European Union Aviation Safety Agency

Opinion No 03/2023

Introduction of a regulatory framework for the operation of drones

Enabling innovative air mobility with manned VTOL-capable aircraft, the initial airworthiness of unmanned aircraft systems subject to certification, and the continuing airworthiness of those unmanned aircraft systems operated in the 'specific' category

RMT.0230 — SUBTASK C#1

EXECUTIVE SUMMARY

This Opinion puts forward the establishment of a comprehensive regulatory framework to address new operational and mobility concepts that are based on innovative technologies, like unmanned aircraft systems (UAS) and aircraft with vertical take-off and landing (VTOL) capability, and foster and promote their acceptance and adoption by European citizens.

The Opinion proposes amendments to existing EU aviation regulations and the establishment of two new ones to address:

— the initial airworthiness of UAS subject to certification in accordance with Article 40 of Commission Delegated Regulation (EU) 2019/945;

— the continuing airworthiness of UAS subject to certification and operated in the 'specific' category; and

— the operational requirements applicable to manned VTOL-capable aircraft (VCA).

The specific objectives of the proposed amendments are to:

— ensure a high and uniform level of safety for UAS subject to certification and operated in the 'specific' category and for operations with manned VCA;

— enable operators to safely operate manned VCA in the single European sky (SES);

— create the conditions for the safe operation of UAS and of manned VCA in the U-space airspace;

— promote innovation and development in the field of innovative air mobility (IAM) while establishing an efficient, proportionate, and well-designed regulatory framework, free of burdensome requirements that could hinder the development of the UAS market;

— harmonise the regulatory framework across the EU Member States by enhancing clarity, filling the gaps, and removing the inconsistencies that are inherent to fragmented regulatory systems;

— foster an operation-centric, proportionate, as well as risk- and performance-based regulatory framework, considering important aspects such as privacy, personal data protection, security, and safety.

REGULATIONS TO BE AMENDED

— Commission Regulation (EU) No 748/2012
— Commission Delegated Regulation (EU) 2019/945
— Commission Implementing Regulation (EU) 2019/947
— Commission Regulation (EU) No 965/2012
— Commission Regulation (EU) No 1178/2011
— Commission Implementing Regulation (EU) No 923/2012
— Commission Implementing Regulation (EU) 2017/373
— Commission Implementing Regulation (EU) 2023/203

REGULATIONS TO BE ISSUED

— Commission Delegated Regulation (EU) …/… on the continuing airworthiness of certified unmanned aircraft systems and their components, and on the approval of organisations and personnel involved in these tasks
— Commission Implementing Regulation (EU) …/… laying down competent authority requirements and administrative procedures for the certification, oversight and enforcement of the continuing airworthiness of certified unmanned aircraft systems, and amending Implementing Regulation (EU) 2023/203

AFFECTED STAKEHOLDERS

UAS and VCA operators; competent authorities (CAs); flight crews; maintenance organisations; continuing airworthiness management organisations (CAMOs); UAS and VCA manufacturers; other airspace users; air traffic management/air navigation services (ATM/ANS) providers and other ATM network functions; air traffic services (ATS) personnel; aerodrome operators; general public

WORKING METHOD(S)		
Development	**Impact assessment(s)**	**Consultation**
By EASA with external support	Detailed	Public — NPA

Related documents: ToR RMT.0230 Issue 4 issued on 19.12.2022; NPA 2022-06 issued on 30.6.2022

PLANNING MILESTONES: Refer to the latest edition of the EPAS Volume II.

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1. About this Opinion

1.1. How this Opinion was developed

The European Union Aviation Safety Agency (EASA) developed this Opinion in line with Regulation (EU) 2018/1139[1] (the Basic Regulation) and the Rulemaking Procedure[2].

Rulemaking task RMT.0230 is included in Volume II of the European Plan for Aviation Safety (EPAS) for 2023–2025[3]. The scope and timescales of the task were defined in the related Terms of Reference (ToR)[4].

EASA developed the *draft* text of this Opinion without a formal rulemaking group but with the contribution of dedicated expert groups established for each of the affected domains. All interested parties were consulted through Notice of Proposed Amendment (NPA) 2022-06[5,6]. Comments were received from interested parties, including industry, national aviation authorities (NAAs), aircraft manufacturers and operators, and service providers.

EASA reviewed the comments received during the public consultation with the support of the dedicated expert groups. The comments received and EASA's responses to them are presented in Comment-Response Document (CRD) 2022-06[7], and they are also summarised in Section 2.4.

EASA developed the *final* text of this Opinion and the draft regulations based on the input received during the public consultation and from the expert groups. The draft regulations are published on the Official Publication of EASA[8].

The major milestones of this RMT are presented on the cover page.

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 01-2022 of 2 May 2022 on the procedure to be applied by EASA for the issuing of opinions, certification specifications and other detailed specifications, acceptable means of compliance and guidance material ('Rulemaking Procedure'), and repealing Management Board Decision No 18-2015 (EASA MB Decision No 01-2022 on the Rulemaking Procedure, repealing MB Decision 18-2015 (by written procedure) | EASA (europa.eu)).

3 European Plan for Aviation Safety (EPAS) 2023-2025 | EASA (europa.eu)

4 https://www.easa.europa.eu/en/document-library/terms-of-reference-and-group-compositions/tor-rmt0230-0

5 NPA 2022-06 - Introduction of a regulatory framework for the operation of drones — Enabling innovative air mobility with manned VTOL-capable aircraft, the IAW of UAS subject to certification, and the CAW of those UAS operated in the 'specific' category | EASA (europa.eu)

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

7 CRD 2022-06 *EASA responses to individual comments* and CRD 2022-06 *Individual comments (without EASA responses)*, available at http://easa.europa.eu/document-library/comment-response-documents.

8 http://easa.europa.eu/document-library/opinions

1.2. The next steps

This Opinion contains the proposed amendments to:

— 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[9];

— 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[10];

— Commission Regulation (EU) No 1178/2011 of 3 November 2011 laying down technical requirements and administrative procedures related to civil aviation aircrew pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council[11];

— Commission Regulation (EU) No 923/2012 of 26 September 2012 laying down the common rules of the air and operational provisions regarding services and procedures in air navigation and amending Implementing Regulation (EU) No 1035/2011 and Regulations (EC) No 1265/2007, (EC) No 1794/2006, (EC) No 730/2006, (EC) No 1033/2006 and (EU) No 255/2010[12];

— Commission Delegated Regulation (EU) 2019/945 of 12 March 2019 on unmanned aircraft systems and on third-country operators of unmanned aircraft systems[13];

— Commission Implementing Regulation (EU) 2019/947 of 24 May 2019 on the rules and procedures for the operation of unmanned aircraft[14];

— Commission Implementing Regulation (EU) 2017/373 of 1 March 2017 laying down common requirements for providers of air traffic management/air navigation services and other air traffic management network functions and their oversight, repealing Regulation (EC) No 482/2008, Implementing Regulations (EU) No 1034/2011, (EU) No 1035/2011 and (EU) 2016/1377 and amending Regulation (EU) No 677/2011[15];

— Commission Implementing Regulation (EU) 2023/203 of 27 October 2022 laying down rules for the application of Regulation (EU) 2018/1139 of the European Parliament and of the Council, as regards requirements for the management of information security risks with a potential impact on aviation safety for organisations covered by Commission Regulations (EU) No 1321/2014, (EU) No 965/2012, (EU) No 1178/2011, (EU) 2015/340, Commission Implementing Regulations (EU) 2017/373 and (EU) 2021/664, and for competent authorities covered by Commission Regulations (EU) No 748/2012, (EU) No 1321/2014, (EU) No 965/2012, (EU) No 1178/2011, (EU) 2015/340 and (EU) No 139/2014, Commission Implementing Regulations (EU) 2017/373 and (EU) 2021/664 and amending Commission Regulations (EU) No 1178/2011, (EU) No 748/2012,

9 OJ L 224, 21.8.2012, p. 1 (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32012R0748&qid=1653917810933).
10 OJ L 296, 25.10.2012, p. 1 (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32012R0965&qid=1653917990505).
11 OJ L 311, 25.11.2011, p. 1 (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32011R1178&qid=1653918130754).
12 OJ L 281, 13.10.2012, p. 1 (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32012R0923&qid=1653918228805).
13 OJ L 152, 11.6.2019, p. 1 (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019R0945&qid=1653918419960).
14 OJ L 152, 11.6.2019, p. 45 (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019R0947&qid=1653918578552).
15 OJ L 62, 8.3.2017, p. 1 (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32017R0373).

(EU) No 965/2012, (EU) No 139/2014, (EU) No 1321/2014, (EU) 2015/340, and Commission Implementing Regulations (EU) 2017/373 and (EU) 2021/664[16],

and the proposed new delegated and implementing acts:

— Commission Delegated Regulation (EU) …/… of … on the continuing airworthiness of certified unmanned aircraft systems and their components, and on the approval of organisations and personnel involved in these tasks;

— Commission Implementing Regulation (EU) …/… of … laying down competent authority requirements and administrative procedures for the certification, oversight and enforcement of the continuing airworthiness of certified unmanned aircraft systems, and amending Implementing Regulation (EU) 2023/203.

It is submitted to the European Commission, which shall decide whether to amend those Regulations and adopt the new ones based on the contents of this Opinion.

[16] OJ L 31, 2.2.2023, p. 1 (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32023R0203).

2. In summary — why and what

Over the last years, the industry has been developing new operational concepts based on innovative technologies, like unmanned aircraft systems (UAS) and aircraft with vertical take-off and landing (VTOL) capability. Such developments, stimulated by a global wave of digitalisation and automation, have reinforced the impetus for the creation of new air mobility concepts in the framework of the 'smart, green and digital' cities initiative led by the European Commission under the 'Sustainable and Smart Mobility Strategy'[17].

The analysis of the available literature and of the official policy documents issued in Europe and worldwide by aviation organisations and regulatory authorities (e.g. ICAO, European Commission, SESAR, the FAA, etc.) and by the industry showed that there is no agreed and consolidated definition of the notion of 'urban air mobility' (UAM).

Considering that:

— limiting the focus on pure mobility aspects is too restrictive when compared to the actual, possible operations with new aircraft technologies;

— the definition of 'urban environment' varies from country to country and/or between regions;

— EASA shall regulate operations with UAS and VTOL-capable aircraft (VCA) beyond the pure geographical reach of the urban environment;

— it is necessary to consider use cases that are not specific to operations in urban environments (e.g. commercial intercity, cargo delivery, public services, private/recreational vehicles, etc.),

EASA shall introduce the following concepts for the purpose of standardising the communication on the matter at European Union level, and to be used for the development of future requirements (regulations and rules):

— **innovative[18] aerial services (IAS)**: the set of operations and/or services that are of benefit to the citizens and to the aviation market, and that are enabled by new airborne technologies; the operations and/or services include both the transportation of passengers and/or cargo and aerial operations (e.g. surveillance, inspections, mapping, telecommunications networking, etc.);

— **innovative air mobility (IAM)**: the safe, secure and sustainable air mobility of passengers and cargo enabled by new-generation technologies integrated into a multimodal transportation system;

— **urban air mobility (UAM)**: the subset of IAM operations conducted in to, within or out of urban environments.

Although the term 'innovative' may seem applicable to a certain point in time, the regulatory framework remains operation-centric and performance based. Certification and operational requirements are proportionate to the type of the operation and of the environment in which the

[17] https://transport.ec.europa.eu/transport-themes/mobility-strategy_en

[18] While the notion of UAS and electrical or hybrid engines may be immediately associated to 'innovative' aspects, the aircraft design or the propulsion systems do not necessarily play a role in the classification of an aircraft as 'innovative' (an example may be a conventionally propelled aeroplane or helicopter with a C2 link enabling the remote-piloting capability).

operation is performed. In the certification domain, more stringent requirements are imposed for aircraft that carry passengers or operate over congested areas. The same approach applies in the operational domain where the driving factor remains the type of operation and the area where the operation is performed (congested versus non-congested areas).

Figure 1 — Domains of UAS and VCA operations

IAM operations for the transportation of passengers and/or cargo will be enabled by aircraft with different design characteristics and with different methods for generating lift during the cruise phase (e.g. wing- or thrust-borne, or a combination of the two) compared to aeroplanes and rotorcraft, while the majority of them are expected to include the VTOL capability in order to optimise and maximise their use in urban environments.

These aircraft are developed for new operational uses and include different design principles and technologies that are not typically found in conventional rotorcraft and aeroplanes. The peculiarities that deserve a distinct approach in terms of certification and operational approach are as follows:

— *Propulsion systems*

Rotorcraft have been mainly characterised by combustion engines (either turboshaft or piston engines). Electric engines are gradually being introduced in rotorcraft designs, rather as additional redundant propulsion system than as the main source of lift and thrust generation. On the contrary, aircraft with VTOL capability are expected to be equipped mainly with electric engines. Furthermore, the use of a combination of novel multiple lift and thrust units enables a higher degree of redundancy when appropriately dimensioned and designed.

— *Flight control systems*

Excluding very few cases of helicopters equipped with fly-by-wire flight control systems, all rotorcraft are currently equipped with traditional flight controls (either boosted or not), with the addition of an augmented flight control system for stabilisation and long-term flight path control. Due to multiple lift/thrust units, advanced flight control systems (fly-by-wire or fly-by-light) form part of the design of VTOL aircraft in all current and newly started projects. In terms of design, this imposes new challenges with regard to achieving desired performance and safety standards, integrating suitable human–machine interface (HMI) and addressing human factors.

Moreover, it requires a completely different approach in terms of certification, with particular regard to the aircraft handling qualities, for defining both the requirements and the related acceptable means of compliance. Implicitly, new flight control philosophies for the simplified control of the aircraft through progressively increasing levels of automation will typically be implemented.

— *Energy systems*

Novel energy sources (e.g. batteries of various chemistry, hydrogen, hybrid supplies) and their specific risks and limitations, including implications on operational use, require dedicated requirements.

— *Safety-of-design requirements*

The intended use of high-volume operations over cities calls for dedicated requirements to ensure a commensurate safety level to prevent fatalities and protect third parties.

— *Environment*

The noise profile may vary among the different aircraft designs, but noise levels are expected to be lower than those of rotorcraft.

— *Operations*

The concept of operations for these novel aircraft has some peculiarities with respect to conventional rotorcraft and aeroplane operations, and has also an impact on their design and certification:

- piloting techniques with aircraft-specific control philosophies (advanced flight control systems often imply inceptors different than conventional cyclic/pedal/collective flight controls);
- reduced endurance will impose major constraints on operations, requiring aircraft to demonstrate equivalent levels of safety compared to the regulations and procedures used for helicopter operations;
- infrastructure (e.g. vertiports, firefighting, fire protection, high-voltage energy grid connection, security);
- ground handling (e.g. requirements on battery recharge/exchange, emergency response);
- operational procedures (e.g. navigation procedures, need to fly at low levels, flight rules, energy reserves, diversion, etc.);
- increasing levels of automation and pilot assistance systems leading to a different set of competencies and skills possessed by pilots.

— *Strong link between design and operations*

The safe, large-scale integration of these new aircraft into their intended operational environment (e.g. congested or hostile areas) requires synergies on the level of provisions and requirements distributed across several aviation domains (initial/continuing airworthiness,

maintenance, air operations, flight crew licensing, rules of the air, air traffic management, aerodromes).

EASA had initially developed a definition for the initial airworthiness of 'VTOL aircraft' as provided in the EASA 'Special Condition for VTOL and Means of Compliance'[19], focusing on the lift generation design principle using multiple lift/thrust units (more than two), as these new architectures provide opportunities for increased safety through redundancy, but lead to challenges as explained and detailed above.

A corresponding definition is deemed necessary to cover the other regulatory domains, retaining the distinction drawn based on the lift generation design principle, but also explicitly defining a new category of aircraft distinct from aeroplanes and rotorcraft.

— **VTOL-capable aircraft (VCA)**: a power-driven, heavier-than-air aircraft, other than aeroplane or rotorcraft, capable of performing vertical take-off and landing by means of lift and thrust units used to provide lift during take-off and landing.

To ensure coherence in the categorisation of the different aircraft designs, the definition of 'rotorcraft' is consequently amended to accommodate designs with up to two rotors for the generation of lift during the flight.

In performing the above assessment, EASA evaluated the possibility to adopt the existing ICAO definition of powered-lift[20] aircraft as an alternative to VCA, but it was discarded as:

— the definition does not include all potential aircraft configurations that would be categorised as VCA, and in particular those that do not depend 'on non-rotating airfoil(s) for lift during horizontal flight' (e.g. thrust vectoring and direct lift);

— the ICAO framework for powered-lift aircraft is limited only to the requirements available in Annex 1 (applicable for flight crew licensing) while it lacks requirements for the remaining certification and operational domains.

There is a need to establish a comprehensive regulatory framework addressing the safety, security and environmental aspects of this new form of mobility of people and cargo by air in order to ensure its adequate acceptance and adoption by European citizens.

Some elements of this regulatory framework have already been established with the adoption of Commission Implementing Regulation (EU) 2019/947[21], Commission Delegated Regulation (EU) 2019/945[22], and Commission Implementing Regulation (EU) 2021/664[23].

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19 https://www.easa.europa.eu/document-library/product-certification-consultations/special-condition-vtol

20 A heavier-than-air aircraft capable of vertical take-off, vertical landing, and low-speed flight, which depends principally on engine-driven lift devices or engine thrust for the lift during these flight regimes and on non-rotating aerofoil(s) for lift during horizontal flight.

21 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&qid=1692177642564).

22 Commission Delegated Regulation (EU) 2019/945 of 12 March 2019 on unmanned aircraft systems and on third-country operators of unmanned aircraft systems (OJ L 152, 11.6.2019, p. 1) (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019R0945&qid=1692177540).

23 Commission Implementing Regulation (EU) 2021/664 of 22 April 2021 on a regulatory framework for the U-space (OJ L 139, 23.4.2021, p. 161) (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32021R0664&qid=1692177844710).

The Opinion proposes amendments to several existing EU aviation regulations and the establishment of two new ones to address:

— the initial airworthiness of UAS subject to certification in accordance with Article 40 of Commission Delegated Regulation (EU) 2019/945;

— the continuing airworthiness of UAS subject to certification and which are operated in the 'specific' category; and

— the operational requirements applicable to manned VCA.

2.1. Why we need to amend the regulations and propose two new ones — issue/rationale

Compared to current operations with manned aircraft and ground vehicles, UAS and VCA create new opportunities as they open up possibilities in terms of a multitude of aerial services, as well as different types of air mobility, for the transportation of passengers or cargo in various geographical scales ranging from urban environments to intercontinental routes.

In order to ensure the safe integration and operation of UAS and VCA in the aviation system, new European Union regulations have been developed in a stepwise approach while progressively covering the market segments and the different types of designs and operations. This additional effort aims to further complement the existing regulatory framework established with Commission Implementing Regulation (EU) 2019/947, Commission Delegated Regulation (EU) 2019/945 and Commission Implementing Regulation (EU) 2021/664, and to provide for a harmonised set of regulations and rules at EU level.

The analysis of the existing regulations suggested the lack of an adequate regulatory framework to provide for and maintain the necessary level of safety as regards the airworthiness of UAS subject to certification and operated in the 'specific' category and of the operation of manned VCA.

A set of both new and amended regulations is required to enable the deployment and implementation of UAM operational concepts in the Member States and, at the same time, help build up the EU citizens' trust in the use cases of UAM operations conducted with UAS and with passenger-carrying, manned VCA. It is also believed that dedicated requirements for UAS and VCA shall be beneficial to support EU's industry competitiveness at global level.

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 Opinion shall contribute to achieving the overall objectives by addressing the issues described in Section 2.1.

The operational objective of this proposal is to establish a coherent regulatory framework in order to enable the airworthiness of UAS subject to certification which are operated in the 'specific' category and of operations with manned VCA.

RMT.0230 Subtask C#1 shall particularly contribute to achieving the objectives of Article 1(1) and (2) of the Basic Regulation, and in particular:

(a) contribute to the wider Union aviation policy and to the improvement of the overall performance of the civil aviation sector;

(b) facilitate […] the free movement of goods, persons, services and capital, providing a level playing field for all actors in the internal aviation market, and improve the competitiveness of the Union's aviation industry;

(e) promote cost-efficiency, by, inter alia, avoiding duplication, and promoting effectiveness in regulatory, certification and oversight processes as well as an efficient use of related resources at Union and national level;

(f) contribute […] to establishing and maintaining a high uniform level of civil aviation security;

(i) promote research and innovation, inter alia, in regulatory, certification and oversight processes;

(k) support passenger confidence in a safe civil aviation.

The specific objectives of RMT.0230 Subtask C#1 are to:

— ensure a high and uniform level of safety for UAS subject to certification which are operated in the 'specific' category and for operations with manned VCA;

— enable operators to safely operate manned VCA in the single European sky (SES);

— create the conditions for the safe operation of UAS and manned VCA in the U-space airspace;

— promote innovation and development in the field of IAM while establishing an efficient, proportionate, and well-designed regulatory framework which does not unnecessarily hinder the development of the UAS and manned VCA market;

— harmonise the regulatory framework across the EU Member States by enhancing clarity, filling the gaps, and removing the inconsistencies that a fragmented system may have;

— foster an operation-centric, proportionate, as well as risk- and performance-based regulatory framework by considering important aspects such as privacy, personal data protection, security, and safety.

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

The following sections address and summarise the underlying assumptions and criteria adopted for the amendment/establishment of existing/new regulations applicable to the different aviation domains affected by this Opinion.

In particular:

— as regards UAS subject to certification:
  — their initial airworthiness (IAW);

— as regards UAS subject to certification which are operated in the 'specific' category with an airworthiness certificate:
  — their continuing airworthiness (CAW);

— as regards manned VCA:
  — air operations (AIR OPS);
  — flight crew licensing (FCL);
  — standardised European rules of the air (SERA);

— air traffic management (ATM).

2.3.1. Initial airworthiness (IAW)

2.3.1.1. Background

The initial airworthiness of manned aircraft is governed by Commission Regulation (EU) No 748/2012[24] which lays 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.

While the Basic Regulation draws a clear distinction in terms of requirements applicable to 'manned' (Section I) versus 'unmanned' aviation (Section VII), the conditions and procedures for issuing certificates for unmanned aircraft (UA) in accordance with Article 58 of that Regulation may be based on, or consist of, the essential requirements in Section I. Furthermore, Commission Regulation (EU) No 748/2012 is also referred to in Article 40(2) of Commission Delegated Regulation (EU) 2019/945, which establishes that 'a UAS subject to certification shall comply with the applicable requirements set out by Commission Regulation (EU) No 748/2012'.

Because of the above, the current proposal is to amend Commission Regulation (EU) No 748/2012 and its Annex I (Part 21) to include requirements for the certification of UA and of the control and monitoring units (CMUs)[25].

The proposed amendments to Commission Regulation (EU) No 748/2012 are based on the latest adopted amendments to that Regulation.

2.3.1.2. Scope

The scope of the proposed amendments to Commission Regulation (EU) No 748/2012 includes UAS subject to certification independently of the category in which they are operated ('specific' category[26] or 'certified' category).

The proposal suggests that the certification procedures of Part 21 apply to:

— the unmanned aircraft system, defined as the unmanned aircraft (UA) and its CMU, for the issuance of a UA type certificate (TC);

— the CMU, in the case of separate certification of the CMU, for the issuance of a CMU TC.

The certification process shall, therefore, result in the issuance of a TC to the UA and, optionally, to the CMU. Most Part 21 adaptations are related to the introduction of the CMU (the CMU is neither a product nor a part), and to the CMU components. Additionally, the concept of UAS certification is reflected where appropriate, in particular where what is addressed are the certification procedures

[24] 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 (recast) (OJ L 224, 21.8.2012, p. 1) (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32012R0748&qid=1692183458123).

[25] The rationale for the replacement of 'command unit' (CU) with 'control and monitoring unit' (CMU) is provided in Section 2.3.3.1.

[26] Including cases where the applicant opts for type certification even if type certification would not be required for the intended operation. This would be the case for 'specific' category operations where, according to the AMC to Article 11 of Commission Implementing Regulation (EU) 2019/947, the risk assessment indicates a specific and assurance integrity level of III or IV ('medium risk' operations).

and not the certificate itself. It should be noted that, throughout Part 21, the CMU cannot be captured under the generic 'product' terminology as, according to the Basic Regulation, the CMU is not a product.

Manufacturers may modify a manned aircraft (referred to in the Basic Regulation as 'aircraft other than unmanned aircraft') by means of the Part 21 change process and create an unmanned version or an optionally piloted version. The initial airworthiness of such optionally piloted (hybrid) configurations can be addressed with the current proposal. These aircraft configurations shall be listed on a single TC (or restricted TC or flight condition) so that a single TC can be used for the issuance of an individual certificate of airworthiness (CofA) (or a restricted CofA).

2.3.1.3. Overview of the main proposed amendments to Commission Regulation (EU) No 748/2012

The proposed amendments to Commission Regulation (EU) No 748/2012 address in particular the following subjects:

— Specificities of unmanned aircraft

  An unmanned aircraft is an aircraft. The certification procedures of Part 21 have been adapted to allow, by means of the certification of the UAS, the issuance of a UA TC and, in case of separate certification of the CMU, the issuance of a CMU TC.

  As for manned aircraft, a CofA is issued also to unmanned aircraft. However, even when the CMU is issued with a dedicated TC, no CofA is issued for the CMU, whose model shall be instead referenced in the UA CofA.

— Most complex and critical operations with UAS in the 'certified' category of operations, such as UAS for the transportation of passengers, and less critical but still high-risk operations such as UAS used for parcel delivery and operated in the 'specific' category in SAIL V or VI, may require very different reliability flight tests, ranging from a few tens of hours to several hundreds. The need to maintain this flexibility is captured in specific requirements dedicated to UA under new point 21.A.35(f)(2). Manned VCA may also potentially require several hundred hours of reliability flight tests to demonstrate their safe operation. This is captured under new point 21.A.35(f)(1)(i), which is a clarification of current point 21.A.35(f)(2).

— The possibility to define standard changes and standard repairs is extended under point 21.A.90B(a)(1)(iv) to aircraft (manned and unmanned) with VTOL capability with a MTOM of 5 700 kg.

— The introduction of the CMU and of the UAS (as newly defined by Commission Implementing Regulation (EU) 2019/947) throughout Part 21, where appropriate.

— The introduction of the process for the issuance of a TC for the UA and for the CU.

— The definition of 'CMU components' and the introduction of the term throughout Part 21, where appropriate.

— The introduction of the possibility to issue ETSO authorisations for CMU components.

— The definition of 'CMU installation', the determination of the eligibility of a CMU component for installation in the CMU (point 21.A.308), the establishment of a link with the new continuing

airworthiness Regulation for UAS in so far as instructions for the CMU installation need to be released to operators (point 21.A.6 'Manuals').

— The adaptation of the CofA form in order to include information on and designation of the CMU models which can be used to operate UA.

— The inclusion of the airworthiness review certificate (ARC) form for UA that comply with Part-ML.UAS.

The proposed set of amendments to Commission Regulation (EU) No 748/2012, although being developed to cover the airworthiness of UAS subject to certification which are operated in the 'specific' category, are meant to be applicable also for UAS operated in the 'certified' category of operations.

2.3.1.4. CMUs and CMU components

2.3.1.5. Design of CMUs and CMU components

Design solutions for CMUs vary significantly depending on the level of intervention of the remote pilot during the different phases of an operation, during the different phases of flight, and the respective operational concept. The CMU may be contained in a room or in a transportable vehicle, with all the required systems for its operation, or may be deployed with distributed architecture across several rooms, buildings or even transportable vehicles, and may include certain conventional non-aviation systems to ensure appropriate environmental conditions for the pilot and/or the systems. In other cases, the CMU may be very simple, constituted by a few components without container or the need for installation in a building.

The following aspects are important with regard to the type certification of a CMU:

— When the CMU is certified separately from the UA, the type-certification basis of the UAS may not include those elements of the CMU type-certification basis whose compliance has already been demonstrated; however, those requirements addressing the interface between UA and CMU will still have to be addressed to ensure full interoperability of the CMU with the UA.

— As per new point 21.A.308, it is proposed to distinguish between CMU components which are critical for the operation and CMU components which are not critical for the operation. As it is expected that many elements of the CMU will be commercial off-the-shelf (COTS) components not necessarily based on aviation standards, the requirement to accompany such components with an EASA Form 1 should be limited to those classified as critical. The concept of criticality, in the context of point 21.A.308, shall be developed on the level of AMC and GM.

— CMU components need to be specified to the level of detail required to ensure compliance with the relevant airworthiness requirements of the UAS or the CMU and covered by instructions for continued airworthiness (ICAs) to ensure that airworthiness standards are maintained throughout their operational life. Critical CMU components need to be uniquely identified at part number (PN) level and must be accompanied by an authorised release certificate (EASA Form 1) to be eligible for installation on a CMU.

The process for issuing ETSOA applies to 'articles' as defined in Commission Regulation (EU) No 748/2012. This process has now been adapted to include the possibility of issuing an ETSO authorisation for CMU components.

The CMU must be designed by an approved design organisation with the appropriate terms of approval.

Design changes to the CMU that affect the specifications approved as part of the UAS type design are treated as changes to the UA TC or, when the CMU is issued with a TC, changes to the CMU TC, and must be approved according to Subpart D of Part 21.

2.3.1.6. Production of CMUs and CMU components

Unless Subpart F of Part 21 applies, the CMU or the CMU critical components shall be manufactured by an approved production organisation in accordance with approved design data. The CMU or the CMU critical components shall be delivered to the UAS operator with a conformity statement (EASA Form 1) and, if so prescribed by the design approval holder, need to be installed in accordance with the applicable installation instructions.

2.3.1.7. Installation of CMUs and CMU components

If the design approval holder determines that it is necessary, the CMU may need to be installed in a physical environment, in accordance with the specifications of the CMU type design or the UAS type design. The installation shall be released by the Part-CAO.UAS organisation (refer to Section 2.3.2) in accordance with all the necessary instructions issued by the holder of the CMU TC (when the CMU has its own TC) or the holder of the UA TC.

2.3.1.8. CMU identification

A CMU shall not be registered like an aircraft, and no CofA shall be issued. A CMU produced under Subpart F or Subpart G shall, however, need to be identified with the information already applicable to products as per point 21.A.801(a).

A new requirement (that is, point 21.A.801(e)) is added to cover the specific means to provide such information.

2.3.1.9. Airworthiness directives (ADs)

UAS and CMUs shall meet the requirements of points 21.A.3A and 21.A.3B. The holder of a UA TC, a CMU TC or an ETSOA for CMU components shall establish a system for collecting, investigating and analysing occurrences reported by UAS operators. When a failure, malfunction, defect or other occurrence provides evidence that the operation of a UAS requires action to be taken to restore safety to an acceptable level, an AD shall be issued for the UAS, the CMU or the CMU component to correct the unsafe condition.

2.3.1.10. Adaptation of the forms in the appendices to Part 21

In addition to what is mentioned above regarding airworthiness review certificates (ARCs), EASA Form 1 and CofAs, it is highlighted that the ‘AIRCRAFT STATEMENT OF CONFORMITY’ (EASA Form 52) is extended to UAS, and the ‘PERMIT TO FLY’ (PtF) (Form 20a and Form 20b) is adapted to identify the CMU.

2.3.2. Continuing airworthiness (CAW)

2.3.2.1. General approach

As regards unmanned aircraft, Article 58 of the Basic Regulation requires a delegated act[27] (DA) to regulate the maintenance of UAS, as opposed to Commission Regulation (EU) No 1321/2014[28] which regulates the continuing airworthiness of manned aircraft.

To provide for a clear and comprehensive regulatory framework, EASA proposes to include all aspects of UAS continuing airworthiness (maintenance and continuing airworthiness management) in such new DA, which shall facilitate the establishment of compliance by the regulated entities with the applicable requirements.

In addition, in accordance with Article 62(15) of the Basic Regulation, EASA also proposes a new implementing act (IA) laying down the provisions and requirements for the competent authorities that are responsible for the oversight and enforcement of the DA.

The objective of each of these new regulations is to address the UAS CAW requirements for operations in the 'certified' category as well as for high-risk operations in the 'specific' category (where the UA is subject to an airworthiness certificate). In the DA, the annexes shall apply either to the 'certified' category or to the 'specific' category (high-risk operations).

It is to be noted that this Opinion introduces a new element which was not considered when consulting the initial proposal in the NPA: the need to obtain a permit to fly (PtF) (in addition to the operational authorisation) if the airworthiness certificate is invalid. This led to the addition of a PtF privilege for CAO.UAS organisations (point CAO.UAS.095(e)), accompanied by the necessary requirements for staff qualifications, record-keeping, scope of work and PtF issuance, as well as the amendment of the Part-CAO.UAS certificate (EASA Form 3-CAO.UAS).

2.3.2.2. Draft delegated act (DA) on the continuing airworthiness of UAS

Structure of the draft DA

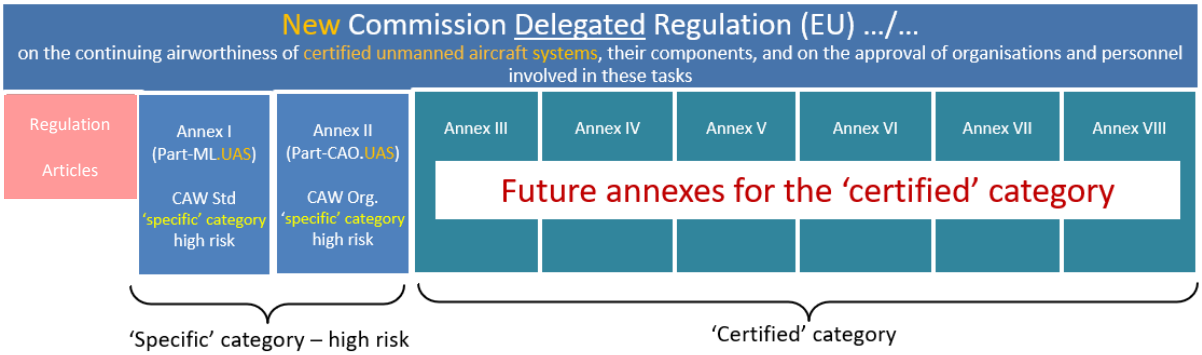
This Opinion puts forward two draft annexes to the draft DA, dedicated to address high-risk operations in the 'specific' category (SAIL V–VI) (i.e. where the UA is subject to an airworthiness certificate). The first draft annex (Part-ML.UAS) lays down the continuing airworthiness standards to be met by the UAS, while the second one (Part-CAO.UAS) lays down the organisational requirements (i.e. Part-CAO.UAS organisations) for the entity responsible for implementing these continuing

[27] The Treaty on the Functioning of the European Union (the Lisbon Treaty) distinguishes between two types of non-legislative acts that are not adopted by legislative procedure: delegated acts (Article 290) to supplement the law, and implementing acts (Article 291) to implement the law.
The two types of acts are delegated to the Commission and are subject to different procedures:
— implementing acts (IAs) are subject to vote by the Member States in committees; the European Parliament (EP) and the Council can scrutinise the IAs and have a permanent right of information on their contents;
— delegated acts (DAs) are not subject to voting in committees; the European Parliament and the Council may veto them or revoke the delegation to the Commission.
For each domain that is subject to rulemaking by EASA, the Basic Regulation specifies which type of act is to be used.
For example, for 'manned' aircraft, Article 17 of the Basic Regulation states that continuing airworthiness topics shall be regulated by implementing acts (IAs). Hence, Commission Regulation (EU) No 1321/2014 is now subject to amendment by means of an IA (i.e. Commission Implementing Regulation).

[28] 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) (EUR-Lex - 32014R1321 - EN - EUR-Lex (europa.eu)).

airworthiness standards. Future annexes to address operations in the 'certified' category shall be developed with a subsequent NPA in the context of this RMT.

Figure 2 — Structure of the draft DA on the continuing airworthiness of UAS



As their names suggest, the new annexes for the 'specific' category have been developed on the basis of Annexes Vb (Part-ML) and Vd (Part-CAO) to Commission Regulation (EU) No 1321/2014 using, where suitable and appropriate, similar conventions / numbering schemes as regards subparts and points. Nevertheless, adaptations have been made to Part-ML.UAS and to Part-CAO.UAS to consider the UAS framework in general and the aspects of the 'specific' category in particular. The principal differences of Part-ML.UAS and Part-CAO.UAS with Part-ML and Part-CAO are the following:

— Part-ML.UAS and Part-CAO.UAS consider and address the specificities of the CMU, which does not exist in manned aviation (see specificities of these parts below).

— No maintenance licensing is proposed for UAS in the 'specific' category. This notably implies that the requirements for 'independent certifying staff' in Part-ML have not been extended to Part-ML.UAS. However, requirements have been developed for UAS maintenance organisations to establish a 'company authorisation' mechanism for certifying staff instead.

— The absence of maintenance licensing also results in the absence of requirements for approved maintenance training organisations involved with UAS operated in the 'specific' category.

— No requirements have been developed for 'pilot-owner maintenance', considering that the pilot will not be aboard the aircraft and that the remote-pilot qualification will be less extensive than in manned aviation.

The scope of this Opinion is limited to the extent that only organisations that have their principal place of business in Europe are eligible for a Part-CAO.UAS approval.

Scope of the draft DA

It is important to note that Part-ML.UAS and Part-CAO.UAS will not be applicable to all UAS that are subject to certification and operated in the 'specific' category. These annexes shall become applicable only once the operator has obtained a certificate of airworthiness (CofA) or a restricted CofA. Through the amendment of Article 7 of Commission Implementing Regulation (EU) 2019/947, this airworthiness certificate shall be required when the intended UAS operations entail a risk that cannot be adequately mitigated without the certification of the UAS (refer to Article 40(1)(d) of Commission Delegated Regulation (EU) 2019/945).

If the UAS subject to certification is operated in medium[29] risk, it is considered that the UAS operator complies with Commission Implementing Regulation (EU) 2019/947. An airworthiness certificate and adherence to Part-ML.UAS and Part-CAO.UAS is not required. Should the UAS operation later change to high risk, an airworthiness review (AR) would be required for the obtention of the CofA, preceded by the embodiment of a supplemental type certificate (STC) or major change if the UA was initially certified for medium-risk operations only.

Specificities of Annex I (Part-ML.UAS)

Subpart B

The UAS operator has the obligation to contract one or more Part-CAO.UAS organisations (point ML.UAS.201):

— for the continuing airworthiness management of the UAS operated;

— for the maintenance of the UAS operated.

Note: The operator may itself be approved as Part-CAO.UAS organisation.

Subpart C

The UAS maintenance programme (point ML.UAS.302):

— includes the tasks related to the UA and the CMU (individual CMU and UA tasks may be listed and followed separately);

— requires compliance with mandatory continuing airworthiness information (e.g. airworthiness directives (ADs), airworthiness limitations section (ALS));

— requires compliance with the ICAs, but deviations are possible for non-mandatory ICAs;

— is approved by the Part-CAO.UAS organisation.

Modifications and repairs (point ML.UAS.304):

— for UAS and components, modifications and repairs must be approved under Part 21.

Record-keeping (point ML.UAS.305):

— adaptations have been made (compared with point ML.A.305) to reflect a more real-time-oriented access to the records/logs by the remote pilot, maintenance staff, and staff responsible for the pre-flight inspection.

Subpart E

Installation of the CMU components on the CMU (point ML.UAS.520):

— this follows the requirements established in Part 21 (point 21.A.308): for critical components (i.e. point 21.A.308(a) components), an EASA Form 1 is required whereas for non-critical components (i.e. points 21.A.308(b) components), a declaration is sufficient.

Maintenance of the CMU components (point ML.UAS.520):

[29] 'Medium risk' is used to indicate operations in the specific category SAIL III and IV; 'high risk' is used to indicate operations in the specific category SAIL V and VI.

— critical components must be maintained by a maintenance organisation that holds a CAO.UAS approval, and an EASA Form 1 must be issued (see also point ML.UAS.804);

— the person or organisation that performs the maintenance of non-critical components is not regulated, but a 'declaration of maintenance accomplished' must be issued;

— alternatively to the two points above, if the maintenance of the CMU component is performed while remaining installed or being temporarily removed (and reinstalled on the same CMU), such component maintenance may be released together with the CMU maintenance (point ML.UAS.803).

Subpart H

Installation of the CMU (point ML.UAS.805):

— the design approval holder (DAH) may require the CMU to be installed in a physical environment; in this case, such installation must be released by certifying staff of the Part-CAO.UAS organisation (see also point CAO.UAS.095) in accordance with the DAH installation instructions.

Maintenance of the CMU (point ML.UAS.803):

— maintenance carried out in respect of the critical components must be released in a manner similar to UA maintenance.

Subpart I

Airworthiness review (AR) of the UA (points ML.UAS.901 and ML.UAS.903):

— the AR may be carried out by any Part-CAO.UAS organisation that has AR privileges, or by the national competent authority (NCA);

— the AR of the UA includes a review of the CMU(s) used to operate the UA, unless such CMU(s) has (have) been included in an AR in the last 6 months;

— the airworthiness review certificate (ARC) is issued on an EASA Form 15d (see Appendix II) by the NCA or the Part-CAO.UAS organisation;

— the ARC may be extended by the Part-CAO.UAS organisation that has been contracted for the management of the given UA, under certain conditions.

Appendices

Appendix II:

— the 'EASA Form 1' fill-in instructions have been adapted to UAS, considering in particular the possible 'dual release' eligible for installation in both manned and unmanned aircraft (e.g. Part-145 + Part-CAO.UAS).

Note: As regards EASA Form 1, reference shall be made to Appendix II to Annex I (Part-M) to Regulation (EU) No 1321/2014. Hence, the same EASA Form 1 shall be used for UAS.

Specificities of Annex II (Part-CAO.UAS)

No safety management system (SMS) is required for Part-CAO.UAS organisations, but the term 'quality system' is replaced by 'compliance monitoring', which better reflects the intent of such system (point CAO.UAS.100).

Compliance with the requirements for the management of information security (refer to Commission Delegated Regulation (EU) 2022/1645) is not required, but 'light' cybersecurity requirements have been developed (point CAO.UAS.102).

Due to the absence of a maintenance licence, supplementary requirements for personnel (point CAO.UAS.035) have been added for the qualifications of certifying staff (point CAO.UAS.040).

Occurrence-reporting requirements have been included to ensure compliance with both Regulation (EU) No 376/2014 and the Basic Regulation (including reporting to the DAH) (point CAO.UAS.120).

Due to the specificities of UAS operations, additional procedures (as applicable) must be detailed by the organisation in its organisation manual (point CAO.UAS.025), and in particular:

— procedures for maintenance work performed at a location other than the approved facilities;

— procedures for UA maintenance work performed and released remotely from the CU.

2.3.2.3. Draft implementing act (IA) on competent authority requirements

Structure of the draft IA

The proposed draft IA contains a sole annex (Part-AR.UAS), which comprises two subparts:

— **Subpart GEN** establishes general and 'traditional' competent authority requirements (management system, record-keeping, oversight principles, etc.) for the oversight of continuing airworthiness organisations.

Note 1: In the future, the same oversight principles shall apply to organisations involved in the continuing airworthiness of UAS operated in the 'certified' category.

Note 2: Subpart GEN includes the requirement for compliance with Annex I (Part-IS.AR) to Commission Implementing Regulation (EU) 2023/203 (Information security) (and in particular point AR.UAS.GEN.200).

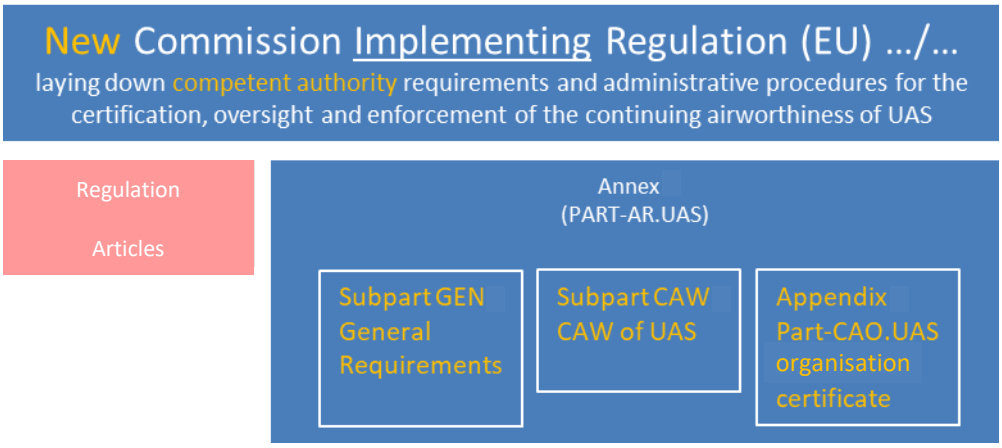
— **Subpart CAW** establishes domain-specific requirements in relation to competent authority tasks and responsibilities regarding the oversight of the continuing airworthiness of UAS, and the issue of airworthiness review certificates (ARCs).

Note 1: Subpart CAW shall be complemented in the context of a future NPA developed under RMT.0230 with additional requirements for the 'certified' category, e.g. approval of the UAS maintenance programme.

Note 2: For the purposes of this Subpart, the competent authority is the authority designated by the Member State of registry of the UA. That authority shall also be responsible for the oversight of the continuing airworthiness of the CU to the extent that it applies to the UA registered in that Member State (point AR.UAS.GEN.010).

Note 3: Subpart CAW includes a survey programme of the UA included in the competent authority registry, similar to the aircraft continuing airworthiness monitoring (ACAM) in manned aviation (point AR.UAS.CAW.303).

Figure 3 — Structure of the draft IA on the continuing airworthiness of UAS



2.3.3. Regulations on UAS

2.3.3.1. From 'command unit' to 'control and monitoring unit'

The existing definition of 'command unit', as given in Article 2(26) of Commission Implementing Regulation (EU) 2019/947 and in Article 3(38) of Commission Delegated Regulation (EU) 2019/945, refers to the functions of 'control or monitoring of the unmanned aircraft during any phase of flight'. Such definition relates two concepts that are rather complementary to each other. Common literature draws a clear distinction between the concept of 'command' and 'control' as they are defined as follows:

— 'command' is the authority vested in an individual for the direction, coordination and control of functions and tasks required for a flight operation; such authority may be exercised either directly by executing the flight operation, or by directing other individuals/organisations involved in the flight operation;

— 'control' is the management and execution of functions and tasks required for a flight operation consistent with a command authority.

The operational assumptions underpinning the regulatory framework for UAS proposed by EASA state that:

— a human is always in command as autonomous operations are excluded;

— the remote pilot may control one unmanned aircraft (UA) at a time, or control simultaneously several UA, also of different types and from different operators;

— the handover of command is not considered; however, the handover of control of an UA between different command units, hence between different remote pilots, is possible.

Given the above assumptions and notional concepts, there is a need to coherently identify the system that provides the functions to control and monitor the UA's flight operation and through which the command authority may be exercised. Depending on the specific operational concepts, the command and control of a UA's flight operation may be exercised by the same person or by different members of the UAS operator's organisation. Accordingly, duties and responsibilities for the safe conduct of the flight may be allocated to different persons within the organisation.

The replacement of the 'command unit' with the newly proposed concept of 'control and monitoring unit' re-establishes coherence with the functions that can be exercised through that specific system. The definition accommodates a variety of operational concepts ranging from those where the system can actively control and monitor the flight trajectory of the UA to those where the system is limited to a monitoring function and where the UA flies under increased levels of automation up to complete autonomy.

2.3.3.2. Commission Delegated Regulation (EU) 2019/945

The definition of 'C2 link service' is deleted since it was used only in connection with the former definition of 'command unit'. A new definition of 'C2 link' is added, consistent with the ICAO definition.

Article 40(1) of Commission Delegated Regulation (EU) 2019/945 establishes the conditions for which a type certificate for a UAS and its compliance with the continuing airworthiness Regulation is required.

It establishes four different conditions. The first three are directly derived from the risk assessment methodology defined in the AMC to Article 11 (SORA) of Commission Implementing Regulation (EU) 2019/947 that clearly excludes from the 'specific' category operations performed over assemblies of people with UAS of a characteristic dimension of 3 m or greater, or when passengers are on board, or when UAS transport dangerous goods not properly protected in an appropriate container.

The first condition of a 3-m large UAS flying over assemblies of people is based on the risk posed by the UAS in case of crash, considering the associated average kinetic energy. As a matter of fact, the model used in the SORA has been built based on aircraft configurations other than lighter-than-air (i.e. fixed-wing aircraft and rotorcraft). The dynamic and energy associated with a potential crash of a lighter-than-air UAS are quite different considering the materials with which they are built and the speed at which they descend in case of deflation. Therefore, it is not considered appropriate to require in all cases a type certificate for lighter-than-air UAS larger than 3 m and operating over assemblies of people. In such case, the UAS operator should carry out a risk assessment and verify whether proper mitigating measures and safety objectives can be identified to classify the operation in the 'specific' category. If this is not possible, point 1(d) of Article 40 shall still apply and the UAS operation shall be classified in the 'certified' category, requiring a type certificate and compliance with the continuing airworthiness Regulation.

Article 40(2) of Commission Delegated Regulation (EU) 2019/945 is amended for clarification purposes:

— the first sentence establishes that the certification of any UAS shall follow the process laid down in Part 21, regardless of the reason why certification is sought;

— the second sentence, however, establishes that the UAS continuing airworthiness Regulation shall apply only to those UAS that have been certified for the reasons established in Article 40(1) of that Regulation.

This means that if a UAS is certified but its certification is not required for the intended type of operation (i.e. certified UAS used in low- or medium-risk operations in the 'specific' category), then the UAS is not subject to the UAS continuing airworthiness Regulation.

2.3.3.3. Commission Implementing Regulation (EU) 2019/947

The title of the Regulation is amended by adding 'systems' to read 'rules and procedures for the operation of unmanned aircraft systems', to be consistent with the rest of its contents.

The definitions in Article 2 are amended to reflect the changes described in Article 3 of Commission Delegated Regulation (EU) 2019/945. Moreover, the definition of 'UAS component' used in point UAS.SPEC.100 is added.

In relation to the proposed amendment of Article 40(2) of Commission Delegated Regulation (EU) 2019/945, Article 7(2) of Commission Implementing Regulation (EU) 2019/947 is amended to impose the obligation to the UAS operator to obtain a (restricted) CofA in the case where the certification of the UAS is required by the type of the intended 'specific' category operation.

This means that if a UAS is certified but its certification is not required by the type of the intended operation, then the UAS operator does not have to obtain a (restricted) CofA. The same approach applies to the noise certificate; however, there may be cases where the UA is not subject to noise requirements.

Article 12 is amended to complement the information that is necessary for the issue of an operational authorisation. If a (restricted) CofA and a noise certificate have been issued in accordance with the (amended) Article 7(2), then this information should be provided. In addition, if the certificate of airworthiness has been issued but is temporarily not valid, information on flight conditions (approved in accordance with Part 21) should be provided.

Point UAS.SPEC.100 is amended to differentiate between the case where a UAS with a (restricted) CofA is used and the case where only certified equipment is used on a UAS. In the first case, the UAS operator shall comply with the new UAS continuing airworthiness Regulation. In the second case, the UAS operator has only limited obligations in respect of the continuing airworthiness of the certified UAS component. A UAS component may be any engine, propeller or part of the UA, or any element of the control and monitoring unit (CMU). Moreover, a requirement is added for operators that operate certified UAS in the 'specific' category to implement any safety measures or mandatory safety information (including airworthiness directives) mandated or issued by the competent authority or by EASA.

2.3.4. Air Operations

2.3.4.1. Definition of 'rotorcraft' and 'helicopter'

The proposed definition of 'VTOL-capable aircraft' (VCA)[30] maintains the focus on the physics of the flight, and it introduces the generic notion of lift/thrust units as elements that ensure the vertical take-off and landing capability of the aircraft. While the proposed definition does not address the aspects of control and automation implied by the definition of 'VCA' as adopted with the EASA SC VTOL, it shall offer increased versatility with regard to operational requirements.

The proposed definition also requires a change in the existing definition of 'helicopter' in Commission Regulation (EU) No 965/2012, in Commission Implementing Regulation (EU) No 923/2012 and in Commission Regulation (EU) No 1178/2011 in order to ensure a clear distinction between these two

[30] A power-driven, heavier-than-air aircraft, other than aeroplane or rotorcraft, capable of performing vertical take-off and landing by means of lift/thrust units used to provide lift during the take-off and landing.

definitions of 'aircraft'. In particular, it is proposed to limit the definition of 'helicopter' to 'a type of rotorcraft supported in flight chiefly by the reaction of the air on up to two power-driven rotors on substantially vertical axes'.

Consequently, to ensure a coherent organisation of the categories of aircraft, it is also necessary to introduce in the above-mentioned Regulations the definition of 'rotorcraft' to make sure that helicopters and gyrocopters are considered a subcategory of rotorcraft, and that rotorcraft is defined as a 'power-driven, heavier-than-air aircraft that depends principally for its support in flight on the lift generated by up to two rotors'.

Should the proposed amendments to the definitions be finally adopted, EASA shall take appropriate action to inform Member States and assist them in the notification process of the differences in relation to the respective provisions of the ICAO Convention.

2.3.4.2. Assumptions about the regulation of VCA operations

The types of aircraft that will be used to offer innovative air mobility (IAM) services do not fall into one of the known categories of aeroplanes or rotorcraft. VCA are considered an emerging type of aircraft that will need to develop over time.

IAM is conceived in such a way in order to accommodate a diverse array of aircraft types whose designs are enabled by ongoing innovations particularly in the area of hybrid and electric propulsion systems, energy storage, lightweight materials, digitalisation, and automation. These innovations have enabled an array of novel designs spanning from multirotor, tilt wing, tilt rotor, powered wing, offering short take-off and landing (STOL) to vertical take-off and landing (VTOL) capabilities.

Apart from the capability to vertically take off and land (which is not necessarily so unique), many VCA designs under development have specific (distributed) propulsion features and other elements that could facilitate/ease the conversion to unmanned configuration.

However, it is not only the novelties in aircraft design that justify the development of specific operating requirements for VCA, differentiating from those applicable to aeroplanes and helicopters. This is the entire network of interconnected systems and elements that underpin the technological advancements used to boost urban air mobility (UAM), including new infrastructure solutions and new personnel competencies.

The specificities of VCA operations are also to be considered. In urban areas, for example, account should be taken of third parties on the ground, obstacles in the take-off and landing paths, urban weather phenomena, infrastructure constraints, energy management, to name a few. Therefore, in abnormal situations, the VCA should be able to continue its flight and safely land at a vertiport causing no damage to passengers nor to third parties on the ground. The route should, therefore, be carefully selected so that en-route diversion locations may be reached within the aircraft performance and the remaining usable energy.

Robust mitigation measures are, therefore, needed for the expected safety risks.

The use of predefined routes for flights over urban environments and densely populated areas is seen and recommended as one of the possible mitigation measures to address ground and collision risks.

Predefined routes may be specific routes or corridors, or geographical areas, which the competent authority may establish in its territory for use by VCA operators where operations may be conducted within acceptable air and ground risks and under specified conditions.

It must be noted that, today, also helicopter operations in urban (congested) areas, excluding HEMS/police/alike operations, usually follow predetermined routes published in aeronautical information publications (AIPs).

Outside urban environments, manned VCA may be handled like any other manned aircraft.

VCA meet the definition of 'aircraft'. Air operations with aircraft have been historically and globally governed by comprehensive regulations, as are other aspects of utilisation of aircraft: registration, airworthiness, air navigation, flight crew licensing, aerodromes, to name a few.

Today, air operations with aeroplanes and helicopters are governed by Commission Regulation (EU) No 965/2012. That Regulation also lays down requirements for the certification of commercial air transport (CAT) operators that operate aircraft (aeroplanes and helicopters) registered in the EU Member States.

Commission Regulation (EU) No 965/2012 does not contain any dedicated requirements for the safe operation of novel aircraft designs, such as VCA, but contains safety standards based on experience gained during the last century.

Air operations with VCA require a level of safety that is at least as high as that applicable to air operations with conventional aeroplanes or helicopters. In some respects, especially due to the novel designs and the lack of operational experience, the precautionary principle should be exercised until more data on operations with innovative aircraft is gathered.

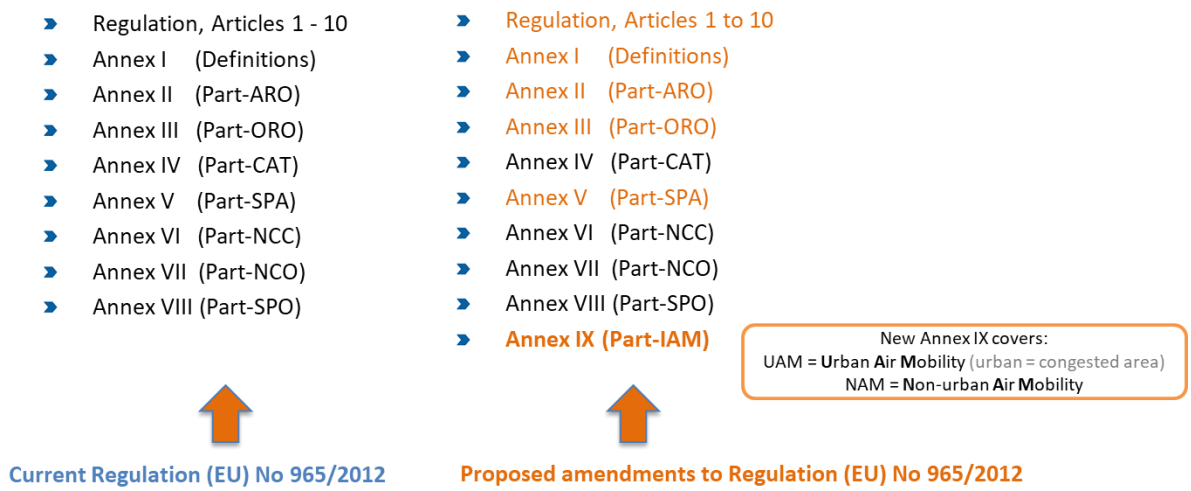
One possible way to achieve the safe roll-out of VCA and their sustainable operation is by drawing upon current standards to identify elements that could be applicable to VCA. For VCA operations to be successfully implemented, safety is the main key factor with public acceptance being equally important. In the recent past, some notable accidents that involved helicopters flying between aerodromes and cities have weakened much of the public support for this type of urban mobility.

2.3.4.3. Amendments to the existing regulatory structure

For the integration of VCA into the transportation systems of the EU Member States, it has been found appropriate to employ the regulatory structure available today for operations with aeroplanes and helicopters (

Figure 4) with the necessary amendments considering novel aircraft designs, types of propulsion, and concepts of operation.

Figure 4 — Proposed amendments to Commission Regulation (EU) No 965/2012



Novel aircraft designs and new concepts of operation require an innovative regulatory approach. To lay the foundations of future VCA operations and differentiate between safety requirements according to operational environments and risks involved, EASA has developed the concept of innovative air mobility (IAM), urban air mobility (UAM), and non-urban air mobility (NAM).

IAM is intended to cover any operation with VCA over congested (urban) and non-congested areas. More specifically, for the purpose of air operations, IAM shall cover CAT operations and non-commercial operations with UAS and VCA over congested (urban) and non-congested areas.

UAM is a subset of IAM operations, where at least one segment of the flight is within a congested (urban) area.

NAM is also a subset of IAM operations where all segments of the flight are outside congested (urban) areas.

An IAM operator may be a CAT operator, a non-commercial operator, or a VEMS operator. An IAM operator certified for urban (UAM) operations may also operate in non-urban areas (NAM). An IAM operator certified for NAM operations shall not operate in UAM.

UA operations in the 'certified' category shall also be included in the concept of IAM. Commission Implementing Regulation (EU) 2019/947 introduced three new categories of operations with UA, based on an operation-centric approach: 'open', 'specific' and 'certified' (these categories relate to the operation rather than to the aircraft). An operation in the 'certified' category requires the certification of the aircraft and its operator (AOC), and the licensing of flight crews (refer to Article 6 of Commission Implementing Regulation (EU) 2019/947).

All operations with VCA are associated with operations in the 'certified' category, although in the initial roll-out of VCA these operations will be performed in manned configuration. The presence of a pilot on board is a temporary mitigation measure, aimed to ensure a level of safety equivalent to that of helicopter operations and to facilitate societal acceptance.

These concepts shall be gradually embodied in new Annex IX (Part-IAM) to Commission Regulation (EU) No 965/2012.

As shown in Figure 5 below, Annex IX (Part-IAM) consists of four subparts:

— GENERAL (GEN),

— OPERATING PROCEDURES (OP),

— AIRCRAFT PERFORMANCE AND OPERATING LIMITATIONS (POL), and

— INSTRUMENTS, DATA AND EQUIPMENT (IDE).

Each subpart, except GEN, shall be structured in two modules: operations in congested (urban) areas (Module-UAM) and operations in non-congested areas (Module-NAM).

Modules 'UAM' shall address operations with VCA certified in accordance with the 'enhanced category' requirements of SC VTOL or equivalent, and shall be designed for point-to-point passenger air taxi and/or cargo-carrying operations or package deliveries in densely populated urban areas or between such areas and suburbs where transportation centres/hubs may be located (known as congested areas) or originating from a congested area to a non-congested area. Modules 'UAM' are intended to provide the highest level of protection of third parties on the ground and of fare-paying passengers (air taxis).

Modules 'NAM' shall address operations with VCA certified in accordance with the 'basic category' requirements of SC VTOL or equivalent, and shall be designed for operations within and between regional areas, without overflying or taking off from / landing at urban areas. Modules 'NAM' shall be mostly relevant for non-commercial, low-risk operations with VCA.

Some of the subparts will be further divided into sections:

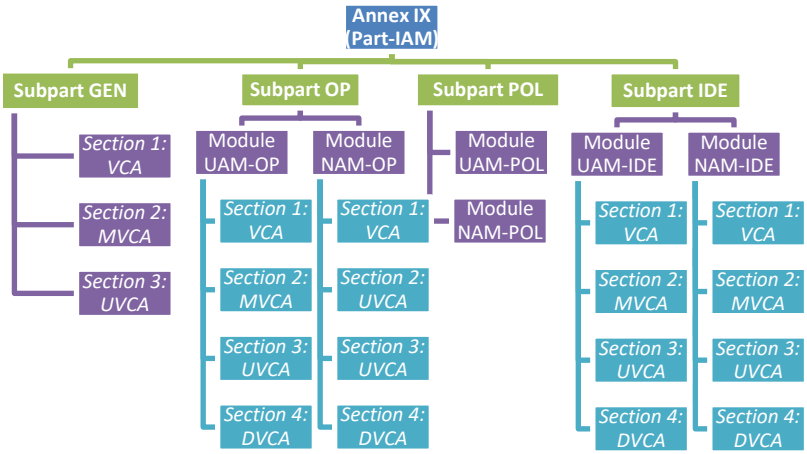
— Section 1: GENERAL REQUIREMENTS FOR VCA (VCA),

— Section 2: MANNED VCA (MVCA) THAT CARRY PASSENGERS AND/OR CARGO,

— Section 3: UNMANNED VCA (UVCA) THAT CARRY PASSENGERS AND/OR CARGO, and

— Section 4: UNMANNED VCA THAT CARRY CARGO (DVCA) ONLY.

Figure 5 — Structure of Annex IX (Part-IAM)



Modules 'NAM', as well as Sections 3 and 4, shall be dealt with in subsequent NPAs under RMT.0230.

2.3.4.4. Air operator certification and responsibilities of the air operator certificate (AOC) holder

Air operations with aeroplanes and helicopters are traditionally regulated on the basis of whether or not the flight is part of a commercial operation[31] or a CAT operation[32]. Moreover, for CAT operations, the certification of the air operator is required (i.e. issuance of an air operator certificate (AOC)) and the establishment of a safety management system (SMS). Commercial operations typically pose higher safety risks than general aviation does and, therefore, require additional measures in the form of air operator certification.

It is expected that in the early stages of the roll-out of VCA, most of the initial VCA operations will be commercial by nature (e.g. air taxi, VEMS, sightseeing or similar), while non-commercial operations (e.g. for leisure, corporate trips, etc.) will represent only a small portion.

The entry of electric and hybrid electric VCA into the market of urban and intercity air services is expected to pose new threats to aviation safety and security. The certification of VCA operators is an important part of the effort to ensure safe and reliable air operations. It helps to ensure that VCA operators have the necessary skills, sufficient experience, and have received appropriate training to operate their aircraft safely and in compliance with all applicable laws and regulations.

The safety levels of VCA operations (refer to the impact assessment of NPA 2022-06) have been compared to current helicopter operations of CAT operators (AOC holders) over congested areas. The comparative assessment of the potential safety hazards posed by VCA operations clearly points to the need of increased mitigating measures in the area of flight crew training, building of safety culture, as well as safety and security risk management.

An appropriate level of oversight and regulation should be in place to ensure both the safety and the protection of interests of residents and their property and of passengers. The risks of flying in urban areas are the same for all users of that airspace, regardless of whether they are AOC holders or not. The issue is how those risks are recognised and addressed. The certification of VCA operators is, therefore, proposed as a mitigation means for all known and potential safety risks.

With the accumulation over time of more experience with, and data from, VCA operations, sufficient flexibility may be provided for, including an adequate framework for the assessment and oversight of non-commercial operators other than the issuance of AOCs.

Annex III (Part-ORO) to Commission Regulation (EU) No 965/2012 lays down requirements for the certification of CAT operators that operate aircraft (aeroplanes and helicopters) registered in the EU Member States. Annex III shall, therefore, be used for the certification of VCA operators.

The applicant for an AOC shall have established a management system, including a safety risk management function, tailored to the complexity of its organisation and the intended operations. This includes the ability to develop safety cases and assess tactical and strategic risks of the intended operations by applying a validated risk assessment methodology and mitigate them.

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[31] The term 'commercial operation' includes 'commercial air transport' (CAT) and is defined in Article 3 of Regulation (EU) No 965/2012 as follows: '"commercial operation" means any operation of an aircraft, in return for remuneration or other valuable consideration, which is available for the public or, when not made available to the public, which is performed under a contract between an operator and a customer, where the latter has no control over the operator;'

[32] The term 'commercial air transport (CAT) operation' is defined in Article 3 of Regulation (EU) 2018/1139 as follows: '"commercial air transport" means an aircraft operation to transport passengers, cargo or mail for remuneration or other valuable consideration.'

The main responsibilities of the AOC holder are to:

— establish appropriate procedures for the operational control of its aircraft;

— ensure that pilots are licensed, depending on the level of automation of the aircraft, appropriately rated, and remain competent;

— ensure that team members (pilots, mechanics, ground-handling staff, etc.) have received appropriate training and have adequate security clearance;

— ensure that the operation of VCA complies with the applicable EU regulations and with the airspace requirements of the Member State where the operation is conducted.

2.3.4.5. Operational requirements and specific approvals

Annex IX (Part-IAM) to Commission Regulation (EU) No 965/2012 is aligned with the type-certification specifications of SC VTOL that are used for the certification of VCA designs. Annex IX (Part-IAM) may accommodate any other equivalent certification basis that might be available in the EU or in a third country in the future. It has been conceived as a technology-agnostic document in order to be able to cater for future technologies or for performance limitations of current technologies.

The main concerns regarding VCA operations relate to pre-flight preparation, selection of vertiports and locations for diversion, fuel/energy management and operational limitations. Annex IX (Part-IAM), therefore, addresses all of them.

VCA operators are required to perform a careful pre-flight planning and operate only if weather conditions are appropriate for the intended operation. When planning passenger operations, VCA operators shall, for departure and arrival, select only those vertiports that are adequate, available, and are at or above the applicable weather minima.

VCA operators shall only use vertiports for normal passenger operations and for diversion. If a VCA operator has an approved method for selection of diversion locations, it may also select en-route diversion locations instead of vertiports. Operators of emergency medical services with VCA (VEMS) may also use operating sites and public interest sites (PISs) that are approved by the competent authority.

A vertiport is 'an area of land, water, or structure used or intended to be used for the landing and take-off of VTOL'. Hence, a vertiport is a type of aerodrome.

However, not every aerodrome will be adequate for VCA movements. Therefore, Annex IX (Part-IAM) contains requirements for the adequacy of vertiports as they should meet the VCA dimensions and weight and take-off and landing performance to clear obstacles and should be provided with firefighting services and other services and facilities as necessary for the intended operation.

In March 2022, EASA published 'Prototype Technical Specifications for the Design of VFR Vertiports for Operation with Manned VTOL-Capable Aircraft Certified in the Enhanced Category (PTS-VPT-DSN)'[33]. These prototype technical specifications have been developed as guidance material for the design of VFR vertiports and describe in detail the physical characteristics of a vertiport, the required obstacle environment, visual aids, lights and markings, as well as more flexible concepts for en-route vertiports that may be used for continued safe flight and landing.

[33] https://www.easa.europa.eu/en/downloads/136259/en

It is expected that most vertiports will be built in urban areas and, therefore, the EASA guidance offers innovative solutions specifically for congested urban environments. A notable innovation is the concept of a funnel-shaped area above the vertiport, designated as an obstacle-free volume. This concept is tailored to the operational capabilities of the new VCA, which can perform landings and take-offs within a vertical segment.

Considering the risk that pertains to electric energy and battery endurance, the concept of 'point of commitment' is proposed. In the flight planning phase, the operator shall establish a point of commitment (which is a virtual reference point) based on the aircraft certified minimum performance and energy reserve requirements. When reaching that point in a real flight operation, the pilot-in-command (PIC) shall commit to land at the destination vertiport or, if this is not possible, at another preselected landing option[34]. For each flight, there shall be two or more landing options available. All safe-landing options shall be reachable from the point of commitment within the performance limitations of the aircraft for that phase of flight and final energy reserves preserved. After that point, a safe landing at the committed landing site should be guaranteed. Planning a destination alternate vertiport beyond the destination vertiport will not be practical and is no longer needed. If a go-around at the destination vertiport is needed due to availability or weather issues, the subsequent flight to an alternate vertiport further down the route may put at risk the safety of the aircraft and its occupants and final energy reserve.

The VCA operator shall always plan the routes taking into account possible degradation of aircraft performance and the phase of flight in which such degradation occurs. This means that all vertiports (departure, arrival) and diversion locations shall be preselected, taking into account the range and other performance parameters for the specific flight phase (such as energy consumption, expected height loss, remaining rate of climb) affected by a single failure or a combination of failures not classified as 'extremely improbable.

The requirements for fuel/energy management take the flight phase into account (hovering, take-off, landing, etc.) as this has a strong impact on energy consumption. In addition, the VCA operator shall ensure that in-flight fuel/energy checks are performed at regular intervals or via an automated dynamic checking process. For that purpose, the PIC shall monitor the amount of usable fuel/energy remaining on board to ensure that it is protected and not less than the fuel/energy that is required to proceed to a vertiport or diversion location where a safe landing can be performed.

Considering that meteorological conditions will have a significant impact on VCA operations, the subject Opinion focuses only on VFR operations by day. Flights may only be commenced if the meteorological reports and forecasts indicate that the expected meteorological conditions at the departure vertiport, along the route to be flown and at the destination vertiport, at the time of arrival, are at or above visual meteorological conditions (VMC).

Similar to aeroplanes and helicopters, the VCA operator shall use meteorological information from certified meteorological service providers in accordance with Commission Implementing Regulation (EU) 2017/373. The VCA operator shall anticipate the probability of encountering unfavourable meteorological conditions, such as severe turbulence and descending air currents.

[34] Landing options may include vertiports, diversion locations, or operating sites.

The specific approvals are regulated under Annex V (Part-SPA) to Commission Regulation (EU) No 965/2012. With regard to VCA operations, Annex V (Part-SPA) is amended.

VCA used for the transport of dangerous goods (DGs) and for emergency medical service operations (VEMS) shall be issued with additional specific approvals. Specific approvals, such as MNPS, RVSM, LVO, etc., for VCA are not foreseen with this Opinion.

ADAC Luftrettung, a German HEMS operator, carried out a study[35] on the feasibility of conducting emergency medical services with VCA (VEMS). This study determined the following: 'Compared to the operation of a rescue transport helicopter, the operation of a multicopter […] with two pilots is excluded, as only two seats (pilot + passenger) are available. As the long-term intention of the manufacturers of eVTOL is to carry out autonomous flights, other multicopter concepts are not designed for operation with two pilots. Only single-pilot operation (with the support of an emergency doctor trained as TC HEMS) is therefore possible and should be considered. It can be assumed that, under consideration of current legal regulations, the specifications of SPA.HEMS.120 would therefore be applicable for a single-pilot cockpit.'

The study also recognised that, as a first step, current VCA designs and performance need to be significantly improved before bringing the medical doctor to the accident site. The second step (transport of patients by the VCA) would require further design and performance enhancements and will be addressed in the future.

The proposed regulatory framework for VEMS under Annex V (Part-SPA) to Commission Regulation (EU) No 965/2012 is, therefore, designed to facilitate that first step. The use of operating sites and public interest sites (PISs) is allowed only for VEMS.

2.3.5. Flight crew licensing

The development of comprehensive flight crew licensing requirements (ab initio training) for manned VCA is under way. A first draft is planned to be published as part of a subsequent, future NPA under RMT.0230. However, it is to be anticipated that some manned VCA manufacturers/operators will already be ready to start operations before the adoption and applicability of the subject draft implementing and delegated acts.

Therefore, in order to ensure that the start of operations with manned VCA in the near future will be supported by the availability of appropriately qualified and licensed flight crews, this Opinion proposes to introduce provisions (new Article 4f to Commission Regulation (EU) No 1178/2011) that will allow holders of commercial pilot licences for aeroplanes (CPL(A)) or helicopters (CPL(H)) to be issued with a VCA type rating that will be endorsed on their CPL(A) or CPL(H), after having completed type-rating training in accordance with the applicable OSD. The proposed Article 4f comprehensively addresses type-rating training including revalidation and renewal, privileges for flying under instrument flight rules (IFR), as well as related instructor and examiner privileges.

This solution (VCA type ratings for existing CPL(A) and CPL(H) holders) will serve as a bridging solution while the relevant comprehensive Part-FCL framework is not yet in place, but it is also planned to keep the content of Article 4f as a permanent arrangement: CPL(A) or CPL(H) holders who wish to continue

[35] ADAC Luftrettung *Feasibility Study on the potential application of multicopters as emergency doctor shuttles* — Result report. Munich, 14 October 2020 (https://luftrettung.adac.de/app/uploads/2020/10/Multikopter_im_Rettungsdienst_-_Machbarkeitsstudie_-_ADAC_Luftrettung.pdf).

their career as VCA pilots will not need to obtain a separate pilot licence for manned VCA; instead, they will be able to add a VCA type rating to their existing licence.

Due to the significant differences between VTOL aircraft under development, for the time being solely type ratings will be established. In the future, different VTOL types may be grouped into classes, provided they have sufficiently similar handling characteristics.

A definition of 'VCA' is proposed to be inserted in Article 2 of Commission Regulation (EU) No 1178/2011, consistently with the definition inserted for the same purpose in Commission Regulation (EU) No 965/2012 and in Commission Regulation (EU) No 923/2012.

That 'bridging solution' would bring about the following:

— **for affected industry stakeholders (operators / training organisations / manufacturers / pilots):** a marginal increase in resources (e.g. staff and/or costs) can be expected related to type-rating training for VCA that needs to be provided to CPL(A) or CPL(H) holders; at the same time, operations with VCA will be supported by the availability of appropriately qualified and licensed flight crews already in the early roll-out phase of VCA operations.

— **for NAAs/EASA:** a marginal increase in resources (e.g. staff) can be expected related to the administration of type ratings for manned VCA that need to be issued to CPL(A) or CPL(H) holders;
at the same time, the 'bridging solution' will provide for a relatively simple way to issue privileges for flying manned VCA, since no initial licensing of pilots would be necessary.

In general, with this 'bridging solution', only pilots that already hold a licence for a conventional aircraft could be involved in operations with manned VCA, with no possibility for ab initio pilot training in VCA. The intention is that only experienced pilots shall fly VCA during the initial roll-out phase of their operation. Experience gained during this phase will contribute to the development of a robust and comprehensive flight crew licensing framework for manned VCA with a future NPA under RMT.0230.

2.3.6. Standardised European rules of the air (SERA)[36]

In general, the main purpose of the SERA provisions is to provide for a safe, orderly and efficient air traffic management and help avoid mid-air collisions. One of the underlying SERA principles is the principle of 'see and avoid' which shall be used by the PIC as last line of defence to avoid mid-air collision in all airspace classes. When the pilot is on board the aircraft, as it is the case for manned VCA, the 'see and avoid' principle is automatically complied with.

As required in point SERA.3105 on minimum heights, and except when necessary for taking off or landing, or except when permitted by the competent authority, an aircraft shall not be flown over congested areas of cities, towns or settlements, or over open-air assemblies of persons, unless at such a height as will permit, in the event of an emergency arising, a landing to be made without undue hazard to persons or property on the ground. The minimum heights for VFR flights shall be those

[36] Commission Implementing Regulation (EU) No 923/2012 of 26 September 2012 laying down the common rules of the air and operational provisions regarding services and procedures in air navigation and amending Implementing Regulation (EU) No 1035/2011 and Regulations (EC) No 1265/2007, (EC) No 1794/2006, (EC) No 730/2006, (EC) No 1033/2006 and (EU) No 255/2010 (OJ L 281, 13.10.2012, p. 1) (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32012R0923&qid=1655032371589).

specified in point SERA.5005(f)[37] and the minimum levels for IFR flights shall be those specified in point SERA.5015(b)[38].

The combined effect of those requirements implies that currently aircraft operations in an urban area may be performed for a very specific purpose (e.g. mainly police helicopters, helicopter emergency medical services (HEMS) operations and, in some cases, specifically authorised operations such as balloons or operations that take off and land at aerodromes located in suburban environments). Due to their design, performance, and operational/business approach, VCA offer a new paradigm to allow more operations in urban environments, depending on the acceptable level of safety, societal acceptance, and noise tolerance.

It is expected that the first type of operations of manned VCA in urban environments will follow a limited set of predefined routes or areas/corridors[39] for which the relevant competent authorities have been assured that the air and ground risks are properly mitigated and, therefore, the objectives of point SERA.3105 shall be met. It must be noted that, today, operations allowed at low level in urban environments (like helicopter operations) also follow predetermined routes. If competent authorities permit aircraft to fly below the minimum heights defined in point SERA.3105, then the safety objectives of point SERA.3105 shall be met. Regarding 'minimum heights', the values of points SERA.5005(f) and SERA.5015(b) do not relieve any aircraft from the obligation to respect the glide-free principle over urban environments referred to in point SERA.3105 'Minimum heights' (see also GM1(b) SERA.5005(f)).

This approach will be necessary until experience is gained on how to validate operations in urban environments from a safety, environmental, security and privacy point of view. In addition, there will be a limited number of vertiports and operating sites in each city, and safety and efficiency must be ensured for air traffic that takes off from and lands at those areas together with other air traffic in urban environments and current air operations. Additionally, when operating within U-space airspace, parts of the airspace need to be predefined to enable dynamic airspace reconfiguration. If, during the development process, it can be demonstrated and validated that safety, environmental protection and compatibility, security, and privacy can be guaranteed without the need for predefined routes or areas/corridors for manned VCA, then this potential limitation would be removed.

With predefined routes, manned VCA would have the possibility to operate in urban environments using predefined take-off and landing procedures, meeting the safety requirements established by local/national authorities.

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[37] In particular, point SERA.5005(f) states that except when necessary for take-off or landing, or except by permission from the competent authority, a VFR flight shall not be flown:
- over the congested areas of cities, towns or settlements or over an open-air assembly of persons at a height less than 300 m (1 000 ft) above the highest obstacle within a radius of 600 m (2 000 ft) from the aircraft;
- elsewhere than as specified above, at a height less than 150 m (500 ft) above the ground or water, or 150 m (500 ft) above the highest obstacle within a radius of 150 m (500 ft) from the aircraft.

[38] Similarly, point SERA.5015(b) specifies that except when necessary for take-off or landing, or except when specifically authorised by the competent authority, an IFR flight shall be flown at a level which is not below the minimum flight altitude established by the State whose territory is overflown, or, where no such minimum flight altitude has been established:
- over high terrain or in mountainous areas, at a level which is at least 600 m (2 000 ft) above the highest obstacle located within 8 km of the estimated position of the aircraft;
- elsewhere than as specified above, at a level which is at least 300 m (1 000 ft) above the highest obstacle located within 8 km of the estimated position of the aircraft.

[39] It is important to understand that these 'predefined' routes or areas/corridors are not the same with today's ATS route network concept, and the method to establish them for each UAM implementation scenario still needs to be developed.

As regards environmental considerations, predefined routes would help to systematically avoid flying over areas and buildings that, for any reason, require protection. Furthermore, the possibility to avoid flying over 'sensitive' places and the assurance of deconflicting paths thanks to predefined routes would help gain greater public acceptance. However, the system of predefined routes might impose limitations to some types of VCA operations.

The alternative solution, that is, 'free routing', would allow manned VCA to operate freely in urban environments. This would not provide sufficient protection against ground risks and would not help pilots of manned VCA to easily identify visually other aircraft. Therefore, this solution has been discarded.

This Opinion proposes respective amendments to SERA with the aim to enable operations with manned VCA. The following section introduces the individual topics as well as explanations for the proposed amendments.

2.3.6.1. The term 'fuel'

The term 'fuel' appears in a significant number of requirements within SERA. With the introduction of manned VCA, which are generally electrically powered, the issue was raised and discussed to determine the best way to describe and reflect the actual situation of this new type of aircraft with regard to fuel status.

Several options were envisaged like the juxtaposition of the terms 'fuel' and 'energy', or the modification of the definition of 'fuel' to also include 'energy', as it is envisaged by ICAO in some cases.

Draft ICAO Annex 6 Part IV point 4.3.6 (version G September 2020) proposes the addition of the following:

'Note — For the remainder of this Part of this Annex, the term 'fuel' is intended to include all sources of energy for RPA, to include (but not limited to) petroleum based, solar, battery or any future source that provides energy to the RPA.'

Due to the use of the term 'fuel' in other applicable aviation regulations, it was concluded that the term 'fuel/energy' would be used whenever appropriate, but the term 'fuel' would be retained when necessary, in particular in sentences that contain standardised phraseology.

2.3.6.2. The term 'helicopter'

The term 'helicopter' appears in several SERA requirements. For some of them, it was considered necessary to determine whether operations with VCA could be assimilated into helicopter operations.

This was in particular the case for point SERA.5001 'VMC visibility and distance from cloud minima' (Note (***)(b)[40]) and for the conditions applicable to *special VFR* (point SERA.5005(b)(2) and (c)(1)) as manned VCA are considered sufficiently different from other aircraft, based on their potential capability to hover and fly at low speed to allow proper observation of other aircraft and obstacles by the pilot.

[40] Note (***)(b): *helicopters may be permitted to operate in less than 1 500 m but not less than 800 m flight visibility, if manoeuvred at a speed that will give adequate opportunity to observe other traffic or any obstacles in time to avoid collision.*

Manned VCA may have similar capabilities to helicopters and the case had to be explored to determine whether the requirements needed to be adapted to allow for similar flexibility, in particular considering the capability to fly at low speed for an extended period of time.

However, compared with helicopters, manned VCA may have specific operational limitations due to the high energy consumption needed to maintain slow- or hover-flight conditions for an extended period of time.

It is expected that pilot training and qualifications for manned VCA will allow for a pilot performance similar to that of a helicopter pilot.

The criterion 'able to hover or fly for an extended period of time at low speed' does not depend on the applicable criteria for the certification of manned VCA in the category 'Enhanced' or 'Basic', but on the parameters of each flight (weight, wind, weather, distance, etc.) and should be known by the pilot/operator only at the time of the flight.

Considering the novelty of such operations, the potential traffic density in which they will operate, the urban environment and the absence of safety records for such operations that have not yet started in real conditions, it is difficult to identify a reference baseline for comparison and safety performance measurement.

Subsequently, it was concluded that it would be difficult to formulate a general requirement that would be appropriate for all possible cases of operations with manned VCA.

Therefore, it was decided, at least in the initial phase of these operations, that the minimum flight visibility for VMC should not be allowed to less than 1 500 m for manned VCA and that the authorisation possibly granted by the competent authority to fly with a 800-m visibility should apply only to helicopters, when the operating conditions permit. This limitation is not included in the subject Opinion because only binding requirements are addressed, but it will be reflected in the related AMC and GM, as appropriate.

This approach could be revisited based on safety records and safety data relative to these operations when they will become available.

Following this investigation related to the comparison between helicopter and manned VCA operations as regards flight visibility, it was decided to proceed with a similar comparison for all other SERA specificities for helicopter operations.

This investigation concluded that the specificities logically also apply to manned VCA and the proposal was to replace the term 'helicopter' by the term 'helicopter/VCA' as per Article 2(25) of the SERA Regulation. The latter was generally selected for requirements on air-taxiing, take-off or landing areas, minimum heights, phraseology, or marshalling signals, and only for some interception cases.

2.3.6.3. The term 'operating site'

For consistency with Commission Regulation (EU) No 965/2012, reference was also made in a number of instances to 'aerodromes' and 'operating sites' at the time of drafting the proposed amendments to Commission Implementing Regulation (EU) No 923/2012.

However, the term 'operating site' was not added everywhere, and the consideration of the case of manned VCA was the occasion to further analyse the instances in which both terms should be used

complementarily. Points SERA.8020 and SERA.11005(ab) were identified as possible 'candidates' for the insertion of the term 'operating site'.

As regards point SERA.8020 'Adherence to flight plan' and weather deterioration below VMC, manned VCA, operating initially in VFR, but also helicopters, may elect to land at places other than an aerodrome in some cases; therefore, it is considered acceptable to extend the possibility to land elsewhere than at an aerodrome as a possible option in case of necessity due to weather. However, what is acceptable in general cases of operations may not be appropriate in case of planned commercial operations with passengers on board and Commission Regulation (EU) No 965/2012 imposes some restrictions on the use of operating sites for such types of operations (e.g. point UAM.OP.MVTA.107 'Urban mobility operations with passengers on board').

In point SERA.11005(ab) 'Unlawful interference', 'attempt to land as soon as practicable' would be the required immediate action for the PIC, as stated in the requirement. Point SERA.11005 presents an emergency contingency situation where an aircraft is under threat due to unlawful interference. For manned VCA, it may also be necessary to extend the possibility to land at places other than an aerodrome in such cases, and may be up to the relevant competent authority to assign other places for landing other than aerodromes.

EASA concluded that, like heliports, vertiports are categorised as aerodromes. As a consequence, there is no need to mention vertiports as an alternative to aerodromes.

Operating sites are already accepted by Commission Implementing Regulation (EU) No 923/2012 as a possible point of departure or destination in the flight plan (point SERA.4005 'Contents of a flight plan'). Therefore, it was considered that operating sites might also be accepted for diversion due to weather deterioration in the general cases laid down in that Regulation, and in any case due to unlawful interference. However, as explained above, this is valid only for general cases. It will be the responsibility of the pilot/operator to decide whether the specificities of a given flight are covered only by Commission Implementing Regulation (EU) No 923/2012 as a general case or are subject to additional restrictions imposed by other regulations.

2.3.6.4. Information on unmanned aircraft

Operations with manned VCA are normally provided with standard flight information service (FIS), where applicable, and that includes any relevant information as described in point SERA.9005 'Scope of flight information service'. Observing the existing and expected development of UAS activities with different capabilities and characteristics leading to possible safety concerns, it was considered appropriate to add in the above requirement pertinent information on known UAS activities. Such information will also be useful for other manned aircraft.

The addition of information related to UAS activities will be beneficial for both manned VCA and manned aircraft in general, and would improve safety.

2.3.6.5. Operation of SSR transponder

Point SERA.13001 'Operation of an SSR transponder' requires that any aircraft equipped with a serviceable transponder shall always operate it. There is an exemption for aircraft without sufficient electrical power. This exemption was intended for aircraft without electrical generation on board (like sailplanes) for which the electrical energy should be kept for operating the transponder in the most relevant circumstances.

The question was addressed to find out whether electrically powered manned VCA should be considered 'aircraft without sufficient electrical power', for example, in the perspective where all available energy should be secured for the functioning of the engine.

These electrically powered manned VCA are designed and certified to be used with their full electrical capability planned and managed throughout the flight.

Subsequently, manned VCA should not be included in the category 'aircraft without sufficient electrical power'. Therefore, no change is proposed to point SERA.13001.

The type of operation and of the operational environment will determine the need to equip the manned VCA with a serviceable transponder.

2.3.7. Air traffic management (ATM)

In accordance with the amendments to point SERA.9005 and, as described in Section 2.3.6.4, to ensure consistency with the current regulatory framework, point ATS.TR.305 'Scope of flight information service' of Annex IV (Part-ATS) to Commission Implementing Regulation (EU) 2017/373 is subsequently partially amended and aligned with point SERA.9005.

2.4. What are the stakeholders' views — outcome of the consultation

NPA 2022-06 was consulted from 30 June to 30 September 2022 and attracted more than 1 300 comments from around 60 commentators.

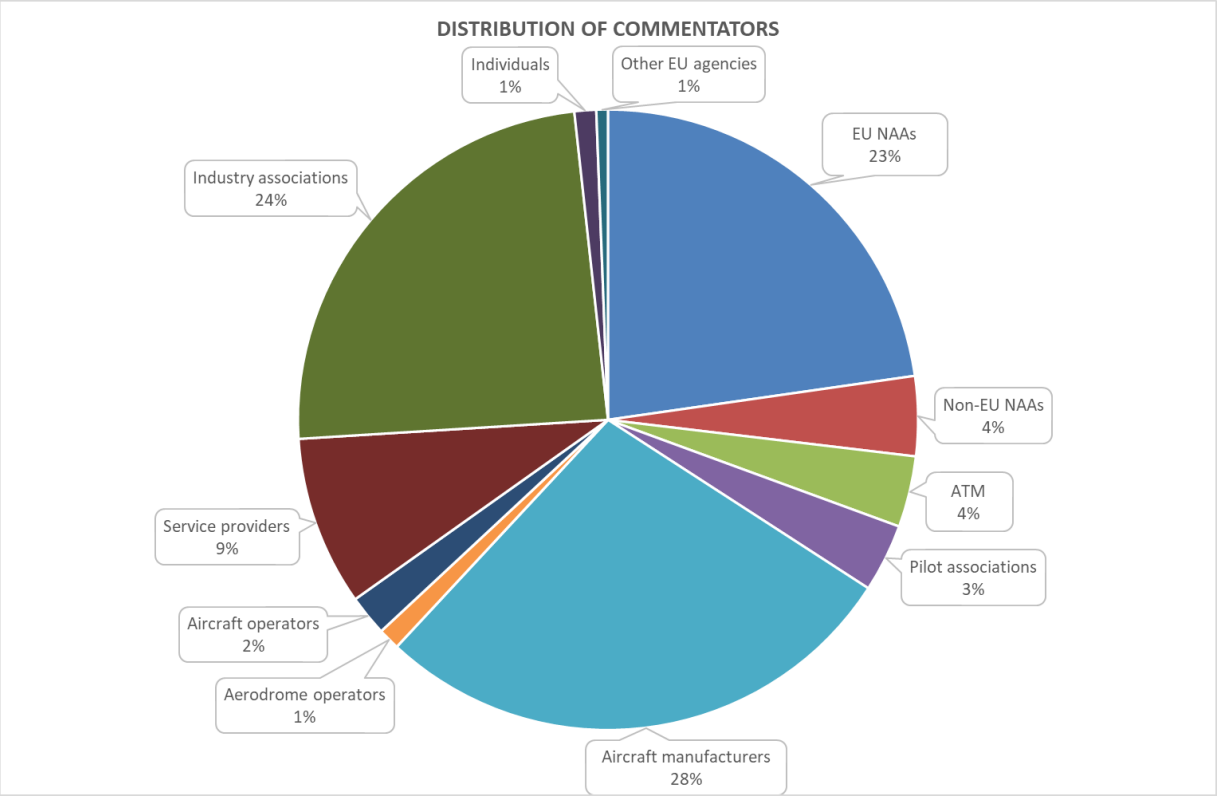

Figure 6 — Distribution of commentators

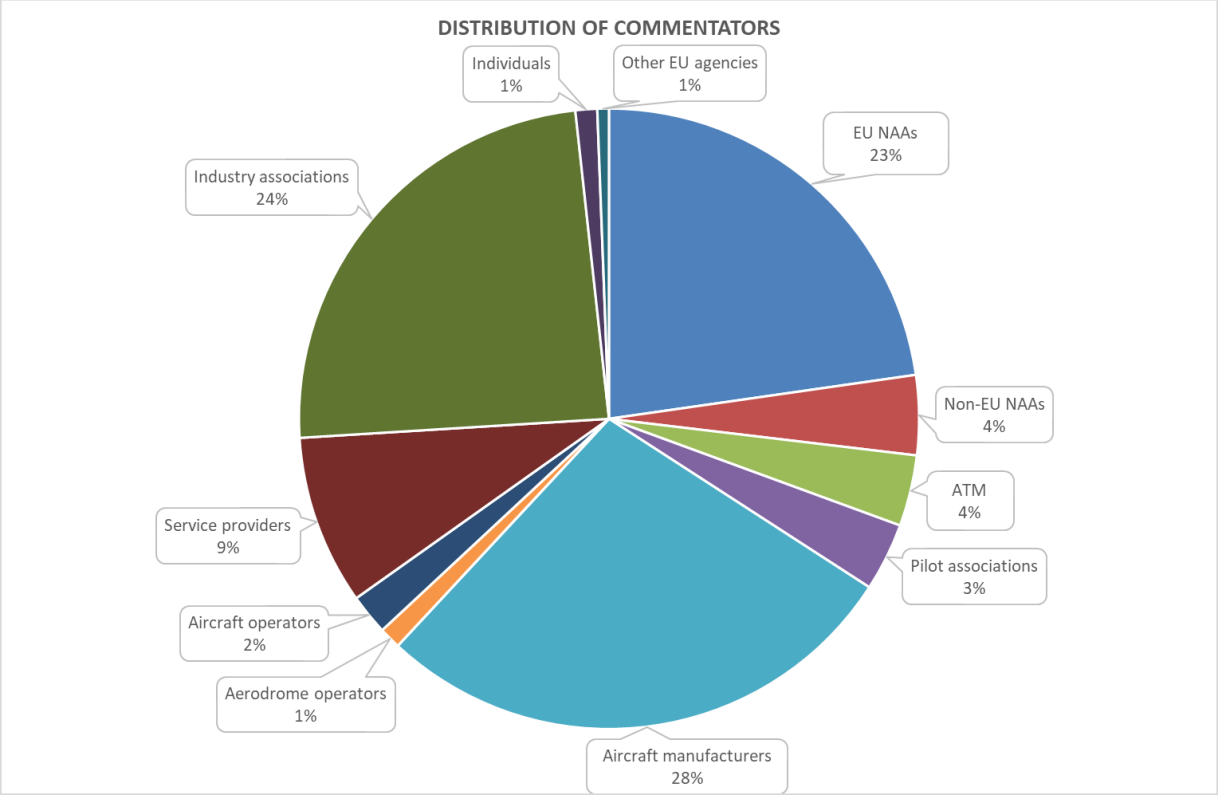

Figure 6 shows the distribution of commentators, while

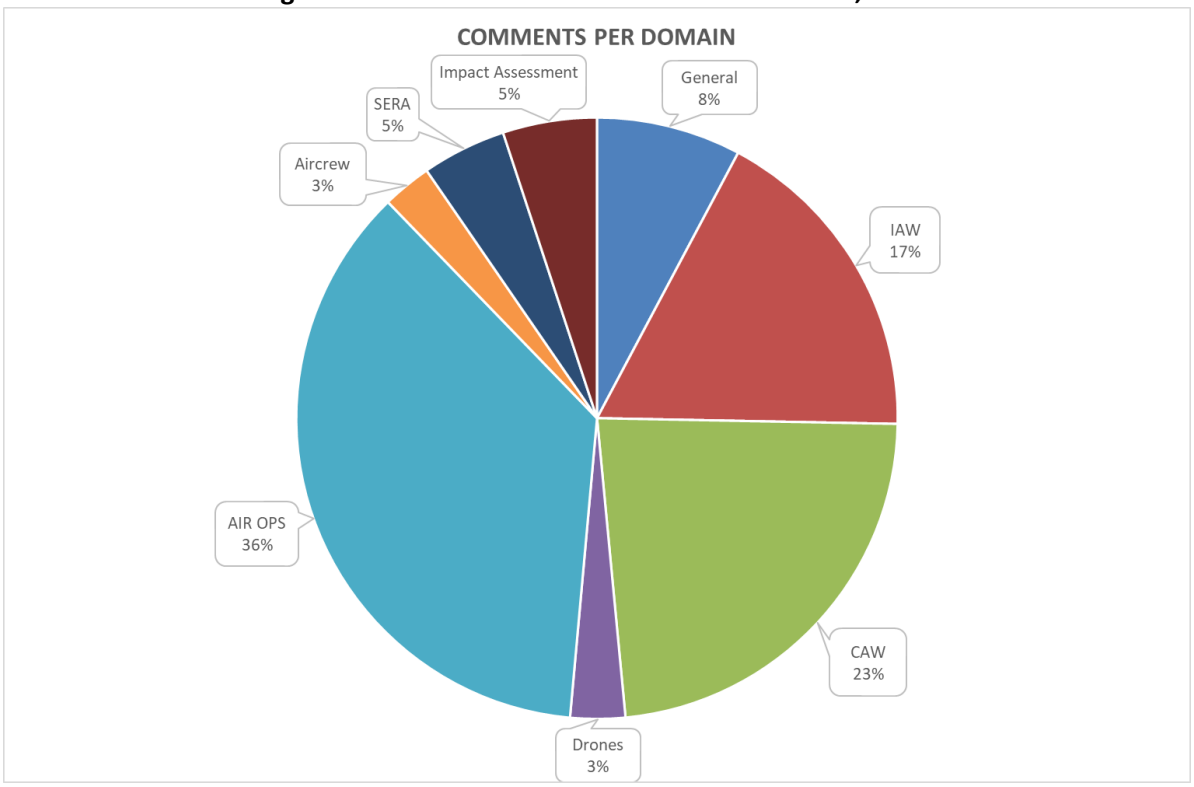

Figure 7 shows the distribution of comments per domain.

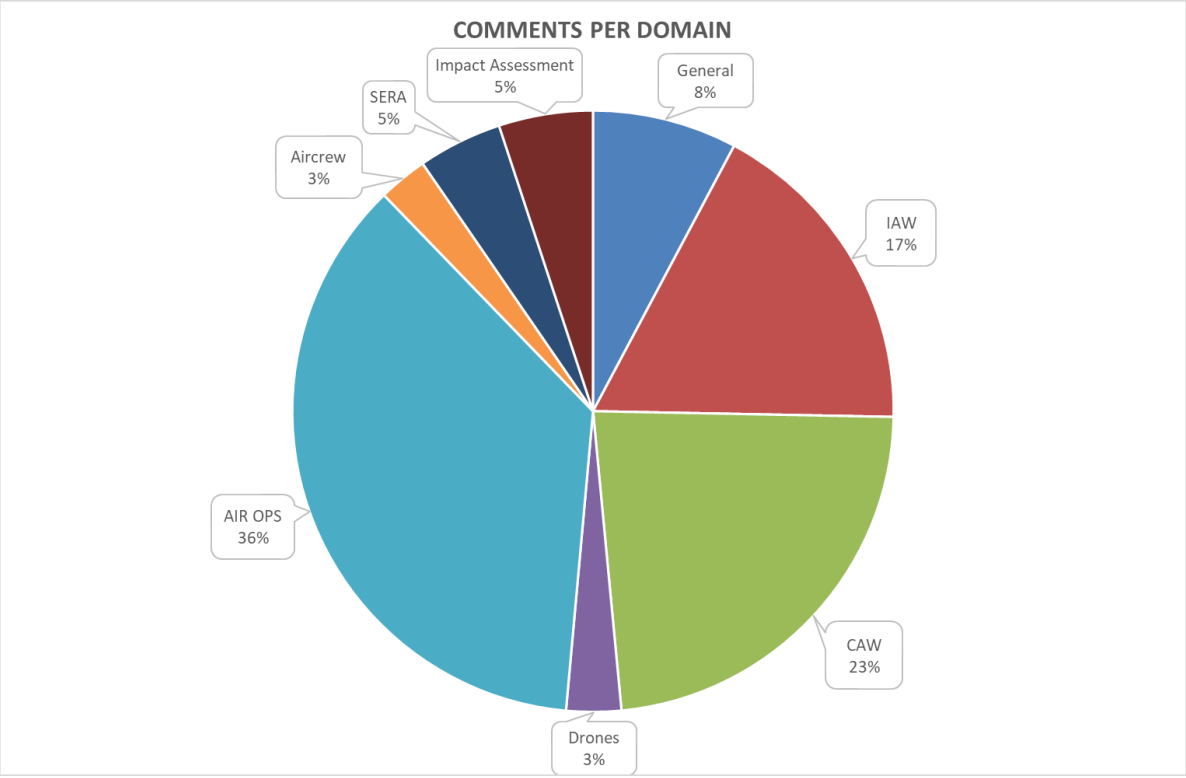

Figure 7 — Comments per domain

In addition to the formal public consultation, EASA took the following into account:

— the comments received during the UAS Technical Advisory Body meeting of 7 February 2022;

— the comments received during the Member States Advisory Body meeting of 28 February 2022; and

— the inputs received during several meetings of the Experts' Groups for the review and assessment of the comments.

The following sections summarise the main comments received and the EASA views on those comments raised on the proposed amendments to the related regulations and the common underlying conceptual approach followed. For the detailed comments and the respective EASA responses, please refer to CRD to NPA 2022-06[41].

2.4.1. General comments

2.4.1.1. Proposed adoption of the definition of 'advanced air mobility' (AAM)

Several commentators challenged the need to establish definitions for 'innovative aerial services' (IAS) and innovative air mobility (IAM) considering the publicly known definition of AAM.

The concept of AAM was originally developed by NASA and later adopted by the FAA. The term is defined by the US Congress in Senate Bill 516 ('Advanced Air Mobility Coordination and Leadership

[41] CRD to NPA 2022-06, available at https://www.easa.europa.eu/en/document-library/comment-response-documents.

Act')[42], and refers to 'a transportation system that transports people and property by air between two points in the United States using aircraft with advanced technologies, including electric aircraft or electric vertical take-off and landing aircraft, in both controlled and uncontrolled airspace'.

The definition adopted by the FAA does not cover all those operations that may be performed with new aircraft types and that do not involve the transportation of people or goods, but rely on dedicated systems or sensors (e.g. cameras, antenna relays, etc.). With the notion of IAS, EASA intends to offer a conceptual definition for all types of operations which EASA is entitled to regulate in accordance with Regulation (EU) 2018/1139.

In addition, the FAA definition refers to US airspace configuration and management, which may differ from the European one.

The concept of IAS (including its subset IAM) has been also recently adopted at political level by the European Commission through the publication of the 'European Drone Strategy 2.0'[43].

2.4.1.2. The VCA category

The introduction of the new VCA category has raised the need to provide additional explanations to illustrate the relationship with the already existing aircraft categories defined in the related aviation regulations.

First of all, it is important to highlight that in all applicable EU aviation regulations, the definitions of all aircraft categories are given in a manner that the aircraft can be either manned or unmanned; the same applies to VCA.

Rotorcraft and helicopters are excluded from the proposed definition of VCA due to the presence of up to two power-driven rotors on a vertical axis, whereas the VCA category relies on lift or thrust units used to provide lift during the vertical take-off and landing.

EASA does not adopt the definition of 'powered-lift aircraft' for the purpose of identifying aircraft categories as such category is only relevant for the purpose of flight crew licensing, while no airworthiness or operational requirements existing in the current regulations.

Traditional two-rotor tiltrotor designs (e.g. AW609) are excluded from the scope of the present regulatory proposal. EASA plans to review the approach to operational rules applicable to tiltrotors in the context of RMT.0731[44] Subtask 3.

In accordance with the proposed definitions, gyroplanes would also be classified as rotorcraft. Operational rules applicable to gyroplanes will be developed in the context of RMT.0731[45] Subtask 2.

42 https://www.congress.gov/bill/117th-congress/senate-bill/516

43 https://transport.ec.europa.eu/news/drone-strategy-creating-large-scale-european-drone-market-2022-11-29_en

44 ToR RMT.0731 - New air mobility | EASA (europa.eu)

45 ToR RMT.0731 - New air mobility | EASA (europa.eu)

2.4.1.3. Correction of typos in the impact assessment

While the analysis and the conclusions of the impact assessment in Chapter 4 of NPA 2022-06 remain valid, the typos that have been identified in the impact assessment are corrected as follows:

— in paragraph 4.1.3.2.3.2.2, the safety criterion SAC-OPE#2 is defined as 'The probability of in-flight collision or near-collision between a VFR manned VTOL-capable aircraft with other airspace users in uncontrolled airspace with U-space shall not be greater than a collision between a VFR helicopter (carried under an AOC) with other airspace users in uncontrolled airspace.';

— in paragraph 4.1.3.2.3.2.3, Figure 13 — 'Air risk in OPE#3' refers to 'Controlled airspace without U-space';

— in paragraph 4.1.3.2.3.2.4:

  — the safety criterion SAC-OPE#4 is defined as 'The probability of in-flight collision or near-collision between a VFR operation with manned VTOL-capable aircraft with other airspace users in controlled airspace with U-space shall not be greater than a collision between a VFR helicopter operation (performed under an AOC) with other airspace users in controlled airspace.';

  — Figure 14 'Air risk in OPE#4' refers to 'Controlled airspace with U-space'.

2.4.2. Initial airworthiness

2.4.2.1. General

The initial airworthiness part of NPA 2022-06 solicited 232 comments. The comments were reviewed by EASA and the assessment of the main ones was presented to the IAW WG and in several other meetings and contexts, such as the MAB and the UAS TeB. Questions were answered and observations were noted for further consideration.

2.4.2.2. The control and monitoring unit (CMU)

Many comments issued during the public consultation focused on the new element introduced in Part 21, namely the 'control and monitoring unit' (CMU). At the time of the NPA, the CMU was defined as 'command unit' (CU) by Commission Implementing Regulation (EU) 2019/947 and CU was, therefore, used throughout the adaptation of Commission Regulation (EU) No 748/2012, in its Annex I (Part 21) and in various forms. However, in the last stages of review of the Opinion, it was decided to provide a new definition for 'CMU' in Commission Implementing Regulation (EU) 2019/947. This term was, therefore, used in Commission Regulation (EU) No 748/2012.

2.4.2.3. The C2 link

Intensely commented was the last sentence introduced in the definition of 'CU' in the NPA: 'the command unit does not include any ground-, air- or space-based equipment or items of equipment that support(s) the command and control (C2) link service'. The sentence was considered either misleading or excluding elements that should instead be included. In the Opinion, EASA has removed this sentence and establishes that the C2 link (data link connecting the UA and the CMU) should not be confused with communication services. These services, defined as 'external services' in the AMC to Article 11 of Commission Implementing Regulation (EU) 2019/947, are under the direct

responsibility of the UAS operator which, in the 'specific' category, needs to have their integrity approved under the applicable operational safety objective (OSO), which is not a design OSO. This is the case, for example, of UAS control and monitoring supported by mobile communication service / LTE on the basis of appropriate service legal agreement to be stablished between the operator and the LTE service provider. Conversely, the equipment and software that provide the C2 link function, included in the ground segment (CMU) and the air segment (UA) of the UAS, are part of the type design and will be certified with rigor dependent on the criticality of the C2 link functions, which is in turn dependent on the specific UAS design and CONOPS.

2.4.2.4. Classification of CMU components

Several comments highlighted the need for AMC and GM to address 'essential' and 'specific', as introduced in point 21.A.308 addressing CMU components' eligibility for installation in the CMU. Some comments highlighted the need to clarify the link of 'essential' and 'specific' with the concept of 'core' and 'outer' layer of the CMU described in the Explanatory Note of the NPA. In the first review round, EASA considered that the use of 'core' and 'outer' layer should be avoided, as these terms are anyway not used in Commission Regulation (EU) No 748/2012. Further to this, in later review stages, it was decided to suppress the distinction between 'specific' and 'not specific' CMU components, referring only to the criticality of these components to decide upon the need to accompany them with an EASA Form 1. This solution is considered simpler and safer, as it is directly linked with the safety of the operation. The concept of critical CMU components and its implications deserve further clarification on the level of AMC and GM in a future NPA.

2.4.2.5. Minimum number of flight-test hours

Some comments requested EASA to clarify the reason for not defining a minimum number of flight-test hours for UAS under the Flight Test requirement of Part 21, to define such a minimum number, or to establish a plan to devise it for each degree of complexity of the UAS and of the operational scenario. In view of the variety of designs and operational scenarios, of the novelty and the still insufficient experience, EASA does not consider this possible. An unspecified minimum number of flight hours should anyway not be interpreted as openness to accept proposals for no flight hours.

2.4.2.6. Standard changes and standard repairs

Regarding standard changes and standard repairs, comments suggested extending the applicability from unmanned VCA to manned VCA. These comments were not only accepted, but the MTOM specified in the NPA (3 175 kg) is now extended to 5 700 kg, on the basis of the new MTOM applicable for SC VTOL (5 700 kg). On the other hand, EASA did not consider it appropriate to extend the concept of standard changes to the CMU, as suggested by some comments. There is no plan, for the moment, to update CS-STAN under RMT.0230.

2.4.2.7. Need for operational authorisation when holding a permit to fly (PtF)

A commentator requested explanations regarding the role of the SORA when a UA is operated under a PtF in the specific high-risk category. A PtF issued under Part 21 does not render an NAA operational authorisation unnecessary if the UAS operation falls within the 'specific' category. The NAA will still have to provide the operational authorisation.

2.4.2.8. Airworthiness status of the CMU

Some comments requested clarification on the use of the CofA for the CMU, and clarification on how it is established that a CMU is 'airworthy'. EASA has implemented the ICAO Annex 8 model, which records, under the UA CofA, the CMU(s) models (but not the S/N) which can be operated with that UA. The instructions of EASA Form 1 have been adapted in order to make Form 1 applicable to declare the airworthiness of a CMU and of a CMU component. The CAO.UAS organisation that manages the UAS's continuing airworthiness shall declare in its manual which CU S/N is used with which UA. The manual of the organisation in charge of the UAS's continuing airworthiness is amended to reflect any new CMU to be used with the aircraft.

2.4.2.9. Differences with the FAA regulatory approach

The FAA commented on the difference between the processes established in the respective regulatory frameworks, as reflected by the FAA concept of associated elements, and the establishment of type certification for unmanned aircraft only. The concept proposed by EASA, which renders Part 21 processes applicable also to the CMU, and provides the option for a dedicated CMU TC, differs from the FAA concept of associated elements. EASA is open for further discussions and considers that it is difficult to include in the regulatory proposal, which focuses on high-risk operations, regulatory concepts as the one hinged on associated elements, originally conceived for operations characterised by significantly lower operational risk. EASA considers that these topics will naturally be addressed in the context of future exchanges among authorities on UAS product transferability, currently in an early stage of discussion.

2.4.3. Continuing airworthiness

2.4.3.1. General

The continuing airworthiness part of NPA 2022-06 received 323 comments from 30 commentators.

The comments were reviewed with the support of the CAW WG (originally set up for the development of the NPA), which met for a series of six online meetings.

Generally, the proposed two new regulations (the draft delegated act for the continuing airworthiness of UAS and their components, and the draft implementing act for the related competent authority requirements) were well received by the commentators. Several industry stakeholders commented on the scope of the new regulations: the draft delegated act actually applies from the moment the UA is issued with an airworthiness certificate (refer to Article 1), so a 'voluntary' application of the continuing airworthiness regulation is possible provided an airworthiness certificate is obtained by the UAS operator (EASA will accept applications for a type certificate only for intended operations starting from SAIL IV).

The absence of maintenance licensing requirements (for certifying staff) for this type of UAS operations (replaced by internal CAO.UAS authorisation requirements) was well understood and accepted, although one comment highlighted the need to ensure minimum competences. Such request is proposed to be addressed on the level of AMC and GM.

Several comments were made following the identification of differences between the 'traditional' Part-ML / Part-CAO and the new Part-ML.UAS / Part-CAO.UAS. Certain elements could be explained by the new context of UAS, while others were missing and have been added in the Opinion.

By contrast, many comments were made suggesting deviations from Commission Regulation (EU) No 1321/2014: a few of these changes were accepted for clarity, but most of the proposed deviations were rejected to ensure a high level of consistency between this Opinion and Commission Regulation (EU) No 1321/2014.

2.4.3.2. Part-ML.UAS

More specifically, the most commented topics in Part-ML.UAS (which resulted in changes in the text of the Opinion) were the determination of who has the responsibility for the continuing airworthiness of the UAS, and the requirements as regards the maintenance programme and record-keeping. The last topic (record-keeping requirements) generated a lot of discussion with the CAW WG and resulted in the complete restructuring of point ML.UAS.305. Another frequently commented topic was the consideration of the CMU in the airworthiness review process, which led to the adjustment and clarification of the text in the Opinion.

2.4.3.3. Part-CAO.UAS

In respect of Part-CAO.UAS, the most commented topic was the scope of work, which resulted, after discussion with the CAW subgroup, in the significant revision (and supplement) of point CAO.UAS.020. Another point of discussion was the qualification requirements for certifying staff, which resulted in adjustments to point CAO.UAS.040, and new AMC and GM shall be developed to support implementation.

2.4.3.4. Part-AR.UAS

Part-AR.UAS attracted fewer comments than Part-ML.UAS and Part-CAO.UAS, but a few of them generated some discussions for the CAW subgroup, in particular in respect of the oversight responsibility for the CMU, the record-keeping duration, and the oversight cycle length. The first topic highlighted the need to create AMC and/or GM, while the two others resulted in changes in the draft implementing regulation as proposed with this Opinion.

2.4.4. Regulations on UAS

The proposed amendments to Commission Implementing Regulation (EU) 2019/947 and Commission Delegated Regulation (EU) 2019/945 attracted a total of 28 comments.

— Several comments requested to include the conditions to require, and the process to issue, a design verification report for UAS operated in the ‘specific’ category medium risk. Since this topic is beyond the scope of this proposal, it will be addressed in a future NPA that will include all improvements to Commission Implementing Regulation (EU) 2019/947 and Commission Delegated Regulation (EU) 2019/945, derived from the experience collected with their application.

— One of the conditions to classify an operation in the ‘certified’ category is the carriage of dangerous goods that pose a risk to third parties. The formulation of Commission Implementing Regulation (EU) 2019/947 allows the possibility to assess the risk posed in the event of crash, allowing the UAS operator to consider whether the quantity of the dangerous goods transported is rather limited to pose a risk. A GM shall provide additional details about the quantification of the risk.

— In the case of UAS specifically designed or modified for research, experimental or scientific purposes, and are likely to be produced in very limited numbers, a type certificate according to Part 21 may not be appropriate and in this case the proposed amendment to Commission Delegated Regulation (EU) 2019/945 allows to make use of a permit to fly (PtF).

— Some commentators requested to better clarify the concept of 'limited numbers'. Given that this is a term already used for manned aircraft in Annex I to Regulation (EU) 2018/1139, and since EASA is not aware of any interpretation issues, it is considered that Commission Delegated Regulation (EU) 2019/945 should not be more specific and GM may be issued. Some other commentators requested to extend the alleviation criteria stated in point 1(d) of Article 40 also to similar operations classified in the 'certified' category. A UAS operated for research, experimental or scientific purposes should be naturally operated in a lower-risk environment (e.g. in the 'specific' category). If the operation is classified in the 'certified' category, then it should be assessed as a special case defining appropriate conditions.

— Clarification was requested on the condition related to design verification requirements for lighter-than-air UAS which have characteristic dimensions larger than 3 m. These configurations may still be classified in the 'specific' category, depending on the outcome of the risk assessment (i.e. SORA). The aim of the proposed amendment is only to avoid that they are directly classified in the 'certified' category when operating over open-air assemblies of people, as it is the case for other configurations.

2.4.5. Air Operations

2.4.5.1. Helicopters and VCA

Some stakeholders commented that helicopters and VCA (originally addressed in the comments as 'VTOL aircraft') will converge in the future, thus eliminating the need to develop specific requirements for VCA.

VCA are different from helicopters, although they share some similarities. Both VCA and helicopters are capable of taking off and landing vertically, which allows them to operate in areas where there is limited space for conventional runways or where conventional aerodromes are not available.

However, there are some key differences between these two types of aircraft:

— *Design*: helicopters use rotor blades to generate lift and provide directional control, while VCA may use a variety of mechanisms, e.g. tilting rotors, tilting wings, ducted fans, or lift fans, to achieve vertical lift and directional control.

— *Speed and range*: VCA are typically designed for shorter-range and lower-speed operations, such as urban air mobility, while helicopters are capable of longer-range and higher-speed operations.

— *Noise levels*: VCA may be designed to be quieter than helicopters, making them more suitable for operations in urban areas.

— *Safety*: VCA may incorporate additional safety features, such as redundant propulsion systems, to minimise the risk of accidents.

— *Pilot training*: pilots of VCA may require different training than pilots of helicopters, due to the different mechanisms used for lift and directional control, as well as the ubiquitous use of fly-by-wire systems and flight control modes.

Overall, while VCA and helicopters share some similarities, they are distinct types of aircraft with different design features, capabilities, and applications.

2.4.5.2. Air operator certificate (AOC) for commercial and non-commercial operators of manned VCA

The approach proposed by NPA 2022-06 would require the certification (i.e. issuance of an AOC) of both commercial and non-commercial operators of manned VCA. Some commentators challenged it arguing that the certification of non-commercial operators would negatively affect the VTOL market in the longer term and might not be proportionate for private operations, e.g. operations with VCA certified under SC VTOL 'basic category'. Moreover, these commentators believe that private pilot licence (PPL) holders should be allowed the same privilege of flying in urban and intercity areas as commercial pilot licence (CPL) holders are.

For other commentators, the proposal to make no distinction between the commercial and non-commercial purpose of the flight raises concerns with regard to the cost–benefit impact as no AOC is required for non-commercial operations of helicopters, for example.

Since the comments affect various aspects of the issue, they have been addressed here below from different perspectives.

The primary reason for certifying aircraft operators is to ensure safety. Operating an aircraft requires a high level of skills and training, and certification helps to ensure that aircraft operators have the necessary knowledge, skills, and experience to operate the aircraft safely. This helps to minimise the risk of accidents and incidents that could result in injury or loss of life.

Certification helps to ensure that aircraft operators comply with all applicable laws, regulations, and standards. This includes compliance with safety regulations, as well as with regulations on pilot training, maintenance, and operations. Certification helps to ensure that aircraft operators operate in a safe and compliant manner.

Many insurance policies and liability agreements require that aircraft operators be certified. Certification provides evidence that an aircraft operator has met certain standards and has been trained to operate the aircraft safely. This can help to reduce the risk of accidents and incidents, and may help to reduce insurance premiums or liability exposure.

Certification can help to establish an aircraft operator's reputation as a safe and reliable provider of aviation services. This can be important for attracting customers, building partnerships, and establishing credibility in the industry.

Today's alternative to aircraft operator certification is either a declaration (applicable to NCC, NCO, non-commercial SPO and commercial low-risk SPO operators) or a high-risk authorisation (commercial SPO). It will be premature and inconsistent with safety and security risks at this stage to allow private/corporate VCA to be operated over urban areas without an AOC.

AOC requirements for non-commercial aircraft operators will be replaced with an adequate regulatory framework when more experience with real operations is gained. Flexibility should come after and not before having gained sufficient knowledge about the specificities of VCA operations.

The impact assessment of NPA 2022-06 specifically deals with the anticipated workload of the competent authorities certifying commercial and non-commercial IAM operations. This workload and associated expertise and staffing are not expected to be significant during the first 5–10 years of VCA operations.

Commercial operations with VCA will not, in the initial years of deployment, involve a higher volume of flights and passengers in urban areas.

Therefore, the subject Opinion maintains the initial proposal for aircraft operator certification irrespective of the nature of operation. It is believed that the safety benefits expected from the proposal outweigh the potential economic and regulatory impacts.

It should be noted that sufficient flexibility is nevertheless foreseen in the area of initial airworthiness certification under EASA's SC VTOL — 'basic category' versus 'enhanced category'. The implementing rules for operations with basic category VCA in non-urban (NAM) areas will be developed further when more data will be available from manufactures and potential operators.

2.4.5.3. Diversion locations

Considering the potential infrastructure constraints in urban areas, i.e. unavailability of sites where adequate vertiports can be built, EASA's 'Prototype Technical Specifications for the Design of VFR Vertiports for Operation with Manned VTOL-Capable Aircraft Certified in the Enhanced Category (PTS-VPT-DSN)'[46] recommend some more flexible characteristics for vertiports along the route, which may be used for diversion (CFSL), while complying with the fuel/energy scheme, aircraft performance requirements and other safety considerations of Commission Regulation (EU) No 965/2012.

Some commentators wished additional flexibility to that proposed by the EASA 'Prototype Technical Specifications for the Design of VFR Vertiports for Operation with Manned VTOL-Capable Aircraft Certified in the Enhanced Category' (PTS-VPT-DSN) regarding the selection of landing locations for the purpose of diversion. Allowing for such flexibility was found appropriate from a practical point of view. Hence, the VCA operator will be able to select presurveyed diversion locations if the method for their selection has been approved by the competent authority. These diversion locations should anyway be suitable, considering VCA performance and operating limitations, and should comply with a set of requirements referring to the size of the landing area, surface characteristics, ground markings, slope, and obstacles clearance areas.

2.4.5.4. Final energy reserve

Some commentators pointed out that NPA 2022-06 did not precisely define the amount of final fuel/energy reserve, as is the case today with aeroplanes and helicopters. They believe this could be an issue for authorities which would not be able to decide whether the final fuel/energy reserve is sufficient or not. Moreover, it could lead to non-harmonised practices among the Member States.

46 https://www.easa.europa.eu/en/downloads/136259/en

The Opinion maintains the initial performance-based proposal regarding the final fuel/energy reserve, which is the equivalent of the energy for the execution of a go-around manoeuvre. That reserve of energy will depend on all the following:

— a representative time to perform a go-around from a landing decision point (LDP) and back to that LDP taking into account the VCA degraded performance following a critical failure;

— conservative ambient conditions from the point of view of fuel/energy consumption;

— an appropriate configuration/speed to perform the go-around and approach procedures;

— a conservative fuel/energy consumption rate.

The representative time is established during the initial airworthiness certification and is defined for each specific design and landing profile. VCA operators may determine a final fuel/energy reserve value for a go-around and vertical landing, and a final fuel/energy reserve value for a go-around and a conventional landing. Also, the representative time will be provided in the AFM. Hence, the competent authorities will have at their disposal a precise figure of the final energy reserve for the purpose of approving the scheme.

2.4.6. Flight crew licensing

With regard to the insertion of proposed draft Article 4f into Commission Regulation (EU) No 1178/2011 (to allow CPL(A) and CPL(H) holders to obtain VCA type ratings), 35 comments were issued in total from NCAs and industry representatives. After a careful initial review of the comments and further internal review followed by discussions with the FCL expert group, the following changes to the proposed draft amendments to Commission Regulation (EU) No 1178/2011 are made:

Draft Article 4f

— A new paragraph (2) is inserted to clarify the administration of the theoretical knowledge examinations.

— In new paragraph (4) and in new final subparagraph of paragraph (7) (NPA: paragraph (5)), text is inserted to introduce a ‘shortcut’ for applicants to obtain a VCA type rating or related instructor privileges in cases where the applicants have been involved in test flights for the relevant aircraft type. These additional requirements are modelled on existing requirements of points FCL.725(e) and FCL.910.TRI(d) of Part-FCL.

— Cross references within Article 4f are corrected.

— The wording of some phrases is slightly adapted, mainly for consistency with existing Part-FCL requirements.

Annex I (Part-FCL)

— Point FCL.060(b) is amended by adding a reference to ‘VCA’ in the introductory phrase, to ensure that CPL(A) or CPL(H) holders, also when flying VCA, will be subject to these recent experience requirements when carrying passengers or being engaged in commercial air transport.

Other essential comments that, after review and discussion with the FCL expert group, did not lead to further changes are summarised as follows:

— Some commentators queried how especially CPL(A) holders who obtain a VCA type rating will receive training in the specificities of the operational environment they will not yet be familiar with (e.g. urban meteorological phenomena). After a longer discussion, it was finally concluded that, in the context of Article 4f, training in such operation-specific topics needs to be covered exclusively by the subsequent training at the operator where the pilot will act as flight crew member. However, based on these comments, it was also decided that future requirements for ab initio VCA pilot training will include sufficiently generic topics (such as urban meteorological phenomena) in the theoretical knowledge syllabus.

— Some commentators requested to also allow LAPL(A)/(H) and PPL(A)/(H) licence holders to obtain a VCA type rating in accordance with Article 4f, arguing that the high level of automation of these novel aircraft will make it very easy to fly them. The future comprehensive framework for initial VCA pilot licensing indeed is planned to also encompass requirements for a non-commercial VCA pilot licence. However, for gaining initial operational experience with novel aircraft which will be mainly operated in highly complex environments (urban areas) and for commercial operations, it was considered necessary to exclusively rely on pilots with higher (professional) qualifications.

— A commentator requested more detailed qualification requirements for competent authority inspectors and approved training organisation (ATO) staff (head of training, chief flying instructor). It was decided that, in the context of Article 4f, the general requirements of Part-ARA and Part-ORA are sufficient, noting that Part-ORA or Part-ARA already today do not contain inspector or ATO staff qualification requirements which are specific to a particular aircraft category. However, when developing the future ab initio VCA pilot training framework, additional requirements (also referring to inspector and ATO staff qualifications) are planned to be inserted in Part-ARA and Part-ORA, in the context of the development, approval, conduct, and oversight of competency-based training and assessment (CBTA) programmes.

— A commentator proposed to introduce the possibility for CPL(A) or CPL(H) holders with a VCA type rating to keep their instrument rating (IR(A) or IR(H)) valid by flying and completing checks solely in VCA. At this early stage, also considering the potentially very different operational environment of IFR flights in a conventional aeroplane or helicopter on the one side and in a VCA on the other, it was concluded that such cross-crediting should not be possible (yet) but may be considered for the future, when reassessing the topic after having gained experience with VCA operations.

2.4.7. Standardised European rules of the air (SERA)

2.4.7.1. Use of predefined routes

The use of predefined routes for the initial roll-out of manned VCA was one of the topics that attracted comments by several stakeholders, mainly manufacturers. They argued that such requirements would not be necessary and that they would hinder market development and the exploitation of the full potential of manned VCA.

The use of the predefined route principle for the initial roll-out of manned VCA operations is considered necessary over urban environments and densely populated areas at low level to respect ground risk requirements and to reduce the risk of collision between manned VCA. The aircraft performance or pilot competences/skills are not considered as factors that drive operational

limitations. From the point of view of airspace management, when airspace is designated as U-space airspace, parts of that airspace need to be predefined to enable dynamic airspace reconfiguration as foreseen by Commission Implementing Regulation (EU) 2021/664[47].

Today, helicopter operations at low level in urban environments also often follow predefined routes. Outside urban environments, manned VCA may be handled like any other manned aircraft.

2.4.7.2. Flight information services (FIS)

The second major topic that attracted comments was related to FIS in relation to UAS. Stakeholders claimed that a change in Commission Implementing Regulation (EU) No 923/2012 was not deemed necessary since the existing Regulation already covers such case.

EASA determined instead that such amendment is needed to ensure proper bridging between the U-space requirements laid down in Commission Implementing Regulation (EU) 2021/664 and the UAS operational requirements laid down in Commission Implementing Regulation (EU) 2019/947. It must be noted that the lead-in sentence of the proposed requirement contains the word 'pertinent'. It is well known that information may not be always available to ATS; however, if information is available and the case is considered pertinent by the ATS, then information shall be provided.

2.5. What are the expected benefits and drawbacks of the proposed amendments

The related detailed impact assessment (IA) is available in Section 4 of NPA 2022-06[48].

Further to the NPA public consultation, the assessment and the overall conclusions of the IA remain valid and unchanged. No major concerns were expressed with regard to the analysis performed. In addition, no substantial changes were introduced compared to the initial text proposed with the NPA.

The proposed amendments are expected to contribute to ensuring a high and uniform level of safety as regards operations with UAS and manned VCA by mitigating potential safety risks and fostering an operation-centric, proportionate, as well as risk- and performance-based and harmonised regulatory framework across the EU Member States. In addition, they are expected to enable the safe integration of the new aviation actors in the Union skies. Further, they will enhance the market development in the field of IAM with an efficient and well-designed regulatory framework, free of burdensome provisions and requirements, while maintaining safety.

As regards environmental aspects, no major impacts have been identified following the analysis of the options considered. RMT.0727[49] Subtask 2 focuses on aspects linked to the identification of the environmental protection requirements applicable to aircraft not covered by ICAO Annex 16. It is acknowledged that, thanks to technological evolution, some of the current IAS operations might benefit in the future from the expected positive environmental impacts (e.g. reduction of noise levels).

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47 Commission Implementing Regulation (EU) 2021/664 of 22 April 2021 on a regulatory framework for the U-space (OJ L 139, 23.4.2021, p. 161) (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32021R0664&qid=1692698779441).

48 https://www.easa.europa.eu/en/document-library/notices-of-proposed-amendment/npa-2022-06

49 Alignment of Part 21 of Regulation (EU) No 748/2012 with Regulation (EU) 2018/1139 (including simple and proportionate rules for General Aviation) — EPAS Vol. II – 2023 Edition and ToR RMT.0727 - Alignment of Part 21 of Regulation (EU) No 748/2012 with Regulation (EU) 2018/1139 (including simple and proportionate rules for GA) | EASA (europa.eu).

The following table highlights the main expected benefits and drawbacks of the elements considered controversial for each affected regulatory domain. It includes references to the CAW, AIR OPS, FCL and ATM domains, while for the IAW domain no specific controversial elements have been identified.

Regulatory domain	Policy proposal	Main benefits/drawbacks
CAW	Specific annexes for the CAW of certified UAS in the 'specific' category on the basis of the principles of Part-ML and Part-CAO	No potential additional costs for a maintenance licence, avoiding potential limitations for personnel that have already gained experience in this field but do not hold a maintenance licence. It also offers an organisation approval with all the necessary CAW privileges (Part-CAO.UAS organisations). It ensures safe and proportionate CAW requirements for certified UAS operated in the 'specific' category.
AIR OPS	Inclusion of manned VCA in emergency medical services (VEMS)	VEMS would quickly bring the emergency doctor at the accident scene to treat and stabilise the patient. VCA employed in EMS are likely to gain full public acceptance due to expected societal benefits and lower levels of pollution (noise and emissions).
	Certification of non-commercial and commercial operators of manned VCA	Air operator certificate (AOC): 1) Positive safety considerations considering the thorough check in the AOC process. 2) Administrative efforts for operators to demonstrate compliance in order to obtain the AOC. 3) EU Member States' competent authorities might face costs related to additional staff required to be hired and trained to issue AOCs to non-commercial and commercial operators and perform oversight. However, these costs are not expected to be major considering the low number of commercial and non-commercial VCA operations expected in the short/medium term; therefore, these activities might be covered partially by existing competent authority staff.

Regulatory domain	Policy proposal	Main benefits/drawbacks
FCL	New requirements to allow existing CPL(A) and CPL(H) holders to add VCA type ratings to their licences	Only pilots that already hold a licence for a conventional aircraft could be involved in operations with manned VCA, with no possibility for ab initio pilot training in VCA. However, in any case, only experienced pilots shall fly VCA during the initial phase of VCA operations. Experience gained during this phase will contribute to the development of a robust and comprehensive flight crew licensing framework for manned VCA with a future NPA in the context of RMT.0230.
ATM	Predefined routes	The establishment of predefined routes would allow to systematically avoid flying over areas and buildings that, for any reason, require noise protection. Furthermore, the possibility to avoid flying over 'sensible' places and the assurance of deconflicting paths thanks to predefined routes would help gain greater public acceptance. However, the system of predefined routes might impose limitations for some types of operations.

2.6. Harmonisation with the ICAO SARPs

The proposed amendments have been developed considering the following ICAO Standards and Recommended Practices (SARPs):

— ICAO Annex 8 has been considered for the definition of the processes applicable to the airworthiness of UAS that are subject to certification;

— the existing provisions for manned aviation available in ICAO Annexes 1 and 2, in parts of Annex 3, in Annexes 6 and 7, and in parts of Annex 11 and in ICAO Doc 4444 'PANS-ATM' have been considered for the development of the requirements applicable to operations with manned VCA.

EASA is closely monitoring ICAO's work in the field of IAM and is exchanging with ICAO on the novelties and coherence of the proposed regulatory framework, while ensuring its consistency with the existing ICAO SARPs.

Should the exchange between EASA and ICAO, and also the ongoing work at ICAO level, reveal the need for additional alignment measures (e.g. VCA definition), they may be addressed during the comitology phase leading to the approval of the affected regulations, ahead of their adoption and after a proper assessment of their impacts.

3. How we monitor and evaluate the proposed amendments

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 proposal on the indicators to be checked is as follows:

What to monitor	How to monitor	Who should monitor	How often to monitor
Number of UAS type certificate applications	EASA database	EASA	On a recurrent basis, e.g. once every 2 years
Number of CMU type certificate applications	EASA database	EASA	On a recurrent basis, e.g. once every 2 years
Number of Part-CAO.UAS approvals	Surveys to NCAs	EASA/NCAs	On a recurrent basis, e.g. once every 2 years
Number of registered UA	Surveys to NCAs	EASA/NCAs	On a recurrent basis, e.g. once every 2 years
Number of UA airworthiness certificates	Surveys to NCAs	EASA/NCAs	On a recurrent basis, e.g. once every 2 years
Number of AOC applications	Surveys to NCAs	EASA/NCAs	On a recurrent basis, e.g. once every 2 years
Number of VEMS authorisations	Surveys to NCAs	EASA/NCAs	On a recurrent basis, e.g. once every 2 years
Number of pilot VCA type ratings	Surveys to NCAs	EASA/NCAs	On a recurrent basis, e.g. once every 2 years
Number of predefined routes	Surveys to NCAs	EASA/NCAs	On a recurrent basis, e.g. once every 2 years

In addition, EASA shall monitor the implementation of the proposed regulatory framework applicable to UAS subject to certification and to manned VCA through regular standardisation activities as well as through regular feedback received from the EASA Advisory Bodies.

4. Proposed actions to support implementation

— Issue and publication of AMC and GM to both new and amended regulations

— Focused communication for Advisory Body meeting(s) (MAB/SAB)

— Clarifications via electronic communication tools between EASA and NAAs (EUSurvey or other)

— Detailed explanations/clarifications on the EASA website

— Dedicated thematic workshop/session

— Combination of the above-mentioned means

Cologne, 30 August 2023

For the European Union Aviation Safety Agency

The Executive Director

Patrick KY

5. References

5.1. Related EASA decisions

n/a

5.2. Related EU regulations

— 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 (recast) (OJ L 224, 21.8.2012, p. 1)

— 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)

— 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 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)

— Commission Regulation (EU) No 1178/2011 of 3 November 2011 laying down technical requirements and administrative procedures related to civil aviation aircrew pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (OJ L 311, 25.11.2011, p. 1)

— Commission Implementing Regulation (EU) No 923/2012 of 26 September 2012 laying down the common rules of the air and operational provisions regarding services and procedures in air navigation and amending Implementing Regulation (EU) No 1035/2011 and Regulations (EC) No 1265/2007, (EC) No 1794/2006, (EC) No 730/2006, (EC) No 1033/2006 and (EU) No 255/2010 (OJ L 281, 13.10.2012, p. 1)

— Commission Implementing Regulation (EU) 2017/373 of 1 March 2017 laying down common requirements for providers of air traffic management/air navigation services and other air traffic management network functions and their oversight, repealing Regulation (EC) No 482/2008, Implementing Regulations (EU) No 1034/2011, (EU) No 1035/2011 and (EU) 2016/1377 and amending Regulation (EU) No 677/2011 (OJ L 62, 8.3.2017, p. 1)

— Commission Implementing Regulation (EU) 2023/203 of 27 October 2022 laying down rules for the application of Regulation (EU) 2018/1139 of the European Parliament and of the Council, as regards requirements for the management of information security risks with a potential impact on aviation safety for organisations covered by Commission Regulations (EU) No 1321/2014, (EU) No 965/2012, (EU) No 1178/2011, (EU) 2015/340, Commission Implementing Regulations (EU) 2017/373 and (EU) 2021/664, and for competent authorities covered by Commission Regulations (EU) No 748/2012, (EU) No 1321/2014, (EU) No 965/2012, (EU) No 1178/2011, (EU) 2015/340 and (EU) No 139/2014, Commission Implementing Regulations (EU) 2017/373 and (EU) 2021/664 and amending Commission Regulations (EU) No 1178/2011, (EU) No 748/2012, (EU) No 965/2012, (EU) No 139/2014, (EU) No 1321/2014, (EU) 2015/340, and Commission Implementing Regulations (EU) 2017/373 and (EU) 2021/664 (OJ L 31, 2.2.2023, p. 1)

5.3. Other references

— EASA Study on the societal acceptance of Urban Air Mobility in Europe[50]

— EASA concept for regulation of Unmanned Aircraft Systems (UAS) operations in the 'certified' category and Urban Air Mobility — Issue 3.0

— EASA Drone Collision Task Force[51]

50 https://www.easa.europa.eu/domains/urban-air-mobility-uam

51 https://www.easa.europa.eu/document-library/general-publications/drone-collision-task-force

6. Related documents

— **CRD** to NPA **2022-06** 'Introduction of a regulatory framework for the operation of drones — Enabling innovative air mobility with manned VTOL-capable aircraft, the initial airworthiness of unmanned aircraft systems subject to certification, and the continuing airworthiness of those unmanned aircraft systems operated in the "specific" category' (RMT.0230 — Subtask C#1) ***EASA responses to individual comments***[52]

— **CRD** to NPA **2022-06** 'Introduction of a regulatory framework for the operation of drones — Enabling innovative air mobility with manned VTOL-capable aircraft, the initial airworthiness of unmanned aircraft systems subject to certification, and the continuing airworthiness of those unmanned aircraft systems operated in the "specific" category' (RMT.0230 — Subtask C#1) ***Individual comments (without EASA responses)***[53]

52 https://www.easa.europa.eu/en/document-library/comment-response-documents

53 https://www.easa.europa.eu/en/document-library/comment-response-documents