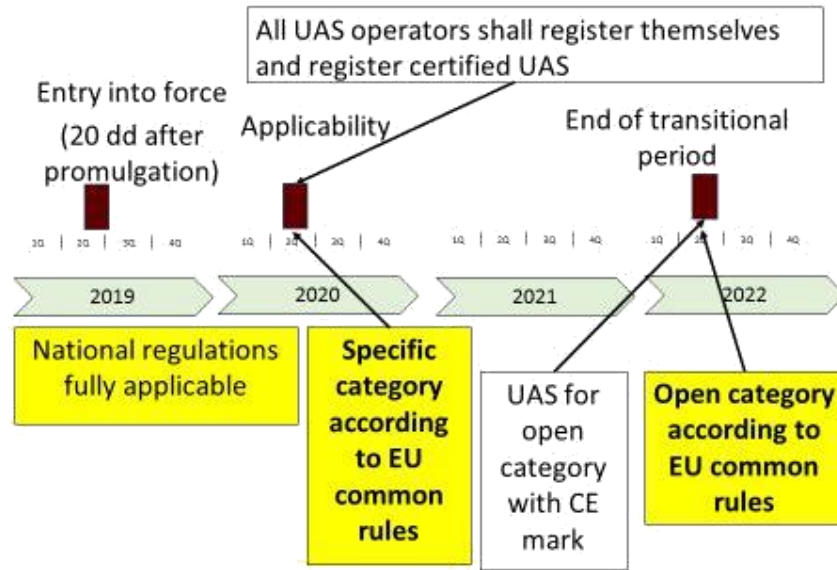
The last step of the transition will occur on 1st July 2022, when:

- a) Operations in the open category will be entirely based on Regulation 2019/947 and its Annex, which means drones in classes C0 and C1 (i.e. up to 900 g) eligible for operations in subcategory A1 (over people), drones in class C2 (i.e. 4 kg) eligible for operations in subcategory A2 (close to people), while operations in A3 (classes C3 and C4 up to 25 kg an far from people) will continue as already on 1st July 2020;
- b) All drones sold on the internal EU market and intended for operations in the open category shall be accompanied by the CE Mark and by the Declaration of Conformity with the harmonised standards based on Regulation 2019/945;
- c) However, drones sold to consumers before 1st of July 2022 may continue to be used in the subcategories A1/C0 (i.e. less than 250 g) or A3 (up to 25 kg but far from people), but not A2;
- d) Finally, model clubs or associations, whose members would be exempted from the risk assessment, shall obtain a collective authorisation based on Art. 16 of Regulation 2019/947.

A summary of these transition provisions is depicted in Figure 3.



## Expected Timeline



**FIGURE 3: Transition from 1<sup>st</sup> July 2020 to 1<sup>st</sup> July 2022**

## 7. What may happen next?

While the transition towards the full application of Regulations 2019/945 and 947 is in progress, of course EC, EASA and Standard Development Organisations (SDO) supported by stakeholders are working of further developments.

In more detail the EC is processing EASA Opinion 05/2019, which, on 6th November 2019 proposed the first two common standard scenarios for inclusion in Appendix 1 to Regulation 2019/947 (currently reserved, alias empty). Readers may not that in case of standard scenario, the operator will not be required to conduct a risk assessment based on SORA. But this does not mean that there is no risk assessment. In fact, in the specific category of UAS operations the risk assessment is always required. But in the case of a standard scenario developed by EASA, the risk assessment is in fact carried out by that Agency (and indeed published in the Explanatory Note of the Opinion). The burden on the operator is so reduced. However, the operator shall still provide evidence that the required mitigations have been implemented, as certified by a notified body or qualified entity when the required level of assurance is high.

Furthermore, although Regulations 2019/945 (Art. 40) and 2019/947 (Art. 6) establish thresholds above which the operations enter into the certified category, common rules for the latter are not yet available. EASA, supported by an Expert Group of stakeholders is working on them and a first NPA may be published early in 2021.

Current thinking in this expert group is that in the certified category there would be different “types” of operation:

- a) Operations type #1: operations under Instrument Flight Rules (IFR) for the carriage of cargo (no passengers) in airspace classes A-C (typical classes of en-route airspace on long range international connections) and taking-off and landing at aerodromes under EASA's scope (i.e. essentially international aerodromes in scope of Volume I of Annex 14 to the Chicago Convention), for which EU common rules would be compliant with ICAO Standards and Recommended Practices (SARPs), including e.g. amendment 175 to Annex 1 to the Chicago Convention for the Remote Pilot Licence (RPL) applicable on 3rd November 2022;
- b) Operations type #2: Operations of UAS taking off and/or landing in congested (e.g. urban) environment using pre-defined routes in volume of airspaces where U-space services are provided (part of the flight could be in non-congested (e.g. rural) environment). These include operations of UA carrying passengers (e.g. Vertical Take-Off and Landing (VTOL) air taxis) or cargo (e.g. UAS providing goods delivery services). Take-off and land could be at any aerodrome or any designated landing port, vertiport or landing site. These operations would not be necessarily compliant with ICAO SARPs since essentially domestic, at heights below the minimum height standardised in Annex 2 to the Chicago Convention (i.e. 500 ft above ground level) and carrying passenger which is beyond current ICAO scope; and
- c) Operations type #3: same as Operation type #2 with manned VTOL aircraft (i.e. pilot on-board), including operations in airspace where U-space services are not available.

In fact, these emerging VTOL operations and related aircraft are very similar, whether the pilot is on-board or not. The envisaged future EU common rules for Urban Air Mobility (UAM) would hence offer a consistent framework within which VTOL operators may initially offer commercial air transport with one single pilot on-board (not excluding a second crew member on the ground), later transitioning to the remote pilot on the ground, then to multiple VTOL under responsibility of a single pilot) one more reason not to apply the ICAO SARPs) and finally to completely autonomous flight, without the need of any pilot. The operator will still need to plan the operation, coordinate with Air Traffic Management/U-Space before take-off and in case of need implement the emergency response plan. Therefore, even in the absence of the pilot a "UAM Dispatcher" may nevertheless be required.

## 8. Footnotes

- (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.
- (2) Commission Delegated Regulation (EU) 2019/945 of 12 March 2019 on unmanned aircraft systems and on third-country operators of unmanned aircraft systems.
- (3) Regulation (EU) No 1025/2012 of the European Parliament and of the Council of 25 October 2012 on European standardisation, amending Council Directives 89/686/EEC and 93/15/EEC and Directives 94/9/EC, 94/25/EC, 95/16/EC, 97/23/EC, 98/34/EC, 2004/22/EC, 2007/23/EC, 2009/23/EC and 2009/105/EC of the European Parliament



and of the Council and repealing Council Decision 87/95/EEC and Decision No 1673/2006/EC of the European Parliament and of the Council.

- (4) Regulation (EC) No 765/2008 of the European Parliament and of the Council of 9 July 2008 setting out the requirements for accreditation and market surveillance relating to the marketing of products and repealing Regulation (EEC) No 339/93.
- (5) Decision No 768/2008/EC of the European Parliament and of the Council of 9 July 2008 on a common framework for the marketing of products, and repealing Council Decision 93/465/EEC.
- (6) <https://ec.europa.eu/growth/tools-databases/nando/>
- (7) Commission Implementing Regulation (EU) 2019/947 of 24 May 2019 on the rules and procedures for the operation of unmanned aircraft.
- (8) Directive 2009/48/EC of the European Parliament and of the Council of 18 June 2009 on the safety of toys.
- (9) EASA Opinion 05/2019 - Standard scenarios for UAS operations in the ‘specific’ category.
- (10) <https://www.online-sora.com/>

<b>Acronyms</b>	
AMC	Acceptable Means of Compliance
ASD-STAN	Aero-Space and Defence - Standard Association
CEN	Comité Européen de Normalisation
DG-ENTR	Directorate-General Enterprise and Industry
EASA	European Aviation Safety Agency
EC	European Commission
EN	European Norm
ESO	European Standardisation Organisations
EU	European Union
IFR	Instrument Flight Rules
ISO	International Standard Association
JARUS	Joint Authorities for Rulemaking on Unmanned Systems
LUC	Light UAS operator Certificate
MTOM	Maximum Take-Off Mass
NBR	New Basic Regulation (establishing EASA)
NPA	Notice of Proposed Amendment
RPL	Remote Pilot Licence

SARPs	Standards and Recommended Practices
SORA	Specific Operation Risk Assessment
TC	Type Certificate
UA	Unmanned Aircraft (i.e. only the 'machine' which flies in the air)
UAM	Urban Air Mobility
UAS	Unmanned Aircraft Systems (i.e. comprising not only the Unmanned Aircraft, but also other components, among which the unit from which the remote pilot commands the flight)
VLOS	Visual Line Of Sight
VTOL	Vertical Take-Off and Landing