European Union Aviation Safety Agency

Notice of Proposed Amendment 2022-06

in accordance with Article 6 of MB Decision No 1-2022

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

EXECUTIVE SUMMARY

This Notice of Proposed Amendment (NPA) 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.

This NPA proposes amendments to existing EU aviation regulations and the creation of 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.

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 VTOL-capable aircraft;

— enable operators to safely operate manned VTOL-capable aircraft in the single European sky;

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

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

— 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.

Domain:	Unmanned aircraft systems (UAS) (civil drones)
Related rules:	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
Affected stakeholders:	Drone and VTOL-capable aircraft operators; competent authorities (CAs); flight crews; maintenance organisations; continuing airworthiness management organisations (CAMOs); drone and VTOL-capable aircraft manufacturers; other airspace users; air traffic management/air navigation services (ATM/ANS) providers and other ATM network functions; air traffic services (ATS) personnel; aerodromes; general public
Driver:	Safety
Rulemaking group:	No, but expert groups
Impact assessment:	Yes
Rulemaking Procedure:	Public consultation

EASA rulemaking procedure milestones

Start Terms of Reference	**Public consultation** NPA 2022-06	**Proposal to the Commission** EASA Opinion	**Adoption by the Commission** Implementing/Delegated act	**Decision** Certification Specifications, Acceptable Means of Compliance, Guidance Material
22.4.2021	30.6.2022	2023/Q1	2023/Q4	n/a

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1. About this NPA

1.1. How this NPA was developed

The European Union Aviation Safety Agency (EASA) developed this NPA 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 2022-2026[3].

The scope and timescales of the task were defined in the related Terms of Reference (ToR)[4].

EASA developed this NPA without a formal rulemaking group but with the contribution of dedicated expert groups established for each of the affected domains. It is hereby submitted to all interested parties for consultation in accordance with Article 115 of the Basic Regulation, and Article 6 of the Rulemaking Procedure.

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

1.2. How to comment on this NPA

Please submit your comments using the automated **Comment-Response Tool (CRT)** available at **http://hub.easa.europa.eu/crt/**[5].

The deadline for the submission of comments is **30 September 2022**.

1.3. The next steps

Following the public consultation, EASA will review all the comments received.

Based on the comments received, EASA will revise, if necessary, 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[6];

— 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[7];

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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 replacing Decision 15-2015 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 (https://www.easa.europa.eu/downloads/136443/en).

3 https://www.easa.europa.eu/document-library/general-publications/european-plan-aviation-safety-2022-2026

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

5 In case of technical problems, please send an email to crt@easa.europa.eu with a short description.

6 OJ L 224, 21.8.2012, p. 1 (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32012R0748&qid=1653917810933).

7 OJ L 296, 25.10.2012, p. 1 (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32012R0965&qid=1653917990505).

— 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[8];

— 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[9];

— Commission Delegated Regulation (EU) 2019/945 of 12 March 2019 on unmanned aircraft systems and on third-country operators of unmanned aircraft systems[10];

— Commission Implementing Regulation (EU) 2019/947 of 24 May 2019 on the rules and procedures for the operation of unmanned aircraft[11],

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 requirements for competent authorities and administrative procedures for the certification, oversight and enforcement of the continuing airworthiness of unmanned aircraft systems,

and shall issue an opinion.

The opinion will be submitted to the European Commission, based on which it will decide whether to amend the related Regulations and also establish new delegated and implementing acts.

A summary of the comments received will be provided in the Explanatory Note of the Opinion. The individual comments received on this NPA, and the EASA responses to them, will be reflected in a comment-response document (CRD), which will be published on the EASA website[12].

8 OJ L 311, 25.11.2011, p. 1 (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32011R1178&qid=1653918130754).

9 OJ L 281, 13.10.2012, p. 1 (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32012R0923&qid=1653918228805).

10 OJ L 152, 11.6.2019, p. 1 (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019R0945&qid=1653918419960).

11 OJ L 152, 11.6.2019, p. 45 (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019R0947&qid=1653918578552).

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

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 have reinforced the impulse towards the creation of new air mobility concepts in the framework of the 'smart, green and digital' cities initiative led by the European Commission.

An 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 concluded that there is no agreed and consolidated definition of the notion of urban air mobility.

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 will regulate operations with UAS and VTOL-capable aircraft 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.);

— the use in other aviation regulatory domains (other than initial airworthiness) of the definition of 'VTOL-capable aircraft'[13] provided by the EASA *Special Condition for VTOL and Means of Compliance*[14] may introduce unnecessary complexities when adopted in other operational regulations,

EASA will 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**[15] **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

[13] Person-carrying, vertical take-off and landing, heavier-than-air aircraft in the 'small' category with lift/thrust units used to generate powered lift and control, and with more than two lift/thrust units used to provide lift during vertical take-off or landing.

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

[15] 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 operation is performed. In the certification domain, more stringent requirements are imposed on 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 where the operation is performed (congested versus non-congested area). 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).

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.

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

Figure 1 — Domains of UAS and VTOL-capable aircraft operations

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, Commission Delegated Regulation (EU) 2019/945, and Commission Implementing Regulation (EU) 2021/664 of 22 April 2021 on a regulatory framework for the U-space[16].

The NPA proposes amendments to several existing EU aviation regulations and the creation of 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;

[16] OJ L 139, 23.4.2021, p. 161 (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32021R0664&qid=1653919403803).

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

The following subjects are not included in the content of this NPA and will be addressed by the Agency with a separate NPA in the future:

— the continuing airworthiness of UAS operated in the 'certified' category;

— the operational requirements applicable to UAS (drones and unmanned VTOL-capable aircraft) operated in the 'certified' category;

— the environmental protection requirements applicable to UAS subject to certification and to VTOL-capable aircraft to which the provisions of ICAO Annex 16 would not apply.

2.1. Why we need to amend the rules — issue/rationale

Compared to existing manned aircraft and ground vehicle operations, UAS and VTOL-capable aircraft create new opportunities as they open the field of 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 different geographical scales ranging from urban environments to intercontinental routes.

In order to ensure the safe integration and operation of UAS and VTOL-capable aircraft in the aviation system, new European Union regulations have been developed in a stepwise approach while progressively covering the market segments and different types of designs and operations. This additional effort aims to further complement the already 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.

An 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 the operation of manned VTOL-capable aircraft.

A set of both new and amended regulations is needed 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 VTOL-capable aircraft. It is also believed that dedicated provisions for UAS and VTOL-capable aircraft will be beneficial to support EU's industry competitiveness at global level.

For a more detailed analysis of the issues addressed by this NPA, please refer to Section 4.1.

2.1.1. ICAO and third-country references relevant to this RMT

References considered for the harmonisation of this RMT with the ICAO Standards and Recommended Practices (SARPs):

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

— all the provisions applicable to the operation of manned VTOL-capable aircraft have been developed considering the existing ICAO provisions applicable to manned aviation.

2.1.2. Links with other RMTs

Some of the elements of the overall scope of the present NPA are linked with the outcomes of additional EASA RMTs, in particular:

— RMT.0727 *Alignment of Part 21 of Regulation (EU) No 748/2012 with Regulation (EU) 2018/1139 (including simple and proportionate rules for GA)*

regarding aspects linked to the identification of the environmental protection requirements applicable to aircraft not covered by ICAO Annex 16;

— RMT.0731 *New air mobility*

regarding aspects linked to the definition of the continuing airworthiness requirement for emerging technologies such as electric and hybrid propulsion in manned aviation;

— RMT.0720 *Management of information security risks*

regarding aspects linked to the protection of the aviation system from cybersecurity attacks and their consequences, and in particular the management of information security risks by organisations in all the aviation domains (design, production, continuing airworthiness management, maintenance, operations, aircrew, ATM/ANS, aerodromes);

— RMT.0729 *Regular update of Commission Implementing Regulation (EU) 2019/947 on the rules and procedures for the operation of unmanned aircraft and of Commission Delegated Regulation (EU) 2019/945 on UAS and on third-country operators of UAS (drones operated in the 'open' and 'specific' category)*

regarding the amendment of existing regulations applicable to UAS

— RMT.0730 *Regular update of the AMC and GM to Commission Implementing Regulation (EU) 2019/947 on the rules and procedures for the operation of unmanned aircraft (drones operated in the 'open' and 'specific' category)*

regarding the amendment of existing AMC and GM to the regulations applicable to UAS;

— RMT.0230 Subtask B *U-space*

regarding the development of AMC and GM to the U-space regulations;

— RMT.0573 *Fuel/energy planning and management*

regarding the update of the applicable operational requirements applicable to aircraft equipped with electrical or hybrid propulsion systems;

— RMT.0255 *Review of Part-66* and RMT.0544 *Review of Part-147*

regarding aspects linked to the basic knowledge requirements and competency-based aspects of maintenance licence applicants.

2.1.3. Links with other initiatives beyond the EASA scope

2.1.3.1 Drone Strategy 2.0

In the frame of the 'Smart and Sustainable Mobility Strategy', the European Commission has adopted the 'Drone Strategy 2.0' which aims to further develop the rules on drones and unmanned aircraft and guide the regulatory and commercial environment. The focus on EU drone technologies aims to

enhance the competitiveness of EU industry by identifying areas of cross-fertilisation so that innovative defence and civil projects can benefit from each other. The 'Drone Strategy 2.0' will look beyond safety and address issues that are technical, legal or administrative obstacles to the development of a thriving drone economy in Europe.

2.1.3.2 Security aspects for vertiports

In the context of the wide spectrum of operations foreseen with manned VTOL-capable aircraft and UAS, the aviation-related security aspects play an important role. The EU aviation security framework is established by Regulation (EC) No 300/2008 of the European Parliament and of the Council of 11 March 2008 on common rules in the field of civil aviation security and repealing Regulation (EC) No 2320/2002[17], while Commission Regulation (EU) No 1254/2009 of 18 December 2009 sets criteria to allow Member States to derogate from the common basic standards on civil aviation security and to adopt alternative security measures[18]. Vertiports may benefit from alternative security measures established and approved at national level in line with the Regulation (EU) 1254/2009 with security measures tailored to the nature of operations taking place at a specific vertiport and its location. EASA will ensure appropriate support to the European Commission in order to develop an appropriate strategic regulatory work to enable the development of this aviation sector.

2.1.3.3 Protection of wildlife

The EASA *Study on the societal acceptance of Urban Air Mobility in Europe*[19] highlighted that wildlife protection is one of the main concerns of the European citizens when considering the potential large number of aircraft flying in the lower levels of the atmosphere. EASA will liaise with the European Commission and support it in developing appropriate measures, either systemic or technical (e.g. establishment of wildlife protection areas, implementation of bird avoidance systems on the ground or on aircraft) to ensure environmental and wildlife protection while rendering the UAM system sustainable.

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 NPA will 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 VTOL-capable aircraft.

This RMT will particularly contribute to achieving the objectives of Article 1(1) and (2) of the Basic Regulation, and in particular:

— contribute to the wider Union aviation policy and to the improvement of the overall performance of the civil aviation sector;

17 OJ L 97, 9.4.2008, p. 72 (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32008R0300&qid=1653924891286).

18 OJ L 338, 19.12.2009, p. 17 (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32009R1254&qid=1653925067697).

19 https://www.easa.europa.eu/sites/default/files/dfu/uam-full-report.pdf

— 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;

— 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;

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

— promote research and innovation, inter alia, in regulatory, certification and oversight processes;

— support passenger confidence in a safe civil aviation.

The specific objectives of this RMT 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 VTOL-capable aircraft;

— enable operators to safely operate manned VTOL-capable aircraft in the single European sky (SES);

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

— promote innovation and development in the field of IAM while creating an efficient, proportionate, and well-designed regulatory framework, free of burdensome provisions that could hinder the market's development;

— harmonise the regulatory framework across the EU MSs 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/creation of existing/new regulations applicable to the different aviation domains affected by this NPA.

In particular:

— for UAS subject to certification:
  — initial airworthiness (IAW);

— for UAS subject to certification which are operated in the 'specific' category:
  — continuing airworthiness (CAW);

— for manned VTOL-capable aircraft:
  — air operations (AIR OPS);
  — flight crew licensing (FCL);

— standardised European rules of the air (SERA).

2.3.1. Initial airworthiness (IAW)

2.3.1.1 Background

The initial airworthiness of manned aviation is governed by Commission Regulation (EU) No 748/2012. This Regulation 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 establishes 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'.

As a consequence of the above, the current proposal is to amend Commission Regulation (EU) No 748/2012 and its Annex I (Part 21) to include provisions for the certification of UA and for the command unit (CU) that remotely controls the UA. Such amendments are the subject of this explanatory note.

The proposed amendments to Commission Regulation (EU) No 748/2012 in Section 3.1 are based on the latest adopted amendments to that Regulation. Please note that some requirements on which the amendments are proposed will become applicable on 7 March 2023.

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[20] or 'certified' category).

The proposal suggests that the certification procedures of Part 21 apply to the UA as well as the elements included in the type design. One of these elements, the command unit, can optionally be issued a dedicated type certificate and, in this case, its certification is carried out through dedicated procedures included in this proposal. Most of the changes proposed to Part 21 are related to the introduction of the concept of 'command unit' and 'command unit components', which are addressed in Section 3.1. It should be noted that, throughout Part 21, the CU cannot be captured under the generic 'product' terminology, as according to the Basic Regulation, the CU cannot be considered a product.

Manufacturers may modify a manned aircraft by means of a Part 21 change process and create an unmanned version or an optionally piloted version. The initial airworthiness of such optionally piloted (hybrid) configurations is included in the scope of the current proposal. These aircraft will be listed on

[20] 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).

a single type certificate (or restricted type certificate or flight condition) so that a single certificate of airworthiness (or restricted certificate of airworthiness or permit to fly) can be issued to individual aircraft.

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 falls within the definition of 'aircraft', thus it is not necessary to distinguish it from manned aircraft and, therefore, the same certification procedures apply as for manned aircraft. As for manned aircraft, the airworthiness of unmanned aircraft is certified through the issuance of a certificate of airworthiness (CofA) based on a type certificate (TC). However, for specific cases such as flight tests, specific provisions have been created.

In particular:

— Most complex and critical applications such as unmanned aircraft for the transportation of passengers and smaller unmanned aircraft for parcel delivery operated in the 'specific' category may require very different reliability flight tests, ranging from a few tens of hours to several hundreds. The need to preserve this flexibility has been captured with specific requirements dedicated to unmanned aircraft under new point 21.A.35(f)(2). Manned VTOL-capable aircraft may also potentially require several hundred hours of reliability flight tests to demonstrate 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).

— UAS in the 'specific' category high risk are subject to an operational authorisation and not to a permit to fly. However, in case of an invalid certificate of airworthiness, in order to obtain the operational authorisation, the approval of the flight conditions (point 21.A.708) is required. As required by point 21.A.709, an application for the approval of flight conditions shall be made. When the approval of the flight conditions is not related to the safety of the design, to the competent authority in a form and manner established by that authority. In the 'specific' category of operation, the risk assessment provided as AMC to Article 11 of Implementing Regulation (EU) 2019/947 determines those operational safety objectives which always need to be taken into account and that are not related to the safety of design. The application for approval of flight conditions will, therefore, be made to EASA to ensure safety of design, and also to the competent authority to ensure that aspects not linked to the design (operational procedures and checklists, remote crew training and multi-crew coordination, external systems) are properly addressed. This process applies to situations where the (R)CofA is not yet issued or is invalid, where the competent authority is designated in accordance with point 21.1 of the Annex (Part 21) to Regulation (EU) No 748/2012[21].

[21] In accordance with the provisions that shall become applicable on 7 March 2023 — refer to Commission Implementing Regulation (EU) 2022/203 of 14 February 2022 amending Regulation (EU) No 748/2012 as regards management systems and occurrence-reporting systems to be established by competent authorities, and correcting Regulation (EU) No 748/2012 as regards the issuance of airworthiness review certificates (OJ L 33, 15.2.2022, p. 46).

  - The possibility to define standard changes and standard repairs has been extended under point 21.A.90B(a)(1)(iv) to unmanned aircraft with VTOL capability with a MTOM of 3 175 kg or less, and to other unmanned aircraft with a MTOM of 5 700 kg or less.

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

— The introduction of the option to issue a TC for the CU.

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

— The introduction of the possibility to issue ETSO authorisations for CU components (for cases where EASA considers such adoption appropriate).

— The definition of 'CU installation', the determination of the eligibility of a CU component for installation in the CU (point 21.A.308), the establishment of a link with the new continuing airworthiness Regulation for UAS in so far as instructions for the CU 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 CU models which can be utilised to operate the UA.

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

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

At this stage, no additional amendments to the Regulation on the certification processes of UAS operated in the 'certified' category are planned to be put forward in subsequent NPAs issued under RMT.0230.

2.3.1.4 Command unit (CU) and CU components

2.3.1.4.1 Design of CU and CU components

This NPA proposes an improved definition of the term 'command unit (CU)' compared to the current definition in Implementing Regulation (EU) 2019/945 and in Delegated Regulation (EU) 2019/947, clarifying that any ground-, air- or space-based equipment that supports the command and control of the aircraft is not considered part of the CU. The term 'ground-, air- or space-based equipment' refers to systems and components which are not included in the UA and the CU configuration subject to certification, but may still be necessary, depending on the operation, to support command and control functions, such as but not limited to satellite communication systems or GNSS. This NPA proposes a consistent definition in all the amended domains. Consequently, the definition of 'CU' has been updated in Implementing Regulation (EU) 2019/945 and in Delegated Regulation (EU) 2019/947, and has been included in new Commission Delegated Regulation (EU) …/… on the continuing airworthiness of UAS.

Design solutions for the CU vary significantly depending on the level of intervention of the remote pilot during the different phases of an operation, the different phases of flight, and the respective

operational concept. The CU might be contained in a room or in a transportable vehicle, with all the required systems for operation, or it might 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 CU may be very simple and may be constituted by a few components without container or the need for installation in a building.

EASA has identified the opportunity to make CU type certification available to the aviation community as a well-known and tested instrument for the appropriate management of the approval process of most complex CUs throughout their life cycle. In the framework of the proposed amendments, a dedicated TC may be issued for the CU. The CU configuration subject to certification is defined by the type-certificate holder as per point 21.A.15 and agreed with EASA.

Although not explicit at Part 21 procedural level, the following aspects are important when it comes to the type certification of a CU:

— When the CU is separately certified, its type design and the substantiation provided to obtain the TC will contribute to the demonstration of the UA certification basis requirements associated with the CU. However, depending on the case, complementary demonstration evidence might still be required.

— It is proposed to distinguish between CU components, which are essential for the operation and specifically designed for their use (‘essential and specific’, as per new requirement in point 21.A.308, addressed below in Section 2.3.1.4.3) and CU components which are not essential and/or not specific.

— The concept of the elements ‘essential and specific’ can be linked to the remote pilot station (RPS) layer model in ICAO Annex 8 — however, reduced to two layers. Any CU component would belong to a ‘core’ or to an ‘outer’ layer. The core layer is constituted by all the ‘essential and specific’ components, as defined by the TC holder. The outer layer includes any other component.

— Essential and specific CU components, constituting the core, need to be specified to the level of detail required to ensure compliance with the relevant airworthiness requirements, uniquely identified at part number (PN) level and covered by instructions for continued airworthiness (ICAs).

— Outer-layer elements are typically assets, equipment and resources required to support the CU operation and provide protection against hacking, lighting, power failures, and electromagnetic interference (EMI).

The possibility of issuing an ETSO authorisation for CU components is proposed by means of an extension of the definition of ‘article’. EASA does not plan to issue an ETSO for components which are not ‘essential and specific’.

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

Design changes to the CU, affecting the specifications approved as part of the UA TC type design, are treated as changes to the UA TC or, where the CU has been issued with a TC, changes to the CU TC and must be approved according to Subpart D of Part 21.

2.3.1.4.2 Production of CU and CU components

Unless Subpart F of Part 21 is followed, the CU core layer is manufactured by an approved production organisation in accordance with approved design data. The CU or CU core-layer components are delivered to the UA operator with a conformity statement (EASA Form 1) and need to be installed in accordance with the applicable installation instructions.

2.3.1.4.3 Installation of CU and CU components

If the design approval holder determines that this is necessary, the CU shall be installed in accordance with the specifications of the CU type design. Such specifications will be in the form of installation and testing instructions. In the 'specific' category, the installation will be released by the Part-CAO.UAS organisation (refer to Section 2.3.2).

The holder of the CU TC (when the CU has its own TC) or of the UA TC will transmit to the operator all the necessary instructions for the CU to be installed and released.

The eligibility of the CU components for installation on the CU is regulated by point 21.A.308, a new requirement specifically drafted to cover the two cases of 'essential and specific' components requiring an EASA Form 1, and components either not essential or not specific, not requiring an EASA Form 1.

2.3.1.4.4 CU identification

A CU shall not be registered like an aircraft, and no CofA shall be issued. A CU will, 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)) has been drafted to cover the specific means to provide such information.

2.3.1.5 Airworthiness Directives (ADs)

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

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[22] (DA) to regulate the maintenance of UAS, as opposed to Commission Regulation (EU) No 1321/2014 which regulates the continuing airworthiness of *manned* aviation.

[22] 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.

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

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

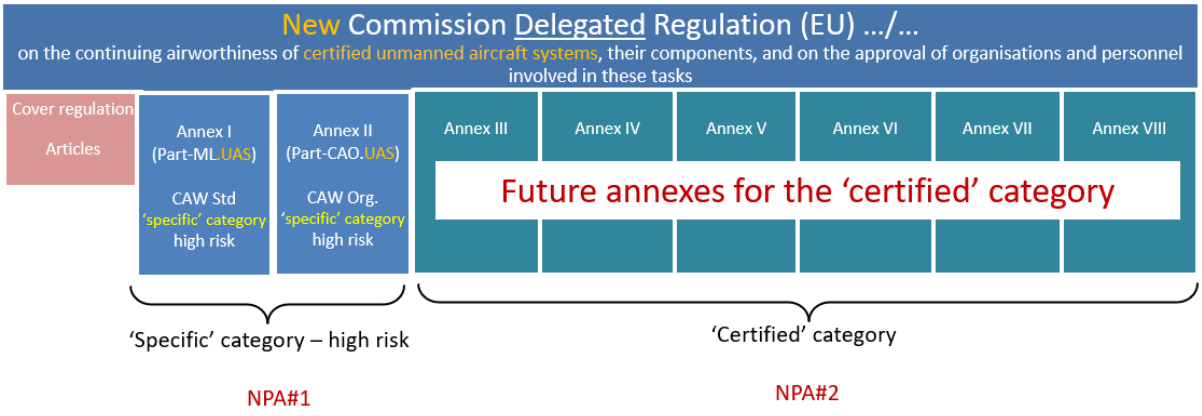
For each of these new regulations the objective is to address the UAS CAW provisions for operations in the 'certified' category as well as for high-risk operations in the 'specific' category. In the DA, the annexes will apply either to the 'certified' category or to the 'specific' category (high-risk operations).

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

Structure of the DA

This NPA puts forward two annexes to the DA, dedicated to address high-risk operations in the 'specific' category (SAIL V–VI). The first annex (Part-ML.UAS) lays down the CAW 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 CAW standards. Future annexes to address operations in the 'certified' category will be developed with a second NPA in the context of this RMT.

Figure 2 — Structure of the draft delegated act 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 take into account the UAS framework in general and the 'specific' category aspects 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 command unit (CU) which does not exist in manned aviation (see specificities of these parts below).

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).

— No maintenance licensing is proposed for UAS in the 'specific' category. This notably implies that the provisions for 'independent certifying staff' in Part-ML have not been extended to Part-ML.UAS. However, requirements have been developed for the UAS maintenance organisation to establish a 'company authorisation' mechanism for the 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 provisions for 'pilot-owner maintenance' have been developed, considering that the pilot will not be aboard the aircraft and that the remote-pilot qualification will be less extensive than in manned aviation.

In the new Part-ML.UAS and Part-CAO.UAS, it is assumed that all CAW organisations have their principal place of business in the European Union.

Scope of the DA

It is important to note that Part-ML.UAS and Part-CAO.UAS will not be applicable to all UAS subject to certification and operated in the 'specific' category. These annexes will become applicable only once the operator has obtained a certificate of airworthiness (CofA) or a restricted certificate of airworthiness (RCofA). Through the amendment of Article 7 of Commission Implementing Regulation (EU) 2019/947, this airworthiness certificate will 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 risk, the UAS operator complies with Commission Implementing Regulation (EU) 2019/947. An airworthiness certificate and adherence to Part-ML.UAS and Part-CAO.UAS are 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 an 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 CU (the individual CU and UA tasks may be listed and followed separately);

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

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

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

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

— for UA, UA components or CU core layer, 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 CU components on the CU (point ML.UAS.520):

— this follows the provisions established in Part 21 (point 21.A.308): for core-layer components, an EASA Form 1 is required whereas for non-core-layer components, a declaration is sufficient.

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

— core-layer 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-core-layer components is not regulated, but a 'declaration of maintenance accomplished' must be issued;

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

Subpart H

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

— the design approval holder (DAH) may require the CU 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 CU (point ML.UAS.803):

— maintenance carried out in respect of the core layer 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 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 can be extended by the Part-CAO.UAS organisation that has been contracted for the management of the given aircraft, under certain conditions;

— in respect of the CU(s) used to operate the UA, the airworthiness review staff shall ensure that a documented review and a physical inspection of the CU(s) have been satisfactorily carried out in the last 3 months.

Appendices

Appendix II:

— the 'EASA Form 1' fill-in instructions have been adapted for UAS purposes, 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 will be made to Appendix II to Annex I (Part-M) to Regulation (EU) No 1321/2014. Hence, the same EASA Form 1 will 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' has been replaced by 'compliance monitoring', which better reflects the intent of such system (point CAO.UAS.100).

Compliance with the 'information security management system' (refer to EASA Opinion No 03/2021 *Management of information security risks*[23]) is not required, but 'light' cybersecurity provisions 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 qualification of certifying staff (point CAO.UAS.040).

Occurrence-reporting provisions have been included to ensure compliance with both Regulation (EU) No 376/2014 and Regulation (EU) 2018/1139 (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 carried out and released remotely from the CU.

2.3.2.3 Draft implementing act (IA) on competent authority requirements

Structure of the IA

The proposed IA contains a single 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 CAW organisations.

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

[23] https://www.easa.europa.eu/document-library/opinions/opinion-032021

Note 2: Subpart GEN includes the requirement to comply with Part-IS.AR (Information security) in accordance with EASA Opinion No 03/2021[24] (and in particular point AR.UAS.GEN.200).

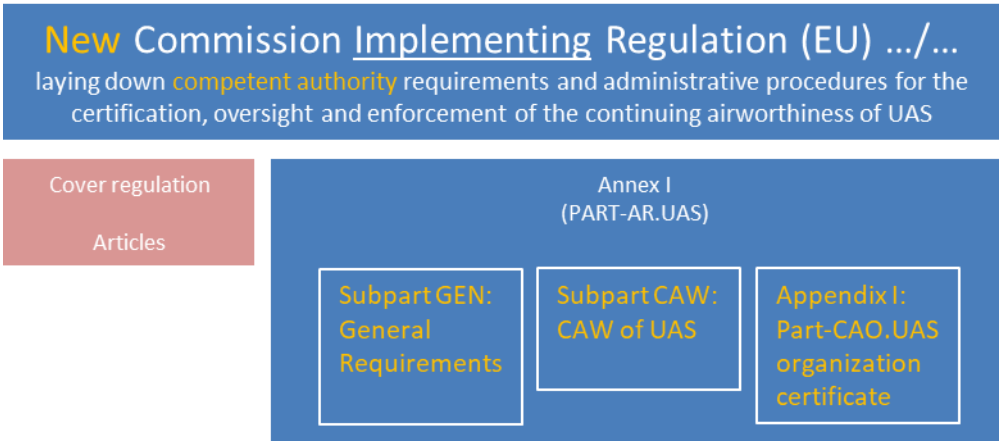
— **Subpart CAW** establishes domain-specific requirements in relation to competent authority tasks and responsibilities regarding the oversight of the CAW of UAS, and the issue of airworthiness review certificates (ARCs).

Note 1: Subpart CAW will be complemented in the context of a future NPA under RMT.0230 with additional requirements for the 'certified' category, e.g. approval of the UAS maintenance programme (point AR.UAS.CAW.302).

Note 2: For 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 CAW 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 implementing act on the continuing airworthiness of UAS



2.3.3. Regulations on UAS

2.3.3.1 Commission Delegated Regulation (EU) 2019/945

The rationale for amending the definition of 'command unit' has already been provided in Section 2.3.1.4.1, while the improved definition of 'C2 link service' clarifies the scope of the service provided which is limited only to the management of the flight and not to the specific operation performed by the UA.

Article 40(1) of Commission Delegated Regulation (EU) 2019/945 establishes the conditions where 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 over assemblies of people with

[24] Final regulation still to be adopted and published.

UAS of a characteristic dimension of 3 m or greater, or when passengers are on board, or when the 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, 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 will still apply and the UAS operation will be classified in the 'certified' category, requiring a type certificate and compliance with the continuing airworthiness Regulation.

Article 40(2) of Delegated Regulation (EU) 2019/945 is proposed to be amended for clarification. The first sentence establishes that the certification of any UAS has to follow the process laid down in Part 21, regardless of the reason why certification is sought. The second sentence, however, establishes that the UAS CAW Regulation will only apply to those UAS that have been certified for the reasons established in Article 40(1) of that Regulation.

This means that if an 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 operation in the 'specific' category), then the UAS is not subject to the UAS CAW Regulation.

2.3.3.2 Commission Implementing Regulation (EU) 2019/947

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 to the UAS operator the obtention of a (restricted) CofA in the case where the certification of the UAS is required by the type of the intended operation.

This means that if an 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.

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

Point UAS.SPEC.100 is amended to differentiate the case where an UAS with a (restricted) CofA is used and the case where only certified equipment is used on an UAS. In the first case, the UAS operator shall comply with the new UAS CAW Regulation. In the second case, the UAS operator has only limited obligations in respect of the continuing airworthiness of the certified equipment.

2.3.4. Air Operations

2.3.4.1 Definition of 'rotorcraft' and 'helicopter'

The proposed definition of 'VTOL-capable aircraft'[25] 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 VTOL-capable aircraft as adopted with the EASA Special Condition VTOL, it shall offer an 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 definitions of 'aircraft'. In particular, it is proposed to limit the definition of 'helicopter' to 'heavier-than-air aircraft supported in flight chiefly by the reaction of the air on up to two power-driven rotors on substantially vertical axes'. This would imply that aircraft configurations with more than two power-driven rotors should be initially classified as 'VTOL-capable aircraft' for the purposes of the above-mentioned Regulations.

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 amendment of the definitions be finally approved, EASA will take appropriate actions 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 General considerations

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

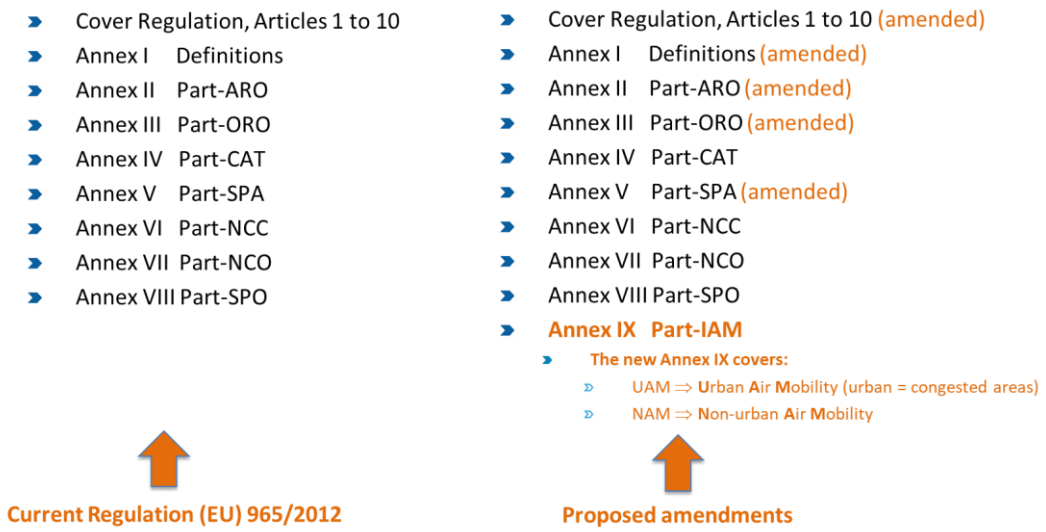
However, that Regulation does not contain appropriate provisions for the safe operation of UAS and of VTOL-capable aircraft and for the certification of operators of such aircraft.

The transportation of persons and/or cargo by VTOL-capable aircraft in congested (urban) or outside congested areas requires a level of safety that is at least as high as that applicable to operations with conventional aeroplanes or helicopters. In some respects, the precautionary principle should be exercised until more data on operations with innovative aircraft is gathered.

Therefore, for the future integration of VTOL-capable aircraft into the transportation systems of the EU Member States, it has been found appropriate to employ the regulatory infrastructure available today for aeroplanes and helicopters (Figure 4) with the necessary amendments considering novel aircraft designs, types of propulsion, and concepts of operation.

[25] 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.

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



The approach towards UAS / VTOL-capable aircraft operations in the 'certified' category underpins the concept of new air mobility of people and cargo, in particular in congested (urban) areas, and its safe integration into existing and future air and ground infrastructure.

The concept of innovative air mobility (IAM) accommodates commercial and non-commercial operations with novel aircraft designs that do not automatically fall under one of the known categories of aeroplanes or helicopters, but which have the capability to vertically take off and land, have specific (distributed) propulsion features, may be operated in unmanned configuration, etc.

That concept has been reflected in the new Annex IX (Part-IAM) to Commission Regulation (EU) No 965/2012, and will gradually address two major aspects of VTOL-capable aircraft operations: manned configuration (with the present NPA), and unmanned configuration (with a subsequent, future NPA under RMT.0230).

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, is structured in two modules: operations in congested (urban) areas (Module-UAM) and operations in non-congested areas (Module-NAM).

Module-UAM will include operations with VTOL-capable aircraft 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.

Operators that intend to conduct countryside-to-countryside operations with VTOL-capable aircraft without flying over or taking off from / landing at urban areas would be subject to Module-NAM (non-urban, non-congested air mobility). That module will be mostly relevant for non-commercial, low-risk operations with VTOL-capable aircraft.

Some of the subparts are further divided into sections:

— Section 1: GENERAL REQUIREMENTS FOR ANY VTOL-CAPABLE AIRCRAFT (VCA),

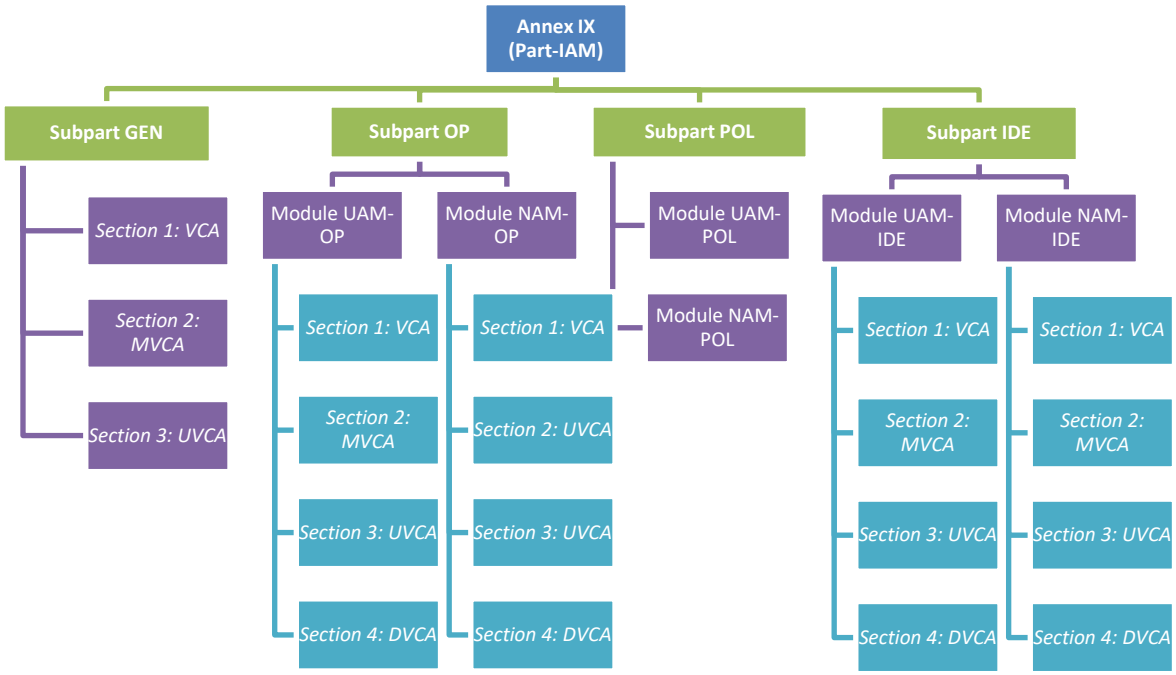
— Section 2: VTOL-CAPABLE AIRCRAFT IN MANNED CONFIGURATION (MVCA),

— Section 3: VTOL-CAPABLE AIRCRAFT IN UNMANNED CONFIGURATION THAT CARRY PASSENGERS (UVCA), and

— Section 4: VTOL-CAPABLE AIRCRAFT IN UNMANNED CONFIGURATION THAT CARRY CARGO (DVCA).

This NPA does not address the UVCA and DVCA sections and their relevant general requirements: they will be dealt with in a subsequent, future NPA under RMT.0230.

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



Air operations with aeroplanes and helicopters are traditionally regulated on the basis of whether or not the flight is part of a commercial operation[26]. Moreover, for CAT operations[27] (part of commercial operations) the certification of the operator is required, e.g. issuance of an air operator certificate (AOC), and the establishment of a safety management system (SMS).

Whilst it is expected that most of the initial operations with VTOL-capable aircraft will be commercial by nature, and non-commercial operations (such as leisure flights, business trips, etc.) will follow at a later stage, novel aircraft designs and their frequent use over densely populated urban areas dictate an innovative approach rather than the traditional differentiation of 'commercial' versus 'non-commercial'. This new approach is operation-centric and requires the same level of safety for the same safety risks, irrespective of the purpose of the flight.

[26] The term 'commercial operation' 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;'

[27] 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.'

2.3.4.3 Air operator certification

Before starting air operations, the operator of a UAS / VTOL-capable aircraft used for commercial or non-commercial operations shall undergo a certification procedure and shall receive an air operator certificate (AOC). The certification requirements and process are the same as those available for operators of aeroplanes and helicopters under Annex II (Part-ARO) and Annex III (Part-ORO) to Commission Regulation (EU) No 965/2012. For this reason, Annex II (Part-ARO) and Annex III (Part-ORO) have been only slightly amended to accommodate operations with manned VTOL-capable aircraft.

The AOC for a VTOL-capable aircraft operator shall remain valid for as long as the operator meets all the applicable requirements; it shall be subject to suspension, limitation, revocation, or termination.

The VTOL-capable aircraft shall be certified, and the list of aircraft intended to be used by the operator shall be included in the operations specifications to the AOC. In addition, the VTOL-capable aircraft shall be equipped with the necessary navigation, communication, surveillance, detect and avoid equipment, as well as with any other equipment deemed necessary for the safety of the intended flight, taking into account the nature of the operation, air traffic management regulations and rules of the air applicable during any phase of the flight.

The approach to VTOL-capable aircraft technology from an operational perspective is neutral (technology-agnostic) as far as possible, unlike the approach to manned aviation where the distinction is made between aircraft categories and classes. However, a balance between prescriptive and performance-based approach is proposed to avoid a too wide interpretation as it might be difficult for operators and competent authorities to implement and enforce it.

A VTOL-capable aircraft must be operated only if it is in airworthy condition, and the equipment and the other components and services necessary for the intended operation are available and serviceable.

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

2.3.4.4 Responsibilities of the AOC holder

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 the operation of VTOL-capable aircraft complies with the applicable EU regulations and with the airspace requirements of the Member State where the operation is conducted.

Detailed operator responsibilities are established in new Annex IX (Part-IAM) to Commission Regulation (EU) No 965/2012, specifically designed to address the IAM concept of operations.

2.3.4.5 Operational requirements and specific approvals

New Annex IX (Part-IAM) to Commission Regulation (EU) No 965/2012) specifically considers VTOL-capable aircraft with electric propulsion although it is also applicable to aircraft with other sources of energy (e.g. hybrid). The main concerns that have been addressed relate to flight routes, aerodromes, usable energy, and energy reserves.

Operators of VTOL-capable aircraft shall perform a careful pre-flight planning and only operate where the conditions are appropriate for the type of the intended operation. For example, when planning normal passenger operations, operators shall only select those aerodromes that are adequate. Adequate must also be the departure and destination aerodromes, as well as all alternate aerodromes. At the flight-planning stage, operators should assess their suitability for the intended flight and establish operating minima for each of them. For contingency-planning purposes, operators shall also assess the suitability of en-route aerodromes for possible diversions in the en-route phase of flight.

The term 'aerodrome' includes heliports and vertiports. Operators of VTOL-capable aircraft shall only use adequate aerodromes for passenger operations. The use of operating sites is only allowed for VEMS and for cargo operations.

VTOL-capable aircraft used for:

— operations using performance-based navigation (PBN);

— the transport of dangerous goods (DG);

— operations with the aid of night-vision imaging systems (NVIS); and

— for emergency medical service operations (VEMS)

shall be issued with additional specific approvals.

The issue of specific approvals is regulated by Part-SPA to Commission Regulation (EU) No 965/2012. Annex V (Part-SPA) has been amended to address the specific operational approval for the conduct of VEMS operations. Instead of amending the existing Subpart SPA.HEMS requirements, it was found more appropriate to add a new Subpart O, but still based on existing Subpart SPA.HEMS requirements.

The specificities of VTOL-capable aircraft do not require a different approach towards emergency medical services. The philosophy of HEMS and its difference from air ambulance apply to VEMS as well. Air ambulance is a conventional CAT flight when the urgency is not an issue for the carriage of patients or medical supplies (blood, organs, drugs, etc.).

ADAC Luftrettung, a German HEMS operator, carried out a study[28] on the feasibility of conducting emergency medical services with VTOL-capable aircraft (VEMS). This study determined found out 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 current VTOL-capable aircraft designs and performance need to be significantly improved before bringing the medical doctor to the site, as a first step. The second step — transport of patients by VTOL-capable aircraft — 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.

[28] 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).

2.3.5. Flight crew licensing

The development of comprehensive flight crew licensing requirements (ab initio training) for manned VTOL-capable aircraft 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 VTOL-capable aircraft manufacturers/operators will already be ready to start operations before the adoption and applicability of the subject draft implementing and delegated acts.

Hence, in order to ensure that the start of operations with manned VTOL-capable aircraft in the near future will be supported by the availability of appropriately qualified and licensed flight crews, this NPA proposes to introduce provisions (a new Article 4f in Commission Regulation (EU) No 1178/2011) that will allow holders of commercial pilot licences for aeroplanes or helicopters (CPL(A) and CPL(H)) to be issued with a VTOL-capable aircraft 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. Draft Article 4f will comprehensively address 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 (VTOL-capable aircraft 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 is also planned to keep the content of Article 4f as a permanent arrangement: CPL(A) or CPL(H) holders who wish to continue their career as VTOL-capable aircraft pilots will not need to obtain a separate pilot licence for manned VTOL-capable aircraft; they will be able to add a VTOL-capable aircraft type rating to their existing licence.

A definition of 'VTOL-capable aircraft' 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 small increase in resources can be expected related to type-rating training for manned VTOL-capable aircraft that needs to be provided to CPL(A) or CPL(H) holders. At the same time, operations with manned VTOL-capable aircraft will be supported by the availability of appropriately qualified and licensed flight crews already in the early phase of VTOL-capable aircraft operations.

— **for NAAs/EASA:** a small increase in resources can be expected related to the administration of type ratings for manned VTOL-capable aircraft 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 VTOL-capable aircraft, 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 VTOL-capable aircraft, with no possibility for ab initio pilot training in VTOL-capable aircraft. However, in any case, the intention is that only experienced pilots shall fly VTOL-capable aircraft during the initial 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 VTOL-capable aircraft with a future NPA under RMT.0230.

2.3.6. Standardised European rules of the air (SERA)[29]

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 pilot-in-command as last line of defence to avoid mid-air collision in all airspace classes. When the pilot is on board aircraft, as it is the case for manned VTOL-capable aircraft, the 'see and avoid' principle is automatically complied with.

As required in point SERA.3105 on minimum heights, and except when necessary for take-off or landing, or except by permission from the competent authority, an aircraft shall not be flown over the congested areas of cities, towns or settlements or over an open-air assembly of persons, unless at such a height 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 specified in point SERA.5005(f)[30] and the minimum levels for IFR flights shall be those specified in point SERA.5015(b)[31].

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 in aerodromes located in suburban environments). Due to their design, performance and operational/business approach, VTOL-capable aircraft 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 VTOL-capable aircraft in urban environment will follow a limited set of predefined routes or areas/corridors[32] for which the relevant competent authorities have got assurance that the air and ground risks are properly mitigated and, therefore, the objectives of point SERA.3105 shall be met. If competent authorities permit aircraft to fly below the minimum heights defined in accordance with point SERA.3105, then the safety objectives of SERA.3105 shall be met. This approach will be necessary until experience is gained on how to validate UAS 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 the safe and efficient air traffic taking off from and landing at those areas together with other air traffic in urban environments and existing air operations must be ensured. If, during the development process, it can be demonstrated and validated that safety, environmental protection and compatibility,

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29 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).

30 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.

31 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.

32 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.

security, and privacy can be guaranteed without the need for predefined routes or areas/corridors for manned VTOL-capable aircraft, then this potential limitation would be removed.

With predefined routes, manned VTOL-capable aircraft would have the possibility to operate in urban environments following predefined routings, i.e. predefined height and heading, and predefined take-off and landing procedures. With regard to safety, having predefined routes would allow the systematic deconfliction between UAS, thus automatically avoiding mid-air collisions (MAC). As regards environmental considerations, predefined routes would help 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 to some types of operations.

The alternative solution on 'free routing' would allow manned VTOL-capable aircraft to operate in urban environments but without any restriction whatsoever with respect to routing possibilities. Considering that, as of today, no detect and avoid (DAA) capabilities among UAS have been verified and certified, it cannot be ensured that MACs could be systematically prevented. Therefore, this solution has been discarded.

This NPA proposes respective amendments to SERA with the aim to enable operations with manned VTOL-capable aircraft. The following section provides an introduction to the individual topics as well as explanations for the proposed amendments included in Section 3.8 of this NPA.

2.3.6.1 The term 'fuel'

The term 'fuel' appears in a significant number of provisions within SERA. With the introduction of manned VTOL-capable aircraft, which are generally electrically powered, the issue was raised and discussed to determine the best manner to reflect the actual situation of these new machines regarding the fuel status.

Several options were envisaged like the juxtaposition of the terms 'fuel' and 'energy', or a 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 terms '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 provisions. For some of them, it was considered necessary to determine whether operations with manned VTOL-capable aircraft 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)[33]) and for the conditions applicable to *special VFR* (point SERA.5005(b)(2) and (c)(1)) as manned VTOL-capable aircraft are the only machines 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.

Manned VTOL-capable aircraft may have similar capabilities to helicopters and the case had to be explored to determine whether the provisions 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 to helicopters, manned VTOL-capable aircraft 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 VTOL-capable aircraft 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 VTOL-capable aircraft 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 record of operations that have not yet started in real conditions, it is difficult to identify a reference baseline for comparison and safety performance measurements.

Subsequently, it was concluded that it would be difficult to formulate a general provision that would be appropriate for all possible cases of operations with manned VTOL-capable aircraft.

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 VTOL-capable aircraft 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 present NPA because only binding provisions 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 operations and manned VTOL-capable aircraft operations as regards flight visibility, it was decided to proceed with a similar comparison for all other SERA specificities of helicopter operations.

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

It was also decided that the definition of 'manned VTOL-capable aircraft', proposed for inclusion in the AIR OPS and FCL Regulation, would also be proposed for inclusion into the SERA Regulation.

[33] 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.*

2.3.6.3 The term 'operating site'

For consistency with the AIR OPS Regulation, reference was also made in a number of instances to 'aerodromes' and 'operating sites' at the time of drafting the SERA Regulation.

However, the term 'operating site' had not been added everywhere and the consideration of the case of manned VTOL-capable aircraft 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 VTOL-capable aircraft, 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 the AIR OPS Regulation 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 by the pilot-in-command, as stated in the provision. Point SERA.11005 presents an emergency contingency situation where an aircraft is under threat due to unlawful interference. For manned VTOL-capable aircraft, 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 beyond aerodromes.

It was 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 the SERA Regulation 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 the SERA 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 the SERA Regulation 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 VTOL-capable aircraft 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 UA activities will be beneficial for both manned VTOL-capable aircraft and manned aircraft in general, and would improve safety.

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 will be subsequently partially amended.

2.3.6.5 Operation of an 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 VTOL-capable aircraft 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 VTOL-capable aircraft are certified and designed to be used with their full electrical capability planned and managed throughout the flight.

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

However, being equipped with a serviceable transponder may remain optional depending on the type of operation and the operational environment considered.

This approach is not contained in the present NPA because only binding requirements are addressed, but it will be reflected in the related, future AMC and GM, as appropriate.

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

This regulatory proposal contributes to ensuring a high and uniform level of safety as regards operations with UAS and manned VTOL-capable aircraft by mitigating potential safety risks and fostering an operation-centric, proportionate, as well as risk- and performance-based regulatory framework harmonised across the EU Member States. In addition, it enables the safe integration of the new aviation actors in the Union skies.

The regulatory proposal enhances the market development in the field of IAM with an efficient and well-designed regulatory framework, free of burdensome provisions.

The following table provides the highlights of the main expected benefits and drawbacks for 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.

Affected regulatory domain	Main benefits/drawbacks
CAW: Specific annexes on the CAW of UAS subject to certification and operated 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 provides for safe and proportionate CAW provisions for UAS subject to certification and operated in the 'specific' category.
AIR OPS: Use of manned VTOL-capable aircraft in emergency medical services (VEMS) Certification of non-commercial operators of manned VTOL-capable aircraft	VEMS would bring quickly on the accident scene the emergency doctor to treat and stabilise the patient. Manned VTOL-capable aircraft used in EMS are likely to gain full public acceptance due to the expected societal benefits and lower levels of pollution (noise and emissions). Air operator certificate (AOC): 1) Positive safety considerations considering the thorough check in the AOC issue process. 2) Administrative effort for operators to demonstrate compliance in order to obtain the AOC. 3) EU MS competent authorities might face costs related to additional personnel required to be hired and trained to issue AOCs to non-commercial operators and perform oversight. However, these costs are not expected to be high considering the low number of non-commercial VTOL-capable aircraft operations expected to be conducted in the short/medium term; therefore, these activities might be performed partially by existing competent authority staff.

Affected regulatory domain	Main benefits/drawbacks
FCL: New provisions to allow existing CPL(A) and CPL(H) holders to add VTOL-capable aircraft type ratings to their licences	Only pilots that already hold a licence for a conventional aircraft could be involved in operations with manned VTOL-capable aircraft, with no possibility for ab initio pilot training in VTOL-capable aircraft. However, in any case, only experienced pilots shall fly VTOL-capable aircraft during the initial 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 VTOL-capable aircraft 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 on some types of operations.

With respect to the CAW and the AIR OPS domains, a detailed analysis leading to the above conclusions can be found in Section 4.3, including reference to the assessed options.

3. Proposed amendments and rationale

The amendment is arranged to show deleted, new or amended, and unchanged text as follows:

— deleted text is ~~struck through~~;

— new or amended text is highlighted in blue;

— an ellipsis '[…]' indicates that the rest of the text is unchanged.

Where necessary, the rationale is provided in *blue italics.*

3.1. Proposed amendments to Commission Regulation (EU) No 748/2012

3.1.1. Draft cover regulation

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, command units and command unit components, as well as for the certification of design and production organisations

[…]

Article 1 Scope and definitions

1. This Regulation lays down, in accordance with Articles ~~5(5) and Article 6(3)~~19, 58 and 62 of ~~Regulation (EC) No 216/2008~~Regulation (EU) 2018/1139, common technical requirements and administrative procedures for the airworthiness and environmental certification of products, parts, ~~and~~ appliances, command units and command unit components specifying:

   […]

   (f) the identification of products, parts, ~~and~~ appliances, command units and command unit components;

   (g) the certification of certain parts, ~~and~~ appliances and command unit components;

   […]

2. For the purpose of this Regulation, the definitions in Regulation (EU) 2018/1139 apply. ~~t~~The following definitions ~~shall~~ also apply:

   […]

   (c) 'Part 21' means the requirements and procedures for the certification of aircraft and related products, parts, ~~and~~ appliances, command units and command unit components, and of design and production organisations laid down in Annex I to this Regulation;

   […]

   (f) 'article' means any part and appliance to be used on civil aircraft and any command unit component;

   […]

   (l) 'command unit' means the equipment or items of equipment to control unmanned aircraft remotely, as defined in Article 3(32) of Regulation (EU) 2018/1139, which ensures the control or monitoring of unmanned aircraft during any phase of flight; 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;

(m) 'command unit component' means any element of the command unit;

(n) 'command unit installation' means the process to integrate the command unit elements in a physical environment that is eligible for that purpose according to a set of installation and testing instructions, such that the installed command unit may be used to operate an unmanned aircraft.

Article 2 Certification of ~~P~~products, parts, ~~and~~ appliances, command units and command unit components ~~certification~~

1. Products, parts, ~~and~~ appliances, command units and command unit components shall be ~~issued certificates~~ certified as specified in Annex I (Part 21).

[…]

Article 8 Design organisations

1. An organisation responsible for the design of products, parts, ~~and~~ appliances, command units and command unit components or for changes or repairs thereto shall demonstrate its capability in accordance with Annex I (Part 21).

2. By way of derogation from point 1, an organisation whose principal place of business is in a non-~~m~~Member State may demonstrate its capability by holding a certificate issued by that State for the product, part, ~~and~~ appliance, command unit and command unit component for which it applies, provided:

[…]

Article 9 Production organisations

1. An organisation responsible for the manufacture of products, parts, ~~and~~ appliances, command units and command unit components shall demonstrate its capability in accordance with the provisions of Annex I (Part 21). This demonstration of capability is not required for the parts, ~~or~~ appliances or command unit components that an organisation manufactures which, in accordance with the provisions of Annex I (Part 21), are eligible for installation in a type-certified product without the need to be accompanied by an authorised release certificate (i.e. EASA Form 1).

2. By way of derogation from point 1, a manufacturer whose principal place of business is in a non-~~m~~Member State may demonstrate its capability by holding a certificate issued by that State for the product, part, ~~and~~ appliance, command unit and command unit component for which it applies, provided:

[…]

6. By way of derogation from points 21.B.125(d)(1) and (2) of Annex I (Part 21), an organisation that produces products, parts, ~~or~~ appliances, command units or command unit components without an approval certificate and that holds a valid letter of agreement issued in accordance with Annex I (Part 21) may correct, until 7 March 2025, any findings of non-compliance related to ~~the~~ Annex I requirements introduced by Commission Implementing Regulation (EU) 2022/203.

~~Where~~If after 7 March 2025 the organisation has not closed those findings, the letter of agreement shall be revoked, limited or suspended in whole or in part.

[…]

3.1.2. Annex I — SECTION A *TECHNICAL REQUIREMENTS*

SUBPART A — GENERAL PROVISIONS

[…]

21.A.2 Undertaking by another person than the applicant for, or holder of, a certificate

The actions and obligations required to be undertaken by the holder of, or applicant for, a certificate for a product, part, ~~or~~ appliance, command unit or command unit component under this Section may be undertaken on its behalf by any other natural or legal person, provided the holder of, or applicant for, that certificate can show that it has made an agreement with the other person such as to ensure that the holder's obligations are and will be properly discharged.

21.A.3A Reporting system

(a) Without prejudice to Regulation (EU) No 376/2014 of the European Parliament and of the Council(*) and its delegated and implementing acts, all natural or legal persons that have applied for or hold a type-certificate, restricted type-certificate, supplemental type-certificate, European Technical Standard Order (ETSO) authorisation, major repair design approval or any other relevant approval deemed to have been issued under this Regulation shall:

1. establish and maintain a system for collecting, investigating and analysing occurrence reports in order to identify adverse trends or to address deficiencies and to extract occurrences whose reporting is mandatory in accordance with point 3 and those which are reported voluntarily. When the principal place of business is located in a Member State, a single system may be established to meet the requirements of Regulation (EU) No 376/2014 of ~~of~~ the European Parliament and of the Council and its implementing acts and of Regulation (EU) 2018/1139 and its delegated and implementing acts. The reporting system shall include:

   (i) reports of and information related to failures, malfunctions, defects or other occurrences which cause or might cause adverse effects on the continuing airworthiness of the product, part, ~~or~~ appliance, command unit or command unit component covered by the type-certificate, restricted type-certificate, supplemental type-certificate, ETSO authorisation, major repair design approval or by any other relevant approval deemed to have been issued under this Regulation;

   (ii) errors, near misses and hazards that do not fall under point (i);

2. make available to known operators of the product, part, ~~or~~ appliance, command unit or command unit component and, on request, to any person authorised under other implementing or delegated acts the information about the system established in accordance with point 1, and on how to provide reports of and information related to failures, malfunctions, defects or other occurrences referred to in point 1(i);

3. report to the Agency any failure, malfunction, defect or other occurrence of which it is aware and is related to a product, part, ~~or~~ appliance, command unit or command unit component covered by the type-certificate, restricted type-certificate, supplemental type-certificate, ETSO authorisation, major repair design approval or by any other relevant approval deemed to have been issued under this Regulation, and which has resulted or may result in an unsafe condition.

(b) Without prejudice to Regulation (EU) No 376/2014 of the European Parliament and of the Council and its delegated and implementing acts, any natural or legal person that holds or has applied for a production organisation approval certificate under Subpart G of this Section, or that produces a product, part, ~~or~~ appliance, command unit or command unit component under Subpart F of this Section, shall:

1. […]

2. report to the responsible design approval holder all the cases where products, parts, ~~or~~ appliances, command units or command unit components have been released by the production organisation and possible deviations from the applicable design data have been subsequently identified, and investigate with the design approval holder to identify those deviations which could lead to an unsafe condition;

3. […]

4. if the production organisation acts as a supplier to another production organisation, also report to that other organisation all the cases where it has released products, parts, ~~or~~ appliances, command units or command unit components to that organisation and possible deviations from the applicable design data have been subsequently identified.

[…]

21.A.3B Airworthiness directives

[…]

(b) The Agency shall issue an airworthiness directive when:

1. an unsafe condition has been determined by the Agency to exist in an aircraft, as a result of a deficiency in the aircraft, or an engine, propeller, part or appliance installed on this aircraft, or a command unit or its components; and

2. that condition is likely to exist or develop in other aircraft.

(c) […]

1. […]

2. following the approval by the Agency of the proposals referred to in ~~under~~ point (1), make available to all known operators or owners of the product, part, ~~or~~ appliance, command unit or command unit component and, on request, to any person required to comply with the airworthiness directive, appropriate descriptive data and accomplishment instructions.

[…]

21.A.4 Coordination between design and production

Each holder of a type-certificate, restricted type-certificate, supplemental type-certificate, ETSO authorisation, approval of a change to type-certificate or approval of a repair design, shall collaborate with the production organisation as necessary to ensure:

(a) the satisfactory coordination of design and production required by points 21.A.122, 21.A.130(b)(3) and (4), 21.A.133 and 21.A.165(c)(2) and (3) as appropriate; and

(b) the proper support of the continued airworthiness of the product, part, ~~or~~ appliance, command unit or command unit component.

21.A.5 Record-keeping

All natural or legal persons that hold or have applied for a type-certificate, restricted type-certificate, supplemental type-certificate, ETSO authorisation, design or repair approval, permit to fly, production organisation approval certificate or letter of agreement under this Regulation shall:

(a) when they design a product, part, ~~or~~ appliance, command unit or command unit component, or changes or repairs thereto, establish a record-keeping system and maintain the relevant design information/data; that information/data shall be made available to the Agency in order to provide the information/data that is necessary to ensure the continued airworthiness of the product, part, ~~or~~ appliance, command unit or command unit component, the continued validity of the operational suitability data, and compliance with the applicable environmental protection requirements;

(b) when they produce a product, part, ~~or~~ appliance, command unit or command unit component, record the details of the production process relevant to the conformity of the product, part or appliances, command unit or command unit component with the applicable design data, and the requirements imposed on their partners and suppliers, and make that data available to their competent authority in order to provide the information that is necessary to ensure the continuing airworthiness of the product, part or appliance;

(c) with regard to permits to fly:

1. maintain the documents that are produced to establish and justify the flight conditions, and make them available to the Agency and to their competent authority of the Member State in order to provide the information that is necessary to ensure the continued airworthiness of the aircraft and of the command unit;

2. when they issue a permit to fly under the privilege of approved organisations, maintain the documents associated with it, including inspection records and documents that support the approval of the flight conditions and the issuance of the permit to fly itself, and make them available to the Agency and to their competent authority of the Member State responsible for the oversight of the organisation in order to provide the information that is necessary to ensure the continued airworthiness of the aircraft and of the command unit;

[…]

21.A.6 Manuals

The holder of a type-certificate, restricted type-certificate, or supplemental type-certificate shall:

(a) produce, maintain and update master copies of all manuals or variations in the manuals required by the applicable type-certification basis, the applicable operational suitability data

certification basis and the environmental protection requirements for the product, command unit or article, and provide copies, on request, to the Agency;

(b) for unmanned aircraft, determine whether the installation of a command unit in a physical environment is necessary, and provide the operator with all the necessary instructions for the installation and release of the command unit in accordance with Annex I (Part-ML.UAS) to Commission Delegated Regulation (EU) …/….

21.A.7 Instructions for continued airworthiness

(a) The holder of a type-certificate, restricted type-certificate, supplemental type-certificate, design change or repair design approval shall develop or reference the instructions which are necessary for ensuring that the airworthiness standard related to the aircraft type and any associated part, command unit or command unit component is maintained throughout the operational life of the aircraft and the command unit, when demonstrating compliance with the applicable type-certification basis established and notified by the Agency in accordance with point 21.B.80.

(b) At least one set of complete instructions for continued airworthiness shall be provided by the holder of:

1. a type-certificate or restricted type-certificate to each known owner of one or more products or command units upon ~~its~~ their delivery or upon the issuance of the first certificate of airworthiness or restricted certificate of airworthiness for the affected aircraft, whichever occurs later;~~,~~

2. a supplemental type-certificate or design change approval to all known operators of the product or command unit affected by the change upon the release to service of the modified product or command unit;~~,~~

3. a repair design approval to all known operators of the product or command unit affected by the repair upon the release to service of the product or command unit in which the repair design is embodied;~~.~~ ~~T~~the repaired product, part,~~ or~~ appliance, command unit or command unit component may be released into service before the related instructions for continued airworthiness have been completed, but this shall be for a limited service period, and in agreement with the Agency.

Thereafter, those design approval holders shall make those instructions available on request to any other person required to comply with those instructions.

(c) By way of derogation from point (b), the type-certificate holder or restricted type-certificate holder may delay the availability of a part of the instructions for continued airworthiness, dealing with long lead accomplishment instructions of a scheduled nature, until after the product or modified product, or the command unit or modified command unit, has entered into service, but shall make those instructions available before the use of this data is required for the product or modified product.

(d) The design approval holder~~,~~ who is required to provide instructions for continued airworthiness in accordance with point (b)~~,~~ shall also make available the changes to those instructions to all known operators of the product or command unit affected by the change and, on request, to any other person required to comply with those changes. That design approval holder shall demonstrate to the Agency, on request, the adequacy of the process of making changes to the instructions for continued airworthiness available in accordance with this point.

21.A.9 Access and investigation

Any natural or legal person that holds or has applied for a type-certificate, restricted type-certificate, supplemental type-certificate, ETSO authorisation, design change or repair approval, certificate of airworthiness, noise certificate, permit to fly, design organisation approval, production organisation approval certificate or letter of agreement under this Regulation, shall:

(a) grant the competent authority access to any facility, product, part~~,~~ ~~and~~ appliance, command unit and command unit component, document, record, data, process, procedure or to any other material in order to review any report, make any inspection, or perform or witness any flight and ground test, as necessary, in order to verify the initial and continued compliance of the organisation with the applicable requirements of Regulation (EU) 2018/1139 and its delegated and implementing acts;

(b) make arrangements to ensure the competent authority has access, as provided for in point (a), also in respect of the natural or legal person's partners, suppliers and subcontractors.

SUBPART B — TYPE-CERTIFICATES AND RESTRICTED TYPE-CERTIFICATES

21.A.11 Scope

This Subpart establishes the procedure for issuing type-certificates for products and command units and restricted type-certificates for aircraft, and establishes the rights and obligations of the applicants for, and holders of, those certificates.

[…]

21.A.15 Application

[…]

(b) An application for a type-certificate or restricted type-certificate shall include, as a minimum, preliminary descriptive data of the product~~,~~ and command unit, the intended use of the product and the kind of operations for which certification is requested. In addition, it shall include, or be supplemented after the initial application by, a certification programme for the demonstration of compliance in accordance with point 21.A.20, consisting of:

1. a detailed description of the type design, including all the configurations to be certified;
2. the proposed operating characteristics and limitations;
3. the intended use of the product and the kind of operations for which certification is requested;

[…]

6. a proposal for the assessment of the meaningful groups of compliance demonstration activities and data, addressing the likelihood of an unidentified non-compliance with the type-certification basis, operational suitability data certification basis or environmental protection requirements and the potential impact of that non-compliance on product safety or environmental protection. The proposed assessment shall take into account at least the elements set out in ~~sub~~points (1) to (4) of point 21.B.100(a). Based on this

assessment, the application shall include a proposal for the Agency's involvement in the verification of the compliance demonstration activities and data; and

[…]

(e) An application for a type-certificate or restricted type-certificate for a large aeroplane or a large rotorcraft shall be valid for 5~~five~~ years and an application for any other type-certificate or restricted type-certificate shall be valid for 3~~three~~ years, unless the applicant demonstrates at the time of application that its product or command unit requires a longer period of time ~~period~~ to demonstrate and declare compliance, and the Agency agrees to that longer period of time ~~period~~.

[…]

21.A.19 Changes requiring a new type-certificate

Any natural or legal person that proposes~~ing~~ to change a product shall apply for a new type-certificate if the Agency finds that the change in the design, power, thrust, or mass is so extensive that a substantially complete investigation of compliance with the applicable type-certification basis is required.

Any natural or legal person that proposes to change a command unit shall apply for a new type-certificate if the Agency finds that the change in design is so extensive that a substantially complete investigation of compliance with the applicable type-certification basis is required.

[…]

21.A.21 Requirements for the issuance of a type certificate or restricted type certificate

(a) In order to be issued with a product or a command unit type certificate, or~~,~~ when the aircraft does not meet the essential requirements of Annex II to Regulation (EU) 2018/1139, with an aircraft restricted type certificate, the applicant shall:

1. demonstrate its capability in accordance with point 21.A.14;
2. demonstrate compliance in accordance ~~comply~~ with point 21.A.20;
3. demonstrate, for aircraft type certificates or restricted type certificates, that the engine ~~and~~or propeller, or both, if installed ~~in~~on the aircraft, and the command unit used to control the unmanned aircraft:

   (~~A~~i) have a type-certificate issued or determined in accordance with this Regulation; or

   (~~B~~ii) have been demonstrated to be in compliance with the aircraft type-certification basis established and the environmental protection requirements designated and notified by the Agency as necessary to ensure the safe flight of the aircraft.

(b) By way of derogation from point (a)(2), at the applicant's request included in the declaration referred to in point 21.A.20(d), the applicant is entitled to have the aircraft type-certificate or restricted type-certificate issued before the applicant has demonstrated compliance with the applicable operational suitability data certification basis, provided that the applicant demonstrates such compliance before the date on~~at~~ which this~~those~~ data is~~are~~ to be actually used.

21.A.31 Type design

(a) The type design shall consist of:

1. the drawings and specifications, and a listing of those drawings and specifications, necessary to define the configuration and the design features of the product and the command unit shown to comply with the applicable type-certification basis and environmental protection requirements;

2. information on the materials and processes and on the methods of manufacture and assembly of the product and the command unit necessary to ensure the conformity of the product and the command unit;

3. an approved airworthiness limitations section of the instructions for continued airworthiness as defined by the applicable certification specifications; and

4. any other data that allows~~ing~~ by comparison the determination of the airworthiness and, if relevant, the environmental characteristics of later products and command units of the same type.

(b) Each type design shall be adequately identified.

21.A.33 Inspections and tests

(a) (Reserved)

(b) Before each test is undertaken during the demonstration of compliance required by point 21.A.20, the applicant shall have verified:

1. for the test specimen, that:

(i) the materials and processes adequately conform to the specifications for the proposed type design;

(ii) the parts of the products and the command unit components adequately conform to the drawings in the proposed type design; and

[…]

21.A.35 Flight ~~T~~tests

[…]

(b) The applicant shall perform~~make~~ all flight tests that the Agency finds necessary to determine:

1. ~~to determine~~ compliance with the applicable type-certification basis and environmental protection requirements; and

2. ~~to determine~~ whether there is reasonable assurance that the aircraft, its parts, ~~and~~ appliances and command unit are reliable and function properly for the aircraft to be certificated under this Annex I (Part 21), except for:~~,~~

(i) manned sailplanes and powered sailplanes,

(ii) balloons and airships defined in ELA1 or ELA2,

(iii) manned aeroplanes with a maximum take-off mass (MTOM) of 2 722 kg or less ~~maximum take-off mass (MTOM)~~.

[…]

(f) The flight tests prescribed in point (b)(2) shall include:

1. for manned aircraft:

   (i) the flight hours that the Agency finds necessary to ensure that its safe operation is demonstrated before the aircraft enters service and shall be at least 150 hours;

   (ii) in particular, for aircraft incorporating turbine engines of a type not previously used in a type-certified~~certificated~~ aircraft, at least 300 hours of operation with a full complement of engines that conform to a type-certificate;

2. for unmanned aircraft, the flight hours that the Agency finds necessary, considering the degree of complexity of the design of the aircraft and the command unit, and their risk on safety, to ensure that its safe operation is demonstrated before the aircraft enters service. ~~and~~

~~2. for all other aircraft, at least 150 hours of operation.~~

21.A.41 Type-certificate

The type-certificate and restricted type-certificate shall include the type design, the operating limitations, the instructions for continued airworthiness, the type-certificate data sheet for airworthiness and emissions, the applicable type-certification basis and environmental protection requirements with which the Agency records compliance, and any other conditions or limitations prescribed for the product or the command unit in the applicable certification specifications and environmental protection requirements. The aircraft type-certificate and restricted type-certificate shall include in addition the applicable operational suitability data certification basis, the operational suitability data and the type-certificate data sheet for noise. The aircraft type-certificate and restricted type-certificate data sheet shall include the record of CO_2 emissions compliance and the engine type-certificate data sheet shall include the record of exhaust emissions compliance.

[…]

SUBPART D — CHANGES TO TYPE-CERTIFICATES AND RESTRICTED TYPE-CERTIFICATES

[…]

21.A.90B Standard changes

(a) Standard changes are changes to a type-certificate:

1. in relation to:

   (i) aeroplanes with a maximum take-off mass (MTOM) of 5 700 kg ~~Maximum Take-Off Mass (MTOM)~~ or less;

   (ii) rotorcraft with a MTOM of 3 175 kg ~~MTOM~~ or less;

   (iii) sailplanes, powered sailplanes, balloons and airships, as defined in ELA1 or ELA2;

   (iv) unmanned VTOL-capable aircraft with a MTOM of 3 175 kg or less, and other unmanned aircraft with a MTOM of 5 700 kg or less.

[…]

21.A.91 Classification of changes to a type-certificate

Changes to a type-certificate are classified as 'minor' and 'major'. A ~~"~~'minor change'~~"~~ has no appreciable effect on the mass, balance, structural strength, reliability, operational characteristics, operational suitability data, or other characteristics affecting the airworthiness of the product or its environmental characteristics, or no appreciable effect on the reliability, operational characteristics, or other characteristics affecting the airworthiness of the command unit. Without prejudice to point 21.A.19, all other changes are considered 'major changes' under this Subpart. Major and minor changes shall be approved in accordance with points 21.A.95 or 21.A.97, as appropriate, and shall be adequately identified.

[…]

21.A.93 Application

[…]

(b) An application shall include, or be supplemented after the initial application by, a certification programme for the demonstration of compliance in accordance with point 21.A.20, consisting of:

1. a description of the change identifying:

   (i) the configuration(s) of the product or the command unit in the type certificate upon which the change is to be made;

   (ii) all areas of the product or the command unit in the type-certificate, including the approved manuals, which ~~that~~ are changed or affected by the change; and

   (iii) when the change affects the operational suitability data, any necessary changes to the operational suitability data;

2. an identification of any reinvestigations necessary to demonstrate compliance of the change and areas affected by the change with the applicable type-certification basis, operational suitability data certification basis and environmental protection requirements; and

3. for a major change to a ~~type-certificate~~:

[…]

   (iii) a proposal for the assessment of the meaningful groups of compliance demonstration activities and data, addressing the likelihood of an unidentified non-compliance with the applicable type-certification basis, operational suitability data certification basis or environmental protection requirements and the potential impact of that non-compliance on product safety or environmental protection; ~~.~~ ~~T~~ the proposed assessment shall take into account at least the elements set out in ~~sub~~points (1) to ~~–~~(4) of point 21.B.100(a). Based on this assessment, the application shall include a proposal for the Agency's involvement in the verification of the compliance demonstration activities and data; and

[…]

21.A.95 Requirements for the approval of a minor change

[…]

(d) By way of derogation from point (a), at the applicant's request included in the declaration referred to in point 21.A.20(d), a minor change to an aircraft type-certificate may be approved before compliance with the applicable operational suitability data certification basis has been demonstrated, provided that the applicant demonstrates such compliance before the date onat which thisthose data isare actually used.

[…]

21.A.97 Requirements for the approval of a major change

[…]

(c) By way of derogation from points (2) and (3) of point (b), at the applicant's request included in the declaration referred to in point 21.A.20(d), a major change to an aircraft type-certificate may be approved before compliance with the applicable operational suitability data certification basis has been demonstrated, provided that the applicant demonstrates such compliance before the date onat which thisthose data isare actually used.

[…]

21.A.101 Type-certification basis, operational suitability data certification basis and environmental protection requirements for a major change to a type-certificate

(a) A major change to a type-certificate and the areas affected by the change shall comply with either the certification specifications applicable to the changed product or command unit on the date of the application for the change or certification specifications which became applicable after that date in accordance with point (f) below. The validity of the application shall be determined in accordance with point 21.A.93(c). In addition, the changed product or the changed command unit shall comply with the environmental protection requirements designated by the Agency in accordance with point 21.B.85.

(b) Except as provided for in point (h), by way of derogation from point (a), an earlier amendment to a certification specification referred to in point (a) and to any other certification specification which is directly related may be used in any of the following situations, unless the earlier amendment became applicable before the date onat which the corresponding certification specifications incorporated by reference in the type-certificate became applicable:

1. a change that the Agency does not finds not to be significant;. I in determining whether a specific change is significant, the Agency shall consider the change in the context of all previous relevant design changes and all related revisions to the applicable certification specifications incorporated by reference in the type-certificate for the product or the command unit;. C changes that meeting one of the following criteria shall automatically be considered significant:

   (i) the general configuration or the principles of construction are not retained;

   (ii) the assumptions used for the certification of the product or the command unit to be changed do not remain valid;

2. each area, system, part, or appliance or command unit component that the Agency finds not to be affected by the change;

3. each area, system, part, or appliance or command unit component that is affected by the change for which the Agency finds that compliance with the certification specifications

referred to in point (a) does not contribute materially to the level of safety of the changed product or command unit, or is impractical.

[…]

21.A.108 Availability of operational suitability data

In the case of a change that affects~~ing~~ the operational suitability data, the holder of the minor change approval shall make available:

(a) at least one set of changes to the operational suitability data prepared in accordance with the applicable operational suitability data certification basis~~,~~ to all known EU operators of the changed aircraft~~,~~ before the operational suitability data must be used by a training organisation or an EU operator; and

[…]

SUBPART E — SUPPLEMENTAL TYPE-CERTIFICATES

21.A.115 Requirements for the approval of major changes in the form of a supplemental type-certificate

[…]

(b) A supplemental type-certificate shall only be issued when:

[…]

5. in case the applicant has specified that it provided certification data on the basis of an arrangement with the owner of the type-certification data in accordance with point 21.A.113(b):

   (i) the type-certificate holder has indicated that it has no technical objection to the information submitted under point 21.A.93; and

   (ii) the type-certificate holder has agreed to collaborate with the supplemental type-certificate holder to ensure the discharge of all the obligations as regards the ~~for~~ continued airworthiness of the changed product and changed command unit through compliance with points 21.A.44 and 21.A.118A.

(c) By way of derogation from points (3) and (4) of point (b), at the applicant's request included in the declaration referred to in point 21.A.20(d), the applicant is entitled to have a supplemental type-certificate for an aircraft issued before the applicant has demonstrated compliance with the applicable operational suitability data certification basis, provided that the applicant demonstrates such compliance before the date on~~at~~ which this ~~those~~ data is~~are~~ to be actually used.

[…]

21.A.117 Changes to that part of a product covered by a supplemental type-certificate

(a) Minor changes to that part of a product or a command unit that is covered by a supplemental type-certificate shall be classified and approved in accordance with Subpart D.

(b) Each major change to that part of a product or a command unit that is covered by a supplemental type-certificate shall be approved as a separate supplemental type-certificate in accordance with this Subpart.

(c) By way of derogation from point (b), a major change to that part of a product or a command unit that is covered by a supplemental type-certificate submitted by the supplemental type-certificate holder itself may be approved as a change to the existing supplemental type-certificate.

[…]

21.A.120B Availability of operational suitability data

In the case of a change that affects~~ing~~ the operational suitability data, the holder of the supplemental type-certificate shall make available:

(a) at least one set of changes to the operational suitability data prepared in accordance with the applicable operational suitability data certification basis~~,~~ to all known EU operators of the changed aircraft~~,~~ before the operational suitability data must be used by a training organisation or an EU operator; and

[…]

SUBPART F — PRODUCTION WITHOUT PRODUCTION ORGANISATION APPROVAL

21.A.121 Scope

(a) This Subpart establishes the procedure for demonstrating the conformity with the applicable design data of a product, part, ~~and~~ appliance, command unit and command unit component that are~~is~~ intended to be manufactured without a production organisation approval under Subpart G.

(b) This Subpart establishes the ~~rules governing the~~ obligations of the manufacturer of a product, part, ~~or~~ appliance, command unit or command unit component ~~being~~ manufactured under this Subpart.

21.A.122 Eligibility

Any natural or legal person may apply to show conformity of individual products, parts, ~~or~~ appliances, command units or command unit components under this Subpart, if:

(a) it holds or has applied for an approval that covers~~ing~~ the design of that product, part, ~~or~~ appliance, command unit or command unit component; or

(b) it has ensured satisfactory coordination between production and design~~,~~ through an appropriate arrangement with the applicant for, or holder of, an approval of such a design.

21.A.124 Application

(a) Each application for an agreement to the showing of conformity of individual products, parts, ~~and~~ appliances, command units and command unit components under this Subpart shall be made in a form and manner established by the competent authority.

(b) Such application shall contain:

1. evidence which demonstrates, where applicable, that:

   (i) the issuance of a production organisation approval under Subpart G would be inappropriate; or

   (ii) the certification or approval of a product, part, ~~or~~ appliance, command unit or command unit component under this Subpart is required~~needed~~ pending the issuance of a production organisation approval under Subpart G;

2. an outline of the information required under~~in~~ point 21.A.125A(b).

[…]

21.A.125A Issuance of a letter of agreement

The applicant shall be entitled to have a letter of agreement issued by the competent authority agreeing to the showing of conformity of individual products, parts, ~~and~~ appliances, command units and command unit components under this Subpart, after:

(a) having established a production inspection system that ensures that each product, part, ~~or~~ appliance, command unit or command unit component conforms to the applicable design data and is in a condition for safe operation;

[…]

21.A.125C Duration and continued validity

(a) The letter of agreement shall be issued for a limited period of time that in any case shall not exceed 1 year. It shall remain valid subject to the organisation's compliance with all the following conditions:

[…]

3. the production organisation is able to provide the competent authority with evidence showing that it maintains satisfactory control of the manufacture of products, parts, ~~and~~ appliances, command units and command unit components under the letter of agreement;

[…]

21.A.126 Production inspection system

(a) The production inspection system required under point 21.A.125A(a) shall provide a means for determining that:

1. incoming materials~~,~~ and bought or subcontracted parts~~, used in the finished product~~ are as specified in the applicable design data;

2. incoming materials~~,~~ and bought or subcontracted parts~~,~~ are properly identified;

3. processes, manufacturing techniques and methods of assembly affecting the quality and safety of the finished product, part, appliance, command unit or command unit component are accomplished in accordance with the specifications accepted by the competent authority;

4. design changes, including material substitutions, have been approved under ~~Subpart D or E~~this Annex and controlled before being incorporated in the finished product, part, appliance, command unit or command unit component.

(b) The production inspection system required by point 21.A.125A(a)~~,~~ shall also be such as to ensure that:

[…]

4. rejected materials and parts are segregated and identified in a manner that precludes their installation in the finished product, part, appliance, command unit or command unit component;

5. materials and parts that are withheld because of deviations from type design or production specifications, and that are to be considered for installation in the finished product, part, appliance, command unit or command unit component are subjected to an approved engineering and manufacturing review procedure;~~ T~~ those materials and parts that have been found in that procedure to be serviceable shall be properly identified and reinspected if it is necessary to be reworked or repaired;~~ M~~ materials and parts rejected in that procedure shall be marked and disposed of to ensure that they are not incorporated in the final product, part, appliance, command unit or command unit component;

[…]

21.A.128 Tests: engines,~~ and~~ propellers and command units

Each manufacturer of engines,~~ or~~ propellers or command units manufactured under this Subpart shall subject each engine,~~ or~~ variable pitch propeller or command unit~~,~~ to an acceptable functional test as specified in the type-certificate holder's documentation, to determine whether~~if~~ it operates properly throughout the range of operation for which it is type-certified~~cated~~, as a means of establishing relevant aspects of compliance with point 21.A.125A(a).

21.A.129 Obligations of the production organisation

Each manufacturer of a product, part,~~ or~~ appliance, command unit or command unit component ~~being~~ manufactured under this Subpart shall:

(a) make each product, part,~~ or~~ appliance, command unit or command unit component available for inspection by the competent authority;

(b) maintain at the place of manufacture the technical data and drawings necessary to determine whether the product, part, appliance, command unit or command unit component conforms to the applicable design data;

(c) maintain the production inspection system that ensures that each product, part, appliance, command unit or command unit component conforms to the applicable design data and is in a condition for safe operation;

(d) provide assistance to the holder of the type-certificate, restricted type-certificate or design approval in dealing with any continuing airworthiness actions that are related to the products, parts,~~ or~~ appliances, command units or command unit components that have been produced;

(e) comply with Subpart A of this Section;

21.A.130 Statement of conformity

(a) Each manufacturer of a product, part,~~ or~~ appliance, command unit or command unit component manufactured under this Subpart shall ~~raise~~ present a statement of conformity, an EASA Form 52 (see Appendix VIII), for complete aircraft, or EASA Form 1 (see Appendix I), for other

products, parts, ~~or~~ appliances, command units or command unit components. This statement shall be signed by an authorised person who holds a responsible position in the manufacturing organisation.

(b) A statement of conformity shall include all ~~of~~ the below:

1. for each product, part, ~~or~~ appliance, command unit or command unit component, a statement that the product, part, ~~or~~ appliance, command unit or command unit component conforms to the approved design data and is in a condition for safe operation;
2. for each aircraft, a statement that the aircraft has been ground- and flight-checked in accordance with point 21.A.127(a);
3. for each engine, ~~or~~ variable pitch propeller or command unit, a statement that the engine, ~~or~~ variable pitch propeller or command unit has been subjected by the manufacturer to a final functional test in accordance with point 21.A.128;

[…]

(c) Each manufacturer of such a product, part, ~~or~~ appliance, command unit or command unit component shall:

1. upon the initial transfer by it of the ownership of such a product, part, ~~or~~ appliance, command unit or command unit component; or
2. upon application for the original issue of an aircraft certificate of airworthiness; or
3. upon application for the original issue of an airworthiness release document for an engine, a propeller, a part, ~~or~~ an appliance, a command unit or a command unit component,

present a current statement of conformity~~,~~ for validation by the competent authority.

(d) The competent authority shall validate by countersignature~~counter-signature~~ the statement of conformity if it finds after inspection that the product, part, ~~or~~ appliance, command unit or command unit component conforms to the applicable design data and is in a condition for safe operation.

SUBPART G — PRODUCTION ORGANISATION APPROVAL

21.A.131 Scope

This Subpart establishes:

(a) the procedure for the issuance of a production organisation approval for a production organisation that shows~~ing~~ the conformity of products, parts, ~~and~~ appliances, command units and command unit components with the applicable design data;

(b) ~~the rules governing~~ the rights and obligations of the applicant for, and holders of, such approvals.

[…]

21.A.139 Production management system

[…]

(d) As part of the quality management element of the production management system, the production organisation shall:

1. ensure that each product, part, ~~or~~ appliance, command unit or command unit component produced by the organisation or by its partners, or supplied from or subcontracted to outside parties, conforms to the applicable design data and is in a condition for safe operation, thus enabling the exercise of the privileges set out in point 21.A.163;
2. establish, implement and maintain, as appropriate, within the scope of the approval, control procedures for:
   (i) document issue, approval or change;
   (ii) vendor and subcontractor assessment audit and control;
   (iii) verifying that incoming products, parts, materials, ~~and~~ equipment, command units and command unit components, including items supplied new or used by the buyers of the products, are as specified in the applicable design data;

[…]

21.A.147 Changes in the production management system

After the issue of a production organisation approval certificate, each change in the production management system that is significant for the demonstration of conformity or the airworthiness and environmental protection characteristics of the product, part, ~~or~~ appliance, command unit or command unit component, ~~,~~ shall be approved by the competent authority before being implemented. The production organisation shall submit an application for approval to the competent authority demonstrating that it will continue to comply with this Annex.

[…]

21.A.151 Terms of approval

The terms of approval shall identify the scope of work, the products or the categories of parts and appliances, or both, the command unit or the command unit components, or both, for which the holder is entitled to exercise the privileges under point 21.A.163.
Those terms shall be issued as part of a production organisation approval.
[…]

21.A.159 Duration and continued validity

(a) A production organisation approval certificate shall be issued for an unlimited period of time. It shall remain valid subject to the production organisation's compliance with all the following conditions:

[…]

3. the production organisation is able to provide the competent authority with evidence showing that it maintains satisfactory control of the manufacture of products, parts, ~~and~~ appliances, command units and command unit components under the approval;

[…]

21.A.163 Privileges

Pursuant to the terms of approval issued under point 21.A.135, the holder of a production organisation approval may:
[…]

(c) in the case of other products, parts, ~~or~~ appliances, command units or command unit components, issue authorised release certificates (EASA Form 1) without further showing;

[…]

21.A.165 Obligations of the holder

The holder of a production organisation approval shall:

[…]

(c) 1. determine that each completed aircraft conforms to the type design and is in a condition for safe operation prior to submitting statements of conformity to the competent authority; or

2. determine that other products, parts, ~~or~~ appliances, command units or command unit components are complete and conform to the approved design data and are in a condition for safe operation before issuing an EASA Form 1 to certify their conformity to approved design data and that they are in a condition for safe operation;

[…]

4. determine that other products, parts, ~~or~~ appliances, command units or command unit components conform to the applicable data before issuing an EASA Form 1 as a conformity certificate.

(d) provide assistance to the holder of the type-certificate or other design approval in dealing with any continuing airworthiness actions that are related to the products, parts, ~~or~~ appliances, command units or command unit components that have been produced;

[…]

21.A.239 Design management system

[…]

(d) As part of the design assurance element of the design management system, the design organisation shall:

1. establish, implement and maintain a system for the control and supervision of the design, and of design changes and repairs, of products, parts, ~~and~~ appliances, command units and command unit components covered by the terms of approval; that system shall:

(i) include an airworthiness function responsible for ensuring that the design of products, parts, ~~and~~ appliances, command units and command unit components, or the design changes and repairs, comply with the applicable type-certification basis, the applicable operational suitability data certification basis and the applicable environmental protection requirements;

[…]

3. specify the manner in which the design management system accounts for the acceptability of the parts or appliances and command unit components that are designed or the tasks that are performed by its partners or subcontractors according to the methods which are the subject of written procedures.

[…]

21.A.243 Handbook

(a) As part of the design management system, the design organisation shall create and furnish to the Agency a handbook that describes, directly or by cross reference, the organisation, its relevant policies, processes and procedures, the type of design work, and the categories of products, parts, ~~and~~ appliances, command units and command unit components for which the design organisation holds a design organisation approval, as identified in the terms of approval issued in accordance with point 21.A.251 and, where relevant, the interfaces with and the control of its partners or subcontractors.

[…]

(b) Where any parts, ~~or~~ appliances or command unit components or any changes to the products or command units are designed by partner organisations or subcontractors, the handbook shall include a statement of how the design organisation is able to demonstrate, for all the parts, ~~and~~ appliances, command units and command unit components, ~~the~~ compliance in accordance with point 21.A.239(d)(2), and shall contain, directly or by cross reference, descriptions of and information on the design activities and the organisation of those partner organisations or subcontractors, as necessary to establish the statement.

[…]

21.A.245 Resources

[…]

(e) The design organisation shall ensure that:

1. the staff in all technical departments are of sufficient numbers and experience, and have been given the appropriate authority to be able to discharge their allocated responsibilities and the facilities, equipment and accommodation that are adequate to enable the staff to fulfil the airworthiness, operational suitability data and environmental protection requirements as regards the product and command unit;

[…]

21.A.247 Changes in the design management system

After the issue of a design organisation approval, each change to the design management system that is significant to the demonstration of compliance or to the airworthiness, operational suitability data and environmental protection of the product, part, ~~or~~ appliance or command unit shall be approved by the Agency before being implemented. The design organisation shall submit to the Agency an application for approval demonstrating, on the basis of the proposed changes to the handbook, that it will continue to comply with this Annex.

[…]

21.A.251 Terms of approval

The terms of approval shall identify the types of design work, the categories of products, parts, ~~and~~ appliances and command units for which the design organisation holds a design organisation approval, and the functions and duties that the organisation is approved to perform with regard to the airworthiness, operational suitability data and environmental characteristics of the products and command units. For design organisation approvals covering type-certification or European Technical Standard Order (ETSO) authorisation for auxiliary power units (APUs), the terms of approval shall additionally contain ~~in addition~~ the list of products, command units or APUs. Those terms shall be issued as part of a design organisation approval.

[…]

21.A.263 Privileges

[…]

(c) The holder of a design organisation approval shall be entitled, within the scope of its terms of approval issued under point 21.A.251 and under the relevant procedures of the design management system:

1. to classify changes to a type-certificate or to a supplemental type-certificate and repair designs as 'major' or 'minor';
2. to approve minor changes to a type-certificate or to a supplemental type-certificate and minor repair designs;
3. (Reserved)~~;~~
4. (Reserved)~~;~~
5. to approve certain major repair designs under Subpart M to products, command units or auxiliary power units (APUs);

[…]

21.A.265 Obligations of the holder

The holder of a design organisation approval shall, within the scope of its terms of approval, as established by the Agency:

[…]

(c) determine that the design of the products or command units, or of the changes or repairs thereto, complies with the applicable type-certification basis, operational suitability data certification basis, and the environmental protection requirements, and have no unsafe features;

[…]

SUBPART H — CERTIFICATES OF AIRWORTHINESS AND RESTRICTED CERTIFICATES OF AIRWORTHINESS

[…]

21.A.174 Application

[…]

(b) Each application for a certificate of airworthiness or restricted certificate of airworthiness shall include:

1. the class of the airworthiness certificate applied for;
2. with regard to new aircraft:
   (i) a statement of conformity:

— issued under point 21.A.163(b); or

— issued under point 21.A.130 and validated by the competent authority; or

— for an imported aircraft, a statement signed by the exporting authority that the aircraft conforms to a design approved by the Agency;

(ii) a weight and balance report with a loading schedule when required by the applicable certification specifications for the particular aircraft; and~~;~~

(iii) the flight manual, when required by the applicable certification specifications for the particular aircraft~~.~~;

3. with regard to used aircraft originating from:

(i) a Member State, an airworthiness review certificate issued in accordance with Annex I (Part-M) or Annex Vb (Part-ML) to Commission Regulation (EU) No 1321/2014[34] or with Annex I (Part-ML.UAS) to Commission Delegated Regulation (EU) …/…;

(ii) a non-~~m~~Member State:

— a statement by the competent authority of the State where the aircraft is, or was, registered, reflecting the airworthiness status of the aircraft on its register at the time of transfer;

— a weight and balance report with a loading schedule when required by the applicable airworthiness codes for the particular aircraft;

— the flight manual when such ~~a~~ manual is required by the airworthiness codes for the particular aircraft;

— historical records to establish the production, modification and maintenance standards of the aircraft, including all limitations associated with a restricted certificate of airworthiness issued in accordance with point 21.B.327;

— a recommendation for the issuance of a certificate of airworthiness or restricted certificate of airworthiness and for an airworthiness review certificate pursuant to an airworthiness review in accordance with Annex I (Part-M) to Regulation (EU) No 1321/2014[35] or an airworthiness review certificate in accordance with Annex Vb (Part-ML) to Regulation (EU) No 1321/2014 or Annex I (Part-ML.UAS) to Commission Delegated Regulation (EU) …/…~~.~~;

— the date on which the first certificate of airworthiness was issued and, if the standards of Volume III of Annex 16 to the Chicago Convention apply, the CO_2 metric value data.~~;~~

[…]

[34] 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).

[35] 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).

SUBPART K — PARTS, ~~AND~~ APPLIANCES AND COMMAND UNIT COMPONENTS

21.A.301 Scope

This Subpart establishes the procedure relating to the approval of parts, ~~and~~ appliances and command unit components.

21.A.303 Compliance with the applicable requirements

The showing of compliance of parts, ~~and~~ appliances and command unit components to be installed in a type-certified~~cated~~ product or command unit shall be made:

(a) in conjunction with the type-certification procedures of Subpart B, D or E for the product in which it is to be installed; or

(b) where applicable, under the ETSO authorisation procedures of Subpart O; or

(c) in the case of standard parts, in accordance with officially recognised ~~S~~standards.

21.A.305 Approval of parts, ~~and~~ appliances and command unit components

In all cases where the approval of a part, ~~or~~ appliance or command unit component is explicitly required by Union law or Agency measures, the part, ~~or~~ appliance or command unit component shall comply with the applicable ETSO or with the specifications recognised as equivalent by the Agency in the particular case.

[…]

21.A.308 Eligibility of a component for installation on a command unit

(a) A command unit component which is both essential and specific to the intended UA operation, as determined by the design approval holder, is eligible for installation on a command unit provided it is in a condition for safe operation, is marked in accordance with Subpart Q, and is accompanied by an authorised release certificate (EASA Form 1).

(b) A command unit component which is not deemed essential nor specific to the intended UA operation, is eligible for installation on a command unit provided that:

(1) it is in a condition for safe operation; and

(2) the installer holds a document issued by the person or organisation that has manufactured the element, which declares the name and identification of the component, the conformity of the component with its design data, and contains the issuance date.

SUBPART M — REPAIRS

21.A.431A Scope

(a) This Subpart establishes the procedure for the approval of a repair design of a product, part, ~~or~~ appliance, command unit or command unit component, and establishes the rights and obligations of the applicant~~s~~ for, and holder~~s~~ of, that~~ose~~ approval~~s~~.

[…]

(c) A 'repair' means the elimination of damage and/or restoration to an airworthy condition following the initial release to service by the manufacturer of any product, part, ~~or~~ appliance, command unit or command unit component.

(d) The elimination of damage by replacement of parts, ~~or~~ appliances or command unit components without the necessity for design activity shall be considered ~~as~~ a maintenance task and shall, therefore, require no approval under this Annex.

[…]

21.A.431B Standard repairs

(a) Standard repairs are repairs:

(1) in relation to:

(i) aeroplanes with a maximum take-off mass (MTOM) of 5 700 kg ~~Maximum Take-Off Mass (MTOM)~~ or less;

(ii) rotorcraft with a MTOM of 3 175 kg ~~MTOM~~ or less;

(iii) sailplanes and powered sailplanes, balloons and airships as defined in ELA1 or ELA2;~~.~~

(iv) unmanned VTOL-capable aircraft with a MTOM of 3 175 kg or less, and other unmanned aircraft with a MTOM of 5 700 kg or less;

[…]

21.A.433 Requirements for the approval of a repair design

(a) A repair design shall only be approved:

[…]

3. when no feature or characteristic has been identified that may render~~make~~ the product unsafe for the use~~s~~ for which certification is requested;

4. where the applicant has specified that it has provided certification data on the basis of an arrangement with the owner of the type-certification data in accordance with point 21.A.432C(b)(7):

(i) when the holder has indicated that it has no technical objection to the information submitted under point (a)(2); and

(ii) when the holder has agreed to collaborate with the repair design approval holder to ensure the discharge of all the obligations with regard to the ~~for~~ continued airworthiness of the changed product or command unit through compliance with point 21.A.451.

[…]

21.A.439 Production of repair parts

Parts, ~~and~~ appliances and command unit components to be used for the repair shall be manufactured in accordance with production data based upon all the necessary design data as provided by the repair design approval holder:

(a) under Subpart F; or

(b) by an organisation appropriately approved in accordance with Subpart G; or

(c) by an appropriately approved maintenance organisation.

21.A.441 Repair embodiment

(a) The embodiment of a repair shall be made in accordance with Annex I (Part-M), ~~Annex II (Part-145),~~ or Annex Vb (Part-ML) ~~or Annex Vd (Part-CAO) of~~ to Regulation (EU) No 1321/2014, or Annex I (Part-ML.UAS) to Regulation (EU) …/…, or by a production organisation approved in accordance with Subpart G of this Annex, in accordance with the privilege provided for in point 21.A.163(d);

(b) The design organisation shall ~~transmit to~~provide the organisation that performs~~ing~~ the repair with all the necessary installation instructions.

[…]

21.A.445 Unrepaired damage

(a) When a damaged product, part, ~~or~~ appliance, command unit or command unit component~~,~~ is left unrepaired, and is not covered by previously approved data, the evaluation of the damage for its airworthiness consequences may only be made;

1. by the Agency; or

2. by an appropriately approved design organisation under a procedure agreed with the Agency.

[…]

SUBPART P — PERMIT TO FLY

21.A.708 Flight conditions

Flight conditions include:

[…]

(b) any condition or restriction necessary for the safe operation of the aircraft, including:

[…]

7. for unmanned aircraft, the configuration of the command unit used to control the aircraft and specific arrangements and instructions for the operation of the command unit;

(c) the substantiation that the aircraft is capable of safe flight under the conditions or restrictions of point (b);

(d) the method used for the control of the aircraft configuration and, for unmanned aircraft, the command unit configuration, in order to remain within the established conditions.

[…]

SUBPART Q — IDENTIFICATION OF PRODUCTS, PARTS, ~~AND~~ APPLIANCES, COMMAND UNITS AND COMMAND UNIT COMPONENTS

21.A.801 Identification of products and command units

(a) The identification of products and command units shall include the following information:

1. the manufacturer's name;
2. the product and command unit designation;
3. the manufacturer's serial number;
4. the 'EXEMPT' mark in case of an engine, when the competent authority has granted an exemption from the environmental protection requirements;
5. any other information the Agency finds appropriate.

[…]

(e) Any natural or legal person that manufactures or assembles a command unit under Subpart G or Subpart F shall identify it by means of a plate, stamping, engraving, etching or other approved method of fireproof identification that contains the information specified in point (a) in such a manner that it is accessible and legible and will not likely be defaced or removed during normal service, or lost or destroyed in an accident.

21.A.803 Handling of identification data

(a) No person shall remove, change, or place identification information referred to in point 21.A.801(a) on any aircraft, engine, propeller, propeller blade, ~~or~~ propeller hub or command unit, or in point 21.A.807(a) on an APU, without the approval of the Agency.

(b) No person shall remove or install any identification plate referred to in point 21.A.801, or in point 21.A.807 for an APU, without the approval of the Agency.

(c) By way of derogation from points (a) and (b), any natural or legal person that performs~~ing~~ maintenance work under the applicable associated implementing rules may, in accordance with methods, techniques and practices established by the Agency:

1. remove, change, or place the identification information referred to in point 21.A.801(a) on any aircraft, engine, propeller, propeller blade, ~~or~~ propeller hub or command unit, or in point 21.A.807(a) on an APU; or
2. remove an identification plate referred to in point 21.A.801, or in point 21.A.807 for an APU, when it is necessary during maintenance operations.

(d) No person shall install an identification plate removed in accordance with point (c)(2) on any aircraft, engine, propeller, propeller blade, ~~or~~ propeller hub or command unit other than the one from which it was removed.

21.A.804 Identification of parts, ~~and~~ appliances and command unit components

(a) Each part or appliance, which is eligible for installation in a type-certified product, and each command unit component, which is eligible for installation in a command unit certified in accordance with this Annex I, shall be ~~marked~~ permanently and legibly marked with:

1. a name, trademark, or symbol identifying the manufacturer in a manner identified by the applicable design data;
2. the part number, as defined in the applicable design data; and
3. the letters 'EPA':
   (i) for parts or appliances produced in accordance with approved design data that does not belong~~ing~~ to the type-certificate holder of the related product, except for ETSO articles and for parts and appliances covered under point (b) of point 21.A.307;
   (ii) for command unit components produced in accordance with approved design data that does not belong to the type-certificate holder of the related command unit, except for ETSO command unit components and for command unit components covered under point (b) of point 21.A.308.

(b) By way of derogation from point (a), if the Agency agrees that a part, ~~or~~ appliance or command unit component is too small or that it is otherwise impractical to mark a part, ~~or~~ appliance or command unit component with any of the information required by point (a), the authorised release document that accompanies~~ying~~ the part, ~~or~~ appliance or command unit component, or its container, shall include the information that could not be marked on the part, ~~or~~ appliance or command unit component.

[…]

3.1.3. Annex I — Section B *PROCEDURES FOR COMPETENT AUTHORITIES*

SUBPART A — GENERAL PROVISIONS

[…]

21.B.20 Immediate reaction to a safety problem

[…]

(b) The Agency shall implement a system to appropriately analyse any relevant safety information received and, without undue delay, provide the relevant authority of the Member States and the Commission with any information, including recommendations or corrective actions to be taken, that is necessary for them to react in a timely manner to a safety problem that involves~~ing~~ products, parts, appliances, command units, command unit components, persons or organisations that are subject to Regulation (EU) 2018/1139 and its delegated and implementing acts.

[…]

SUBPART B — TYPE-CERTIFICATES AND RESTRICTED TYPE-CERTIFICATES

21.B.70 Certification specifications

The Agency, in accordance with Article 76(3) of Regulation (EU) 2018/1139, shall issue certification specifications and other detailed specifications, including certification specifications for airworthiness, operational suitability data and environmental protection~~,~~ that competent authorities, organisations and personnel may use to demonstrate compliance of products, parts~~, and~~ appliances, command units and command unit components with the relevant essential requirements set out in Annexes II, IV~~, and~~ V and IX to that Regulation, as well as with those for environmental protection set out in Article 9(2) of and in Annex III to~~of~~ that Regulation. Such specifications shall be sufficiently detailed and specific to indicate to applicants the conditions under which certificates shall~~are to~~ be issued, amended or supplemented.

21.B.75 Special conditions

(a) The Agency shall prescribe special detailed technical specifications, named 'special conditions', for a product or command unit if the related certification specifications do not contain adequate or appropriate safety standards for the product or command unit because:

1. the product or command unit has novel or unusual design features relative to the design practices on which the applicable certification specifications are based;
2. the intended use of the product is unconventional; or
3. experience with~~from~~ other similar products or command units in service or products or command units that have~~ing~~ similar design features or newly identified hazards have shown that unsafe conditions may develop.

(b) Special conditions contain such safety standards as the Agency finds necessary in order to establish a level of safety equivalent to that of the applicable certification specifications.

21.B.80 Type-certification basis for a type-certificate or restricted type-certificate

The Agency shall establish the type-certification basis and notify it to the applicant for a type-certificate or restricted type-certificate. The type-certification basis shall consist of:

(a) the certification specifications for airworthiness designated by the Agency from those applicable to the product or the command unit ~~at~~on the date of application for that certificate, unless:

[…]

3. the Agency accepts or prescribes other means that:

(i) in the case of a type-certificate, demonstrate compliance with the essential requirements of Annex II and, where applicable, of Annex IX to Regulation (EU) 2018/1139; or

[…]

21.B.82 Operational suitability data certification basis for an aircraft type-certificate or restricted type-certificate

The Agency shall establish the operational suitability data certification basis and notify it to the applicant for an aircraft type-certificate or restricted type-certificate. The operational suitability data certification basis shall consist of:

(a) the certification specifications for operational suitability data designated by the Agency from~~out of~~ those applicable to the aircraft on~~at~~ the date of the application or on~~at~~ the date of the application supplement for operational suitability data, whichever date is later, unless:

[…]

2. the Agency accepts or prescribes alternative means to demonstrate compliance with the relevant essential requirements of Annexes II, IV, ~~and~~ V and IX to Regulation (EU) 2018/1139.

[…]

21.B.103 Issuance of a type-certificate or a restricted type-certificate

(a) The Agency shall issue an aircraft, engine, ~~or~~ propeller or command unit type-certificate or an aircraft restricted type-certificate, provided that:

1. the applicant complies~~has complied~~ with point 21.A.21;

2. the Agency, through verification~~s~~ of the demonstration of compliance in accordance with its involvement determined in accordance with ~~pursuant to~~ point 21.B.100, has not found any non-compliance with the applicable type-certification basis, the operational suitability data certification basis, where applicable, in accordance with point 21.B.82, and the applicable environmental protection requirements; and

3. no feature or characteristic has been identified that may render~~make~~ the product unsafe for the use~~s~~ for which ~~the~~ certification is requested.

[…]

SUBPART D — CHANGES TO TYPE-CERTIFICATES AND RESTRICTED TYPE-CERTIFICATES

[…]

21.B.107 Issuance of an approval of a change to a type-certificate

(a) The Agency shall issue an approval of a change to a type-certificate provided that:

[…]

2. the Agency, through ~~its~~ verification of the demonstration of compliance in accordance with the level of its involvement determined in accordance with ~~pursuant to~~ point (a) or point (b) of point 21.B.100 has not found any non-compliance with the applicable type-certification basis, operational suitability data certification basis, where applicable, in accordance with point 21.B.82, and the applicable environmental protection requirements; and

3. no feature or characteristic has been identified that may render~~make~~ the product unsafe for the use~~s~~ for which certification is requested.

(b) In the case of a change that affects~~ing~~ the operational suitability data, by way of derogation from points (1) and (2) of point (a), at the applicant's request included in the declaration referred to in point 21.A.20(d), the Agency may approve a change to an aircraft type-certificate before compliance with the applicable operational suitability data certification basis has been demonstrated, provided that the applicant demonstrates such compliance before the date on~~at~~ which this~~those~~ data is~~are~~ to be actually used.

[…]

SUBPART E — SUPPLEMENTAL TYPE-CERTIFICATES

[…]

21.B.111 Issuance of a supplemental type-certificate

(a) The Agency shall issue a supplemental type-certificate, provided that:

1. the applicant complies~~has complied~~ with point 21.A.115(b);

2. the Agency, through ~~its~~ verification of the demonstration of compliance in accordance with the level of its involvement established in accordance with ~~pursuant to~~ point 21.B.100(a), has not found any non-compliance with the applicable type-certification basis, operational suitability data certification basis, where applicable, in accordance with point 21.B.82, and the applicable environmental protection requirements; and

3. no feature or characteristic has been identified that may render~~make~~ the product unsafe for the use~~s~~ for which certification is requested.

(b) In the case of a supplemental type-certificate that affects~~ing~~ the operational suitability data, by way of derogation from points (1) and (2) of point (a), at the applicant's request included in the declaration referred to in point 21.A.20(d), the Agency may issue a supplemental type-certificate before compliance with the applicable operational suitability data certification basis has been demonstrated, provided that the applicant demonstrates such compliance before the date on~~at~~ which this~~those~~ data is~~are~~ to be actually used.

[…]

SUBPART F — PRODUCTION WITHOUT PRODUCTION ORGANISATION APPROVAL

[…]

21.B.120 Initial certification procedure

(a) Upon receiving an application for the issue of a letter of agreement for the purpose of demonstrating conformity of the individual products, parts, ~~and~~ appliances, command units and command unit components, the competent authority shall verify the applicant's compliance with the applicable requirements.

[…]

21.B.135 Maintenance of the letter of agreement

The competent authority shall maintain the letter of agreement for as long as:

(a) the manufacturer ~~is~~ properly uses~~ing~~ the EASA Form 52 (see Appendix VIII) as a statement of conformity for complete aircraft, and the EASA Form 1 (see Appendix I) for products other than complete aircraft, parts, ~~and~~ appliances and command unit components; and

(b) inspections performed by the competent authority of the Member State before validation of the EASA Form 52 (see Appendix VIII) or the EASA Form 1 (see Appendix I), as per point 21.A.130(c) did not reveal any findings of non-compliance with the requirements or the procedures as contained in the manual provided by the manufacturer, or any non-conformity of the respective products, parts, ~~or~~ appliances or command unit components; ~~T~~these inspections shall check at least that:

1. the agreement covers the product, part, ~~or~~ appliance or command unit component to be~~ing~~ validated, and remains valid;

[…]

SUBPART G — PRODUCTION ORGANISATION APPROVAL

[…]

21.B.222 Oversight programme

[…]

(b) The oversight programme shall take into account the specific nature of the organisation, the complexity of its activities, the results of past certification and/or oversight activities, and it shall be based on the assessment of the associated risks. It shall include, within each oversight planning cycle:

1. assessments, audits and inspections, including, as appropriate:

(i) management system assessments and process audits;

(ii) product audits of a relevant sample of the products, parts, ~~and~~ appliances, command units and command unit components that are within the scope of the organisation;

[…]

SUBPART H — CERTIFICATES OF AIRWORTHINESS AND RESTRICTED CERTIFICATES OF AIRWORTHINESS

21.B.320 Investigation

[…]

(b) The competent authority of the Member State of registry shall prepare evaluation procedures covering at least the following elements:

[…]

5. inspection of aircraft and, if used to control the aircraft, of the command unit;

[…]

21.B.325 Issuance of an airworthiness certificate

(a) The competent authority of the Member State of registry shall issue or change a certificate of airworthiness (EASA Form 25, see Appendix VI) without undue delay when it is satisfied that the requirements of point 21.B.326 and the applicable requirements of ~~Section A of~~ Subpart H of Section A of this Annex I (Part 21) are met.

(b) The competent authority of the Member State of registry shall issue or change a ~~R~~restricted certificate of airworthiness (EASA Form 24, see Appendix V) without undue delay when it is satisfied that the requirements of point 21.B.327 and the applicable requirements of ~~Section A of~~ Subpart H of Section A of this Annex I (Part 21) are met.

(c) For new aircraft, and for used aircraft that originate~~ing~~ from a non-~~m~~Member State, in addition to the appropriate airworthiness certificate referred to in point (a) or point (b), the competent authority of the Member State of registry shall issue:

1. for aircraft subject to Annex I (Part-M) to Commission Regulation (EU) No 1321/2014, an initial airworthiness review certificate (EASA Form 15a, Appendix II);
2. for new aircraft subject to Annex Vb (Part-ML) to Commission Regulation (EU) No 1321/2014, an initial airworthiness review certificate (EASA Form 15c, Appendix II);
3. for used aircraft that originate~~ing~~ from a non-~~m~~Member State and which are subject to Annex Vb (Part-ML) to Commission Regulation (EU) No 1321/2014, an initial airworthiness review certificate (EASA Form 15c, Appendix II), when the competent authority has performed the airworthiness review;~~.~~
4. for new unmanned aircraft that are subject to Annex I (Part-ML.UAS) to Delegated Regulation (EU) …/…, an initial airworthiness review certificate (EASA Form 15d, Appendix II);
5. for used unmanned aircraft that originate from a non-Member State and that are subject to Annex I (Part-ML.UAS) to Delegated Regulation (EU) …/…, an initial airworthiness review certificate (EASA Form 15d, Appendix II), when the competent authority has performed the airworthiness review.

21.B.326 Certificate of airworthiness

The competent authority of the Member State of registry shall issue a certificate of airworthiness for:

[…]

(b) used aircraft:

1. upon presentation of the documentation required by point 21.A.174(b)(3) demonstrating that:

[…]

(iii) the aircraft has been inspected in accordance with the provisions of Annex I (Part-M) or Annex Vb (Part-ML) to~~f~~ Regulation (EU) No 1321/2014 or Annex I (Part-ML.UAS) to Commission Delegated Regulation (EU) …/…, as appropriate;

[…]

21.B.327 Restricted certificate of airworthiness

(a) The competent authority of the Member State of registry shall issue a restricted certificate of airworthiness for:

[…]

2. used aircraft:

(i) upon presentation of the documentation required by point 21.A.174(b)(3) demonstrating that:

[…]

(C) the aircraft has been inspected in accordance with the provisions of Annex I (Part-M) or Annex Vb (Part-ML) to~~f~~ Regulation (EU) No 1321/2014 or Annex I (Part-ML.UAS) to Commission Delegated Regulation (EU) …/…, as appropriate;

[…]

SUBPART J — DESIGN ORGANISATION APPROVAL

[…]

21.B.432 Oversight programme

[…]

(b) The oversight programme shall take into account the specific nature of the organisation, the complexity of its activities, the results of past certification or oversight activities, or both, and it shall be based on the assessment of the associated risks. It shall include, within each oversight planning cycle:

1. assessments, audits and inspections, including, where appropriate:

(i) management system assessments and process audits;

(ii) product audits of a relevant sample of the design and certification of the products, parts, ~~and~~ appliances, command units and command unit components that are within the scope of work of the organisation;

[…]

SUBPART K — PARTS, ~~AND~~ APPLIANCES AND COMMAND UNIT COMPONENTS

Administrative procedures established by the Agency shall apply

[…]

SUBPART Q — IDENTIFICATION OF PRODUCTS, PARTS, ~~AND~~ APPLIANCES, COMMAND UNITS AND COMMAND UNIT COMPONENTS

Administrative procedures established by the Agency shall apply

[…]

3.1.4. Appendices to Annex I (EASA FORMS)

Appendix I — Authorised Release Certificate — EASA Form 1 referred to in Annex I (Part 21)

[…]

Instructions for the use of EASA Form 1

These instructions relate only to the use of EASA Form 1 for production purposes. Attention is drawn to Appendix II to Annex I (Part-M) to~~f~~ Regulation (EU) No 1321/2014 and to Appendix III to Annex I (Part-ML.UAS) to Commission Delegated Regulation (EU) …/…, which cover~~s~~ the use of EASA Form 1 for maintenance purposes.

1. PURPOSE AND USE

1.1. The~~A~~ primary purpose of the certificate is to declare the airworthiness of new aviation ~~products~~ engines, propellers, parts, ~~and~~ appliances, command units and command unit components (‘the item(s)’).

[…]

1.6. The certificate does not constitute an approval to install the item(s) on a particular aircraft, engine, or propeller, or on a particular command unit in case of command unit components, but helps the end user determine its airworthiness approval status.

[…]

5. COMPLETION OF THE CERTIFICATE BY THE ORIGINATOR

[…]

Block 8 Part Number

Enter the part number as it appears on the item or tag/packaging. In the case of an engine, ~~or~~ propeller or command unit, the type designation may be used.

[…]

Appendix II — EASA Form 15a, ~~and~~ 15c and 15d — Airworthiness Review Certificate

[…]

AIRWORTHINESS REVIEW CERTIFICATE (ARC)

(for unmanned aircraft (UA) that comply with Part-ML.UAS)

ARC reference: ……..

Pursuant to Regulation (EU) 2018/1139 of the European Parliament and of the Council:

[NAME OF THE COMPETENT AUTHORITY]

hereby certifies that:

☐ … it has performed the airworthiness review, in accordance with Annex I (Part-ML.UAS) to Commission Delegated Regulation (EU) …/…, of the following UA:

[or]

☐ … the following new UA:

UA manufacturer: …… UA manufacturer designation: ……

UA registration: ……UA serial number: ……

(and) is considered airworthy at the time of the review.

Date of issue: ..... Expiry date: ……

Airframe flight hours (FH) on the date of review (*): ……

Signed: ..... Authorisation No (if applicable): ……

[OR]

[NAME OF APPROVED ORGANISATION, ADDRESS and APPROVAL REFERENCE] (**)

hereby certifies that it has performed the airworthiness review, in accordance with Annex I (Part-ML.UAS) to Commission Delegated Regulation (EU) …/…, of the following UA:

UA manufacturer: …… UA manufacturer designation: ……

UA registration: ……UA serial number: ……

and is considered airworthy at the time of the review.

Date of issue: ..... Expiry date: ……

Airframe flight hours (FH) on the date of review (*): ……

Signed: ..... Authorisation No (if applicable): ……

==========

First extension: The UA complies with the conditions of point ML.UAS.901(c) of Annex II (Part-ML.UAS) to Commission Delegated Regulation (EU) …/…

Date of issue: ..... Expiry date: ……

Airframe flight hours (FH) on the date of issue (*): ……

Signed: ..... Authorisation No: ……

Company name: ..... Approval reference: ……

==========

Second extension: The UA complies with the conditions of point ML.A.901(c) of Annex II (Part-ML.UAS) to Commission Delegated Regulation (EU) …/…

Date of issue: ..... Expiry date: .....

Airframe flight hours (FH) on the date of issue (*): .....

Signed: ..... Authorisation No: .....

Company name: ..... Approval reference: .....

(*) Except for balloons and airships.

(**) The issuer of the form may tailor it to their needs by deleting the name, the certifying statement, the reference to the subject aircraft and the issuance details that are not relevant for their use.

EASA Form 15d — Issue 1

Appendix III — Permit to Fly — EASA Form 20a

Competent authority logo	**PERMIT TO FLY**

36	
This permit to fly is issued pursuant to ~~Regulation (EC) No 216/2008, Article 5(4)(a)~~Commission Regulation (EU) 2018/1139 and certifies that the aircraft is capable of safe flight for the purpose and within the conditions listed below, and is valid in all Member States. This permit to fly is also valid for flights to and within non-Member States provided a separate approval is obtained from the competent authorities of those~~such~~ States:	1. Nationality and registration marks:
2. Aircraft manufacturer/type: [for unmanned aircraft, please insert command unit model and designation]	3. Serial No:
4. The permit to fly covers: [purpose in accordance with point 21.A.701(a)]	
5. Holder: [in case of a permit to fly issued for the purpose of point 21.A.701(a)(15), this should state: 'the registered owner']	
6. Conditions/remarks:	
7. Validity period:	
8. Place and date of issue:	9. Signature of the competent authority representative:

EASA Form 20a — Issue 2

[36] For use by the State of Registry.

Appendix IV — Permit to Fly (issued by approval organisations) — EASA Form 20b

The Member State of the ~~C~~competent ~~A~~authority that has~~having~~ issued the organisation approval under which the permit to fly is issued; or 'EASA' when the approval is issued by EASA.	**PERMIT TO FLY**

Name and ~~A~~address of the organisation that issues~~ing~~ the permit to fly.	[37]
This permit to fly is issued pursuant to Regulation (EU) 2018/1139 ~~Regulation (EC) No 216/2008, Article 5(4)(a)~~ and certifies that the aircraft is capable of safe flight for the purpose and within the conditions listed below, and is valid in all Member States. This permit to fly is also valid for flights to and within non-Member States provided a separate approval is obtained from the competent authorities of those~~such~~ States.	1. Nationality and registration marks:
2. Aircraft manufacturer/type: [for unmanned aircraft, please insert command unit model and designation]	3. Serial No:
4. The permit to fly covers: [purpose in accordance with point 21.A.701(a)]	
5. Holder: *[~~O~~organisation that issues~~ing~~ the permit to fly]*	
6. Conditions/remarks:	
7. Validity period:	
8. Place and date of issue:	9. Authorised signature: Name: Approval ~~R~~reference No:

EASA Form 20b — Issue 2

[37] For use by the ~~O~~organisation ~~A~~approval holder.

Appendix V — Restricted Certificate of Airworthiness — EASA Form 24

Competent authority LOGO

RESTRICTED CERTIFICATE OF AIRWORTHINESS

[38]	[Member State of ~~r~~Registry] [COMPETENT AUTHORITY OF THE MEMBER STATE]	[38]
1. Nationality and registration marks	2. Manufacturer and manufacturer'~~s~~ designation of aircraft	3. Aircraft serial number
4. Categories		
5. This restricted ~~C~~certificate of ~~A~~airworthiness is issued pursuant to [39] [the Convention on International Civil Aviation dated 7 December 1944] [and] [Regulation (EU) 2018/1139 of the European Parliament and of the Council] ~~Regulation (EC) No 216/2008, Article 5(4)(b)~~ in respect of the above-mentioned aircraft which is considered ~~to be~~ airworthy when maintained and operated in accordance with the foregoing and the pertinent operating limitations. In addition to the above, the following restrictions apply: [38] [39] [The aircraft may be used in international navigation notwithstanding the above-mentioned restrictions]. Remark: [for unmanned aircraft, please insert command unit model and designation]		
Date of issue:	Signature:	
6. This ~~R~~restricted ~~C~~certificate of ~~A~~airworthiness is valid unless revoked by the competent authority of the Member State of ~~r~~Registry. A current ~~A~~airworthiness ~~R~~review ~~C~~certificate shall be attached to this certificate.		

EASA Form 24 — Issue 3~~2.~~

This certificate shall be carried on board during all flights.

[38] For use by the State of Registry.
[39] Delete as applicable.

Appendix VI — Certificate of Airworthiness — EASA Form 25

Competent authority LOGO

CERTIFICATE OF AIRWORTHINESS

[40]	[Member State of ~~r~~Registry] [COMPETENT AUTHORITY OF THE MEMBER STATE]	[40]
1. Nationality and registration marks	2. Manufacturer and manufacturer~~'s~~ designation of aircraft	3. Aircraft serial number
4. Categories		
5. This ~~C~~certificate of ~~A~~airworthiness is issued pursuant to the Convention on International Civil Aviation dated 7 December 1944 and Regulation (EU) 2018/1139 of the European Parliament and of the Council ~~Regulation (EC) No 216/2008, Article 5(2)(c)~~ in respect of the above-mentioned aircraft which is considered ~~to be~~ airworthy when maintained and operated in accordance with the foregoing and the pertinent operating limitations. Limitations/Remarks: [40] [for unmanned aircraft, please insert command unit model and designation] Date of issue: Signature:		
6. This ~~C~~certificate of ~~A~~airworthiness is valid unless revoked by the competent authority of the Member State of ~~r~~Registry. A current ~~A~~airworthiness ~~R~~review ~~C~~certificate shall be attached to this certificate.		

EASA Form 25 — Issue 3~~2.~~

This certificate shall be carried on board during all flights.

[…]

Appendix VIII — Aircraft statement of conformity — EASA Form 52

AIRCRAFT STATEMENT OF CONFORMITY		
1. State of manufacture	2. [MEMBER STATE] ([1]) A Member of the European Union ([2])	3. Statement reference~~.~~ ~~n~~ No:
4. Organisation		
5. Aircraft type	6. Type-certificate reference~~.~~ ~~n~~Nos:	
7. Aircraft registration or mark	8. Production organisation identification ~~n~~No:	
9. Engine/propeller/command unit details ([3])		
10. Modifications and/or service bulletins ([3])		
11. Airworthiness directives		
12. Concessions		
13. Exemptions, waivers or derogations ([3])		
14. Remarks		
15. Certificate of airworthiness		
16. Additional requirements		
17. Statement of conformity		

[40] For use by the State of Registry.

It is hereby certified that the aircraft fully conforms ~~fully~~ to the type-certified design and to the items in blocks 9, 10, 11, 12 and 13. The aircraft is in a condition for safe operation. The aircraft has been satisfactorily tested in flight.		
18. Signed	19. Name	20. Date (dd/mm/yyyy)
21. Production organisation approval reference		

EASA Form 52 — Issue 4~~3~~

(1) Or 'EASA', if EASA is the competent authority.

(2) Delete for non-EU Member States or EASA.

(3) Delete as applicable.

Instructions for the use of the 'Aircraft statement of conformity — EASA Form 52'

[…]

3. COMPLETION OF THE STATEMENT OF CONFORMITY BY THE ORIGINATOR

[…]

3.2. A statement of conformity may not be issued to the competent authority of the Member State of ~~r~~Registry unless the design of the aircraft~~,~~ ~~and~~ its installed products and, for unmanned aircraft, the command unit are approved.

[…]

3.4. This statement of conformity is not intended to include those items of equipment that may be required to be fitted in order to satisfy the applicable operational rules. However, some of those individual items may be included in block 10 or in the approved type design. Operators are, therefore, reminded of their responsibility to ensure compliance with the applicable operational rules for their own particular operations.

[…]

Block 9 The engine type and the propeller type(s) in full as specified in the relevant type-certificate and its associated data sheet. Their production organisation identification number and the associated location must also be stated. For unmanned aircraft, the command unit type in full as specified in the relevant type-certificate, its associated data sheet, and its production organisation identification number.

Block 10 Approved design changes to the aircraft definition.

Block 11 A listing of all the applicable airworthiness directives (or equivalent) and a declaration of compliance, together with a description of the method of compliance of the subject individual aircraft, including products and installed parts, appliances and equipment and, for unmanned aircraft, command unit and command unit components. Any future compliance requirement time must be stated.

[…]

Block 17 The validity of the statement of conformity is subject to the full completion of all the blocks on the form. A copy of the flight test report, together with any recorded defects and rectification details, must be kept on file by the production organisation approval ~~certificate~~ holder. The report must be signed as satisfactory by the appropriate certifying staff and a flight crew member, e.g. the test pilot or the flight test engineer. The flight tests performed are those defined under the control of the quality management element of the production system, as established by point 21.A.139, in particular point 21.A.139(d)(2~~1~~)(vi), to ensure that the aircraft conforms to the applicable design data, and is in a condition for safe operation.

The listing of the items provided (or made available) to satisfy the aspects of this statement that relate to the safe operation of the aircraft must be kept on file by the production organisation approval ~~certificate~~ holder.

[…]

Appendix XI — Letter of agreement for production without a production organisation approval — EASA Form 65

Letter of agreement referred to in Subpart F of Annex I (Part 21)

[MEMBER STATE] ([1])

A Member of the European Union ([2])

LETTER OF AGREEMENT FOR PRODUCTION WITHOUT A PRODUCTION ORGANISATION APPROVAL

[NAME OF THE APPLICANT]

[TRADE NAME (if different from the name of the applicant)]

[FULL POSTAL ADDRESS OF THE APPLICANT]

Date (day month year~~Day, Month, Year~~)

Reference: [MEMBER STATE CODE ([2])].21F.XXXX

Dear Mr/Ms [~~N~~name of the ~~A~~applicant],

~~Y~~your production inspection system has been evaluated and found to be in compliance with Section A~~,~~ Subpart A and Subpart F of Annex I (Part 21) to Commission Regulation (EU) No 748/2012.

Therefore, subject to the conditions specified below, we agree that the showing of conformity of the products, parts~~, and~~ appliances, command units and command unit components mentioned below may be done according to ~~under~~ Section A~~,~~ Subpart F of Annex I (Part 21) to Commission Regulation (EU) No 748/2012.

No of Units	**P/N**	**S/N**

AIRCRAFT

PARTS

The following conditions are applicable to this letter of agreement:

(1) It is valid while [~~C~~company ~~N~~name] remains in compliance with Section A~~,~~ Subpart A and Subpart F of Annex I (Part 21) to Commission Regulation (EU) No 748/2012.

(2) It requires compliance with the procedures specified in [~~C~~company ~~N~~name] manual reference~~.~~/issue date……

(3) It terminates on ……..

(4) The statement of conformity issued by [~~C~~company ~~N~~name] under point 21.A.130 of Commission Regulation (EU) No 748/2012 shall be validated by the issuing authority of this letter of agreement in accordance with the procedure …… of the referenced manual.

(5) [~~C~~company ~~N~~name] shall immediately notify the issuing authority of this letter of agreement ~~immediately~~ of any changes to the production inspection system that may affect the inspection,

conformity or airworthiness of the products and parts, command units and command unit components listed in this letter of agreement.

For the competent authority: [COMPETENT AUTHORITY IDENTIFICATION ([1])([2])]

Date and signature

EASA Form 65 — Issue 4~~3~~

([1]) Or 'EASA', if EASA is the competent authority.

([2]) Delete for non-EU Member States.

[…]

3.2. Draft Commission Delegated Regulation (EU) …/…

3.2.1. Draft cover regulation

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

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to 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[41], and in particular Articles 17(1)(g), 62(14) and (15), and 72(5) thereof,

Whereas:

[…]

HAS ADOPTED THIS REGULATION:

Article 1 Subject matter and scope

This Regulation establishes common technical requirements and administrative procedures to ensure the continuing airworthiness of unmanned aircraft systems (UAS), including any component for installation thereto, where the unmanned aircraft (UA) is, or will be registered in a Member State, and:

(a) is intended to be operated in the 'specific category' of UAS operation as defined in Article 5 of Commission Implementing Regulation (EU) 2019/947[42] and a certificate of airworthiness or a restricted certificate of airworthiness has been or will be issued to the UA; or

(b) is intended to be operated in the 'certified category' of UAS operation as defined in Article 6 of Commission Implementing Regulation (EU) 2019/947.

Article 2 Definitions

For the purposes of this Regulation, the definitions in Regulation (EU) 2018/1139 apply.

[41] 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).

[42] 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).

In addition, the following definitions also apply:

(a) 'unmanned aircraft system (UAS)' means an unmanned aircraft (UA) and the equipment to control it remotely;

(b) 'command unit (CU)' means the equipment or items of equipment to control unmanned aircraft remotely, as defined in Article 3(32) of Regulation (EU) 2018/1139, which ensures the control or monitoring of the unmanned aircraft during any phase of flight; 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;

(c) 'certifying staff' means the personnel responsible for the certification of maintenance upon its completion;

(d) 'component' means any engine, propeller, part, or any element of the command unit (CU);

(e) 'continuing airworthiness' means all of the processes ensuring that, at any time in its operating life, the UAS complies with the applicable airworthiness requirements and is in a condition for safe operation;

(f) 'maintenance' means any one or a combination of the following activities: overhaul, repair, inspection, replacement, modification or defect rectification of an UAS or component, with the exception of pre-flight inspection;

(g) 'organisation' means a natural person, a legal person or part of a legal person; such an organisation may be established at more than one location whether or not within the territory of the Member States;

(h) 'pre-flight inspection' means the inspection carried out before flight to ensure that the UA is fit for the intended flight;

(i) 'principal place of business' means the head office or the registered office of the undertaking from which the principal financial functions and the operational control of the activities referred to in this Regulation are exercised;

(j) 'critical maintenance task' means a maintenance task that involves the assembly or any disturbance of a system or any part on an UA, engine or propeller that, if an error occurred during its performance, could directly endanger the flight safety;

(k) 'command unit (CU) installation' means the process to integrate the CU elements in a physical environment that is eligible for that purpose according to a set of installation and testing instructions, such that the installed CU may be used to operate a UA.

Article 3 Continuing airworthiness requirements

1. The continuing airworthiness of UAS referred to in Article 1(a), and the components for installation thereon, shall be ensured in accordance with Annex I (Part-ML.UAS).

2. By way of derogation from point (1), the continuing airworthiness of UAS referred to in Article 1(a), for which approved flight conditions have been issued, shall be ensured on the basis of specific continuing airworthiness arrangements defined in the approved flight conditions issued in accordance with Annex I (Part 21) to Commission Regulation (EU) No 748/2012[43].

[43] Commission Regulation (EU) No 748/2012 of 3 August 2012 laying down implementing rules for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations (OJ L 224, 21.8.2012, p. 1).

Article 4 Approvals for organisations involved in the continuing airworthiness of UAS

An organisation that is involved in the continuing airworthiness of UAS referred to in Article 1(a) and components for installation thereon, including maintenance, shall comply with Annex II (Part-CAO.UAS) and obtain the related approval certificate from its competent authority.

Article 5 Certifying staff

Certifying staff shall be qualified in accordance with the requirements specified in Annex II (Part-CAO.UAS).

Article 6 Competent authorities

Competent authorities that are responsible for performing certification, oversight and enforcement tasks pursuant to this Regulation shall comply with Implementing Regulation (EU) …/….

Article 7 Entry into force

This Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels, [date].

For the Commission
The President
Ursula VON DER LEYEN

3.2.2. Draft Annex I (Part-ML.UAS) to Commission Delegated Regulation (EU) …/…

ANNEX I
(PART-ML.UAS)

ML.UAS.1

(a) For the purpose of this Annex, the competent authority shall be the authority specified in point AR.UAS.GEN.010(a) of Annex I to Implementing Regulation (EU) …/….

(b) For the purpose of this Annex, the following definitions shall apply:

'Owner' means the person that is accountable for the continuing airworthiness of the unmanned aircraft system (UAS), including, as applicable:

(1) the registered owner of the UAS;

(2) the lessee in the case of a leasing contract;

(3) the UAS operator.

SUBPART A — GENERAL

ML.UAS.101 Scope

This Section establishes the measures to be taken to ensure that the UAS operated in the 'specific category' of UAS operations as defined in Article 5 of Implementing Regulation (EU) 2019/947[44], and for which an airworthiness certificate has been issued to the UA in accordance with Article 7(2) of Implementing Regulation (EU) 2019/947, is airworthy. It also specifies the conditions to be met by the persons or organisations involved in the activities related to the airworthiness of such UAS.

[44] 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).

SUBPART B — ACCOUNTABILITY

ML.UAS.201 Responsibilities

(a) The owner of the UAS shall be accountable for the continuing airworthiness of the UAS and shall ensure that no flight takes place unless all the following requirements are met:

(1) the UAS is maintained in an airworthy condition;

(2) any operational and emergency equipment fitted to the UAS is correctly installed and serviceable, or is clearly identified as unserviceable;

(3) the UA airworthiness certificate is valid;

(4) the scheduled maintenance of the UAS is performed in accordance with the UAS maintenance programme specified in point ML.UAS.302.

(b) By way of derogation from point (a), when the UAS is leased, the accountability set out in point (a) shall apply to the lessee, provided that the lessee is identified in the registration document of the UA or such transfer is detailed in the leasing contract.

(c) Any person or organisation performing maintenance on UAS and components shall be responsible for the maintenance tasks performed.

(d) The UAS operator shall be responsible for the satisfactory accomplishment of the pre-flight inspection. The person carrying out that inspection on behalf of the UAS operator shall be qualified for that purpose. The pre-flight inspection need not be carried out by an approved maintenance organisation or by certifying staff.

(e) The owner of the UAS shall ensure that:

(1) no flight takes place unless the conditions set out in point (a) are met;

(2) the tasks associated with the continuing airworthiness management of the UAS are performed by an organisation that is approved in accordance with Annex II (Part-CAO.UAS) to this Regulation and has its principal place of business in the territory to which the Treaties apply.

If a Part-CAO.UAS organisation is contracted by the UAS owner as regards the performance of those tasks, a written contract shall be established in accordance with Appendix I to this Annex. That contracted organisation shall assume responsibility for the proper performance of those tasks;

(3) the maintenance of the UAS and components for installation thereon is performed by an organisation that is approved in accordance with Annex II (Part-CAO.UAS) to this Regulation and has its principal place of business in the territory to which the Treaties apply.

(g) The UAS owner shall grant the competent authority access to the UAS and the UAS records for the competent authority to determine whether the UAS complies with the requirements of this Annex.

SUBPART C — CONTINUING AIRWORTHINESS

ML.UAS.301 Continuing airworthiness tasks

The continuing airworthiness of the UAS and the serviceability of operational and emergency equipment shall be ensured by:

(a) the accomplishment of pre-flight inspections of the UA;

(b) the performance of unscheduled maintenance, preservation, or rectification of defect and damage in accordance with the data specified in points ML.UAS.401 and ML.UAS.304, as applicable, while taking into account the minimum equipment list (MEL) and the configuration deviation list (CDL), when they exist;

(c) the accomplishment of all scheduled maintenance in accordance with the UAS maintenance programme referred to in point ML.UAS.302;

(d) the compliance with any applicable:

(1) airworthiness directive (AD) issued by the Agency;

(2) operational requirements with a continuing airworthiness impact;

(3) continuing airworthiness requirements mandated by the Agency;

(3) measure required by the competent authority in immediate reaction to a safety problem;

(e) the accomplishment of modifications and repairs in accordance with point ML.UAS.304;

(f) maintenance check flights (MCFs), when necessary.

ML.UAS.302 UAS maintenance programme

(a) The scheduled maintenance of the UAS shall be organised in accordance with an UAS maintenance programme.

(b) The maintenance programme and any subsequent amendments thereto shall be approved by the Part-CAO.UAS organisation that is responsible for managing the continuing airworthiness of the UAS.

(c) The UAS maintenance programme shall demonstrate compliance with:

(1) the mandatory continuing airworthiness information, such as repetitive ADs, the airworthiness limitation section (ALS) of the instructions for continuing airworthiness (ICAs), and specific maintenance requirements contained in the type-certificate data sheet (TCDS);

(2) the ICAs issued by the design approval holder (DAH);

(d) Notwithstanding point (c)(1), by way of derogation from point (c)(2), the UAS maintenance programme may deviate from the ICA, based on data obtained from reviews carried out in accordance with point (e).

(e) The UAS maintenance programme shall be reviewed at least annually in order to assess its effectiveness while considering new or modified ICA. This review shall be performed, alternatively:

(1) in conjunction with the airworthiness review of the UA by the person that performs such an airworthiness review;

(2) by the organisation that manages the continuing airworthiness of the UAS in those cases where the review of the UAS maintenance programme is not performed in conjunction with an airworthiness review.

If the review shows deficiencies in the content of the UAS maintenance programme, it shall be amended accordingly. The person that performs the review shall inform the competent authority of the Member State of Registry if he or she does not agree with the measures taken by the Part-CAO.UAS organisation to amend the UAS maintenance programme.

ML.UAS.303 Airworthiness directives (ADs)

Any applicable AD must be carried out within the requirements of that AD unless otherwise specified by the Agency.

ML.UAS.304 Modifications and repairs

(a) Any damage to an UAS or component shall be assessed before being repaired.

(b) Carrying out modifications and repairs on the UAS, UA component or CU component referred to in point 21.A.308(a) of Annex I (Part 21) to Regulation (EU) No 748/2012 shall require such modification and repair to be either:

(1) approved by the Agency;

(2) approved by a design organisation that complies with Annex I (Part 21) to Regulation (EU) No 748/2012;

(3) contained in the requirements referred to in point 21.A.90B or point 21.A.431B of Annex I (Part 21) to Regulation (EU) No 748/2012.

ML.UAS.305 UAS continuing airworthiness record system

(a) A system shall be established to record continuing airworthiness information of the UAS. That system shall be used by the remote pilot and the person(s) involved in the continuing airworthiness of the UAS.

(b) The UAS continuing airworthiness records system shall record the following:

(1) details of the maintenance carried out on the UAS, in particular all certificates of release to service (CRSs) required by points ML.UAS.801 or ML.UAS.803;

(2) the pre-flight inspection carried out on the UA;

(3) information considered necessary to ensure continued flight safety;

(4) the current mass and balance report;

(5) other data necessary to demonstrate compliance with points (e) and (f).

(c) Each maintenance-related entry shall be made as soon as possible following the completion of the maintenance so that it provides an up-to-date maintenance status to the remote pilot.

(d) The record system shall include logs for the UA, the engine and the CU and, as appropriate, for components that are subject to airworthiness limitations.

(e) The UAS continuing airworthiness record system shall be able to provide:

(1) the current status of ADs and measures mandated by the competent authority in immediate reaction to a safety problem;

(2) the current status of modifications and repairs;

(3) the current status of compliance with the UAS maintenance programme;

(4) the current status of components that are subject to airworthiness limitations;

(5) the current list of deferred maintenance.

(f) With respect to components, in addition to the authorised release document, EASA Form 1 or equivalent, the following information relevant to installed components that are subject to airworthiness limitations, shall also be entered in the record system:

(1) the identification of the component(s);

(2) the type, serial number and registration, as appropriate, of the UA, engine or component to which the particular component has been fitted, along with the reference to the installation and removal of the component;

(3) the date together with the component's accumulated total flight time, flight cycles, landings and calendar time, as relevant to the particular component;

(4) the current information referred to in point (e), applicable to the component.

(g) These records shall be controlled by the organisation responsible for the management of the continuing airworthiness of the UAS pursuant to point ML.UAS.201 and shall be presented to the competent authority upon request.

(h) All entries made in the UAS continuing airworthiness records shall be clear and accurate. When it is necessary to correct an entry, the correction shall be made in a manner that clearly shows the original entry.

(i) The records shall be kept for the period specified below:

(1) all detailed maintenance records in respect of the UAS and of any component that is subject to airworthiness limitations, until such time as the information contained in the records is superseded by new information equivalent in scope and detail but not less than 36 months after the UA or the component maintenance has been released;

(2) the total time in service (i.e. hours, calendar time, cycles) of the UAS and of all the components that are subject to airworthiness limitations, for at least 12 months after the UAS or the component has been permanently withdrawn from service;

(3) the time in service (i.e. hours, calendar time, cycles and landings, as appropriate) since the last scheduled maintenance of the component that is subject to an airworthiness limitation, at least until the component's scheduled maintenance has been superseded by another scheduled maintenance of equivalent work scope and detail;

(4) the current status of compliance with the UAS maintenance programme at least until the scheduled maintenance of the UAS or of the component has been superseded by another scheduled maintenance of equivalent work scope and detail;

(5) the current status of ADs applicable to the UAS and components, at least 12 months after the UAS or the component has been permanently withdrawn from service;

(6) details of current modifications and repairs to the UAS, engine(s) and to any other component vital to flight safety, at least 12 months after they have been permanently withdrawn from service.

ML.UAS.307 Transfer of the UAS's continuing airworthiness records

(a) When an UAS is permanently transferred from one owner to another, the relevant continuing airworthiness records referred to in point ML.UAS.305 shall also be transferred.

(b) The time periods for the retention of the records set out in point ML.UAS.305(h) shall continue to apply to the new UAS owner.

SUBPART D — MAINTENANCE STANDARDS

ML.UAS.401 Maintenance data

(a) Maintenance on the UAS shall require the use of and adherence to current applicable maintenance data.

(b) For the purposes of this Annex, 'applicable maintenance data' means any of the following:

(1) any applicable requirement, procedure, standard or information issued by the competent authority or the Agency;

(2) any applicable AD;

(3) the applicable ICA and other maintenance instructions issued by the type-certificate holder, supplementary type-certificate holder and any other organisation that publishes such data in accordance with Annex I (Part 21) to Regulation (EU) No 748/2012;

(4) for components approved for installation by the design approval holder, the applicable maintenance instructions published by the component manufacturer and acceptable to the design approval holder;

ML.UAS.403 UAS defects

(a) Any UAS defect that seriously endangers the flight safety shall be rectified before further flight.

(b) The following persons may decide that a defect does not seriously endanger flight safety, and may defer it accordingly:

(1) the remote pilot or the authorised certifying staff in respect of defects that affect non-required UAS mission equipment;

(2) the remote pilot or the authorised certifying staff when using the MEL in respect of defects that affect required UAS equipment;

(3) the authorised certifying staff in respect of defects other than those referred to in points (b)(1) and (b)(2).

(c) Any UAS defect that does not seriously hazard flight safety shall be rectified as soon as practicable from the date on which the defect was first identified and within the time limits specified in the maintenance data.

(d) Any defect that is not rectified before flight shall be recorded in the UAS continuing airworthiness record system referred to in point ML.UAS.305 and a record shall be made available to the remote pilot.

SUBPART E — COMPONENTS

ML.UAS.501 Installation of UA components

(a) Unless otherwise specified in Annex II (Part-CAO.UAS) to this Regulation or in point 21.A.307 of Annex I (Part 21) to Regulation (EU) No 748/2012, a component may be fitted on an UA only if all the following conditions are met:

(i) it is in a satisfactory condition;

(ii) it has been appropriately released to service using an EASA Form 1 as set out in Appendix II to Annex I (Part-M) to Regulation (EU) No 1321/2014, or equivalent;

(iii) it has been marked in accordance with Subpart Q of Annex I (Part 21) to Regulation (EU) No 748/2012.

(b) Prior to the installation of a component on an UA, the maintenance organisation shall ensure that the particular component is eligible to be fitted taking into account different modifications or AD configurations.

(c) Standard parts shall only be fitted to an UA or to a component when the maintenance data specifies those particular standard parts. Standard parts shall only be fitted when accompanied by evidence of conformity to the applicable standard, and when they have appropriate traceability.

(d) Raw or consumable material shall only be used on an UA or a component provided that:

(i) the aircraft or component manufacturer allows for the use of raw or consumable material in relevant maintenance data;

(ii) such material meets the required material specifications and has appropriate traceability.

(iii) such material is accompanied by documentation that clearly relates to that particular material and contains a statement of conformity to applicable specifications, and also the manufacturing and supplier source.

ML.UAS.502 Maintenance of UA components

(a) UA components which are accepted by the owner in accordance with point 21.A.307(b)(2) of Annex I (Part 21) to Regulation (EU) No 748/2012 shall be maintained by any person or organisation, subject to reacceptance by the owner under the conditions of point 21.A.307(b)(2) of that Annex. Such maintenance is not eligible for the issuance of an EASA Form 1, as set out in Appendix II to Annex I (Part-M) to Regulation (EU) No 1321/2014, and shall be subject to the aircraft release requirements.

(b) The maintenance of UA components shall be released in accordance with the following table:

	Released using an EASA Form 1 (as set out in Appendix II to Annex I (Part-M) to Regulation (EU) No 1321/2014)	Released together with UA maintenance in accordance with point ML.UAS.801 (not possible to issue an EASA Form 1)
Components maintained in accordance with component maintenance data (data issued by the component manufacturer)		
Maintenance other than overhaul	For engines: Engine-rated maintenance organisations For other components: component-rated maintenance organisations	UA maintenance organisations
Overhaul of components other than engines	Component-rated maintenance organisations	Not possible
Overhaul of engines	Engine-rated maintenance organisations	UA maintenance organisations
Components maintained in accordance with aircraft maintenance data (data issued by the aircraft manufacturer)		
All components and all types of maintenance	Engine-rated (for engines) or component-rated (for other components) maintenance organisations	UA maintenance organisations

(c) Components which are referred to in points (b)(3) to (b)(6) of point 21.A.307 of Annex I (Part 21) to Regulation (EU) No 748/2012 may be maintained by any person or organisation. In such case, by way of derogation from point (b), the maintenance of those components shall be released with a 'declaration of maintenance accomplished' issued by the person or organisation that has performed the maintenance. The 'declaration of maintenance accomplished' shall contain at least basic details of the maintenance carried out, the date on which the maintenance was completed, and the identification of the organisation or person that issues it. It shall be considered a maintenance record and equivalent to an EASA Form 1 in respect of the maintained component.

ML.UAS.504 Segregation of components

(a) Unserviceable and unsalvageable components shall be segregated from serviceable components, standards parts, and materials.

(b) A component shall be considered unserviceable in any of the following circumstances:

(1) expiry of the component's limitation as defined in the UAS maintenance programme;

(2) non-compliance with the applicable ADs and other continuing airworthiness requirements mandated by the Agency;

(3) absence of the necessary information to determine the airworthiness status of the component or its eligibility for installation;

(4) evidence of component defects or malfunctions;

(5) involvement of the component in an incident or accident that has likely affected its serviceability.

(c) Components which have reached their certified life limits or contain a non-repairable defect or malfunction shall be classified as unsalvageable and shall not be permitted to re-enter the

component supply system unless their certified life limits have been extended or a repair solution has been approved in accordance with point ML.UAS.304.

ML.UAS.520 Installation and maintenance of CU components

(a) Components shall only be installed on a CU when the maintenance data specifies those components and when they are in a satisfactory condition.

(b) Notwithstanding point (a), CU components referred to in point 21.A.308(a) of Annex I (Part 21) to Regulation (EU) No 748/2012 shall only be installed on the CU if accompanied by an EASA Form 1 or equivalent, and marked in accordance with Subpart Q of Annex I (Part 21) to Regulation (EU) No 748/2012.

(c) Notwithstanding point (a), CU components other than those referred to in point (b) shall only be installed on the CU if accompanied by the declaration specified in point 21.A.308(b) of Annex I (Part 21) to Regulation (EU) No 748/2012, or equivalent.

(d) The maintenance of CU components referred to in point 21.A.308(a) of Annex I (Part 21) to Regulation (EU) No 748/2012 shall be performed by a maintenance organisation approved in accordance with Annex II (Part-CAO.UAS) and be released on an EASA Form 1 as set out in Appendix II to Annex I (Part-M) to Regulation (EU) No 1321/2014.

(e) The maintenance of CU components other than those referred to in point (d) shall be released with a 'declaration of maintenance accomplished' issued by the person or organisation that has performed the maintenance. That declaration shall contain at least basic details of the maintenance carried out, the date on which the maintenance was completed, and the identification of the organisation or person that issues it. It shall be considered a maintenance record and equivalent to the declaration referred to in point 21.A.308(b) of Annex I (Part 21) to Regulation (EU) No 748/2012 for the purpose of installation.

(f) By way of derogation from points (d) and (e), where the CU components are subject to maintenance while they are installed in, or temporarily removed from, the CU, such maintenance may be certified together with the CU maintenance in accordance with point ML.UAS.803.

SUBPART H — CERTIFICATE OF RELEASE TO SERVICE (CRS)

ML.UAS.801 Certification of UA maintenance

(a) When completed, the maintenance carried out on an UA shall be certified on a 'certificate of release to service' (CRS) by a certifying staff. The CRS shall be issued when the certifying staff has verified that all the maintenance that was ordered has been properly carried out taking into account the availability and use of the maintenance data specified in point ML.UAS.401.

(b) A CRS shall contain at least the following:

(1) basic details of the UA maintenance carried out;

(2) the date on which the UA maintenance was completed;

(3) the approval reference of the maintenance organisation and certifying staff issuing the CRS;

(4) the limitations to airworthiness or operations, if any.

(c) By way of derogation from point (a) and notwithstanding point (d), when the ordered maintenance cannot be completed, a CRS may be issued within the approved aircraft limitations. In that case, the CRS shall indicate that the maintenance could not be completed, and also indicate any applicable airworthiness or operations limitations as part of the information required in point (b)(4).

(d) A CRS shall not be issued in the case of any known non-compliance with the requirements of this Annex which endangers flight safety.

ML.UAS.802 Certification of UA component maintenance

(a) When completed, the maintenance carried out on an UA component shall be certified by a certifying staff except for the cases covered by point ML.UAS.502(c). The certification shall be issued when the certifying staff has verified that all the maintenance that was ordered has been properly carried out taking into account the availability and use of the maintenance data specified in point ML.UAS.401 and that the component is in a satisfactory condition.

(b) That certification shall be established on an EASA Form 1, as set out in Appendix II to Annex I (Part-M) to Regulation (EU) No 1321/2014, except when such maintenance is certified together with UA maintenance, as indicated in points ML.UAS.502(a) and (b).

(c) The EASA Form 1 referred to in point (b) shall be filled in according to the instructions provided in Appendix III to this Annex. It may be generated from a computer database.

ML.UAS.803 Certification of CU maintenance

(a) When completed, the maintenance carried out on the CU in respect of features and functions specific to and essential for the UA operation as determined by the design approval holder shall be certified on a CRS by a certifying staff. The CRS shall be issued when that certifying staff has verified that all the maintenance that was ordered has been properly carried out taking into account the availability and use of the maintenance data specified in point ML.UAS.401.

(b) A CRS shall contain at least the following:

(1) basic details of the CU maintenance carried out;

(2) the date on which the CU maintenance was completed;

(3) the approval reference of the maintenance organisation and certifying staff issuing the CRS;

(4) the limitations to airworthiness or operations, if any.

(g) A CRS shall not be issued in the case of any known non-compliance with the requirements of this Annex which endangers flight safety.

ML.UAS.804 Certification of CU component maintenance

(a) When completed, the maintenance carried out on a CU component in accordance with point ML.UAS.520(d) shall be certified by a certifying staff. The certification shall be issued when the certifying staff has verified that all the maintenance that was ordered has been properly carried out taking into account the availability and use of the maintenance data specified in point ML.UAS.401 and that the component is in a satisfactory condition.

(b) That certification shall be established on an EASA Form 1, as set out in Appendix II to Annex I (Part-M) to Regulation (EU) No 1321/2014, except when such maintenance is certified together with CU maintenance, as indicated in point ML.UAS.520(f).

(c) The EASA Form 1 referred to in point (b) shall be filled in according to the instructions provided in Appendix III to this Annex. It may be generated from a computer database.

ML.UAS.805 Certification of CU installation

(a) When completed, the installation of the CU shall be certified on a 'certificate of release to service' (CRS) by a certifying staff. The CRS shall be issued when that certifying staff has verified that all the current applicable installation and testing instructions issued by the design approval holder have been properly complied with, taking into account the CU component installation requirements laid down in point ML.UAS.520.

(b) A CRS shall include:

(1) a reference to the CU installation instructions;

(2) the date on which the CU installation was completed;

(3) the approval reference of the maintenance organisation and certifying staff issuing the CRS;

(4) the limitations to airworthiness or operations, if any.

(c) A CRS shall not be issued in the case of any known non-compliance with the requirements of this Annex which endangers flight safety.

SUBPART I — AIRWORTHINESS REVIEW CERTIFICATE (ARC)

ML.UAS.901 Airworthiness review of the UA

To ensure the validity of the UA airworthiness certificate, an airworthiness review of the UA and its continuing airworthiness records shall be carried out periodically.

(a) An ARC is issued in accordance with Appendix II (EASA Form 15d) to this Annex upon completion of a satisfactory airworthiness review. The ARC shall be valid for 1 year.

(b) The airworthiness review and the issue of the ARC shall be performed in accordance with point ML.UAS.903, alternatively by:

(1) the competent authority;

(2) any Part-CAO.UAS organisation approved to conduct the airworthiness review of such UA.

Whenever circumstances reveal the existence of a potential safety threat, the competent authority shall carry out the airworthiness review and issue the ARC itself.

(c) The validity of an ARC may be extended maximum two consecutive times, for a period of 1 year each time, by the Part-CAO.UAS organisation that manages the continuing airworthiness of the UAS, subject to the following conditions:

(1) the UA has been continuously managed by one or several Part-CAO.UAS organisations since the last issue or extension of the ARC;

(2) the UAS has been maintained for the previous 12 months by approved Part-CAO.UAS maintenance organisations;

(3) the Part-CAO.UAS organisation does not have any evidence or reason to believe that the UAS is not airworthy.

The extension of the ARC by a Part-CAO.UAS organisation is possible regardless of which staff or organisation, as provided for in point (b), has initially issued the ARC.

(d) By way of derogation from point (c), the extension of the ARC may be anticipated for a maximum period of 30 days, without losing the continuity of the airworthiness review pattern, to ensure the availability of the UA in order to place the original ARC on board.

(e) When the competent authority carries out the airworthiness review and issues the ARC itself, the UAS owner shall provide the competent authority with:

(1) the documentation required by the competent authority;

(2) suitable accommodation at the appropriate location for its staff;

(3) when necessary, the support of appropriate certifying staff.

ML.UAS.902 Validity of the UA airworthiness review certificate (ARC)

(a) An ARC becomes invalid if, alternatively:

(1) it is suspended or revoked;

(2) the airworthiness certificate is suspended or revoked;

(3) the UA is not in the aircraft register of a Member State;

(4) the type certificate under which the airworthiness certificate was issued is suspended or revoked.

(b) An UA shall not fly if the ARC is invalid, or if any of the following circumstances are present:

(1) the continuing airworthiness of the UA, the CU or any component fitted to the UAS does not meet the requirements of this Annex;

(2) the UA is intended to be operated with a CU that is subject to an open finding identified in respect of point ML.UAS.903(c);

(3) the UAS does not remain in conformity with the type design approved by the Agency;

(4) the UA has been operated beyond the limitations of the approved flight manual or airworthiness certificate, without appropriate action being taken;

(5) the UA has been involved in an accident or incident that affects its airworthiness, without subsequent appropriate action taken to restore its airworthiness;

(6) a modification or repair to the UAS or any component fitted to the UAS does not comply with Annex I (Part 21) to Regulation (EU) No 748/2012.

(c) Upon surrender or revocation, the ARC shall be returned to the competent authority.

ML.UAS.903 Airworthiness review process

(a) To satisfy the requirement for the airworthiness review of an UA referred to in point ML.UAS.901, the airworthiness review staff shall perform a documented review of the UA records to verify that:

(1) the airframe, the engine and the propeller flying hours and associated flight cycles have been properly recorded;

(2) the flight manual is applicable to the UA configuration and reflects the latest revision status;

(3) all the maintenance due on the UA according to the UAS maintenance programme has been carried out;

(4) all known defects have been corrected or deferred in a controlled manner;

(5) all applicable ADs have been applied and properly recorded;

(6) all modifications and repairs made to the UA have been registered and comply with Annex I (Part 21) to Regulation (EU) No 748/2012;

(7) all components that are subject to an airworthiness limitation and are installed on the UAS are properly identified, registered, and have not exceeded their approved airworthiness limitation;

(8) all maintenance has been certified in accordance with this Annex;

(9) the current mass-and-balance statement reflects the configuration of the UA and is valid;

(10) the UA complies with the current applicable revision of its type design approved by the Agency;

(11) if applicable, the UA has been issued with a noise certificate in compliance with Subpart I of Annex I (Part 21) to Regulation (EU) No 748/2012, corresponding to the current configuration of the UA.

(b) The airworthiness review staff referred to in point (a) shall carry out a physical survey of the UA. For this survey, airworthiness review staff not appropriately authorised as certifying staff shall be assisted by such qualified personnel.

(c) In respect of the CU(s) used to operate the UA, the airworthiness review staff referred to in point (a) shall ensure that a documented review of the CU records and a physical inspection of the CU(s) have been carried out satisfactorily in the last 3 months.

(d) Through the physical survey of the UA and the inspection of the CU, the airworthiness review staff shall ensure that:

(1) all required markings and placards are properly installed;

(2) the UA complies with its approved flight manual;

(3) the UAS configuration complies with the approved documentation;

(4) no evident defect can be found that has not been addressed according to point ML.UAS.403;

(5) no inconsistencies can be found between the UAS and the documented review of records as referred to in point (a).

(e) By way of derogation from point ML.UAS.901(a), the airworthiness review may be anticipated for a maximum period of 90 days, without losing the continuity of the airworthiness review pattern, so as to allow the physical review to take place during a maintenance check.

(f) The ARC (EASA Form 15d) set out in Appendix IV shall only be issued:

(1) by appropriately authorised airworthiness review staff;

(2) when the airworthiness review has been completely carried out, all findings have been closed;

(3) when any discrepancy found in the UAS maintenance programme in accordance with point (h) has been satisfactorily addressed.

(g) A copy of any ARC issued or extended for an UA shall be sent to the Member State of Registry of the particular UA within 10 days.

(h) Airworthiness review tasks shall not be subcontracted.

(i) The effectiveness of the UAS maintenance programme may be reviewed in conjunction with the airworthiness review in accordance with point ML.UAS.302(e). This review shall be completed by the person that has performed the airworthiness review. If the review shows deficiencies of the UA linked with deficiencies in the content of the UAS maintenance programme, the UAS maintenance programme shall be amended accordingly.

ML.UAS.904 Qualification of airworthiness review staff

(a) Airworthiness review staff that act on behalf of the competent authority shall be qualified in accordance with point AR.UAS.CAW.902 of Annex I (Part-AR.UAS) to Implementing Regulation (EU) …/….

(b) Airworthiness review staff that act on behalf of a Part-CAO.UAS organisation shall be qualified in accordance with Annex II (Part-CAO.UAS).

ML.UAS.905 Transfer of an UA registration within the Union

(a) When transferring an UA registration within the Union, the applicant shall:

(1) firstly, provide the former Member State of Registry with the name of the Member State in which the aircraft will be registered;

(2) subsequently, apply to the new Member State of Registry for the issue of a new airworthiness certificate in accordance with Annex I (Part 21) to Regulation (EU) No 748/2012.

(b) Notwithstanding point (a)(3) of point ML.UAS.902, the former ARC shall remain valid until its expiry date.

(c) Notwithstanding points (a) and (b), in those cases where the UAS has been in a non-airworthy condition in the former Member State or where the airworthiness status of the UAS cannot be determined using the existing records, point ML.UAS.906 shall apply.

ML.UAS.906A Airworthiness review of UA imported into the Union

(a) When importing an UAS into a Member State's register from a third country or from a regulatory system where Regulation (EU) 2018/1139 does not apply, the applicant shall:

(1) apply to the competent authority of the Member State of Registry for the issue of a new airworthiness certificate in accordance with Annex I (Part 21) to Regulation (EU) No 748/2012;

(2) for UA other than new, have an airworthiness review carried out satisfactorily in accordance with point ML.UAS.901;

(3) have all maintenance carried out to comply with the approved UAS maintenance programme.

(b) If the UA complies with the relevant requirements, the competent authority or the organisation performing the airworthiness review, as provided for in point ML.UAS.901(b), shall issue an ARC and shall submit a copy to the competent authority of the Member State of Registry.

(c) The owner shall allow access to the UAS for inspection by the competent authority of the Member State of Registry.

(d) A new airworthiness certificate shall be issued by the competent authority of the Member State of Registry provided the UA complies with Annex I (Part 21) to Regulation (EU) No 748/2012.

ML.UAS.906B Airworthiness review following changes in UAS operations

(a) If changes in the UAS operations in the 'specific category' result in the need to issue an airworthiness certificate in accordance with Article 7(2) of Implementing Regulation (EU) 2019/947, the owner of the UAS shall:

(1) apply to the competent authority of the Member State of Registry for the issue of an airworthiness certificate in accordance with Annex I (Part 21) to Regulation (EU) No 748/2012;

(2) have an airworthiness review carried out satisfactorily in accordance with point ML.UAS.901;

(3) have all maintenance carried out to comply with the approved UAS maintenance programme.

(b) If the UA complies with the relevant requirements, the competent authority or the organisation performing the airworthiness review, as provided for in point ML.UAS.901(b), shall issue an ARC and shall submit a copy to the competent authority of the Member State of Registry.

(c) The owner shall allow access to the UAS for inspection by the competent authority of the Member State of registry.

(d) The airworthiness certificate shall be issued by the competent authority of the Member State of Registry provided the UA complies with Annex I (Part 21) to Regulation (EU) No 748/2012.

ML.UAS.907 Findings

Following receipt of the notification of findings from the competent authority in accordance with point AR.UAS.GEN.351 of Annex I (Part-AR.UAS) to Implementing Regulation (EU) …/…, the person or organisation responsible for the aircraft continuing airworthiness pursuant to point ML.UAS.201 shall define and demonstrate to the competent authority within a period agreed with the particular authority a corrective action plan to prevent the reoccurrence of the finding and eliminate or mitigate its root cause.

APPENDICES TO ANNEX I (PART-ML.UAS)

Appendix I — Continuing airworthiness management contract

(a) When an owner contracts in accordance with point ML.UAS.201 a Part-CAO.UAS organisation to carry out continuing airworthiness management tasks, upon request by the competent authority, a copy of the contract, signed by both parties, shall be sent by the owner to the competent authority of the Member State of Registry.

(b) The contract shall be developed taking into account the requirements of this Annex and shall define the obligations of the signatories in relation to the continuing airworthiness of the UAS.

(c) It shall contain, as a minimum, the following information:

(1) the UA registration, type and serial number, and the details of the CU;

(2) the aircraft owner's or registered lessee's name or company details, including the address;

(3) details of the contracted Part-CAO.UAS organisation, including the address;

(4) the type of operation.

(d) It shall state the following:

'The owner entrusts the Part-CAO.UAS organisation with the management of the continuing airworthiness of the UAS, the development and approval of the UAS maintenance programme, and the organisation of the maintenance of the UAS according to that UAS maintenance programme.

According to the present contract, both signatories undertake to discharge the respective obligations laid down in this contract.

The owner declares, to the best of its knowledge, that all the information given to the Part-CAO.UAS organisation concerning the continuing airworthiness of the UAS is and will be accurate, and that the UAS will not be repaired or modified without the prior agreement of the Part-CAO.UAS organisation.

In case of any non-conformity with this contract, by either of the signatories, the contract will be cancelled. In such a case, the owner will retain full responsibility for every task linked to the continuing airworthiness of the UAS, and the owner will inform the competent authoritie(s) of the Member State of Registry within 2 weeks about the cancellation of the contract.'

(e) When an owner contracts a Part-CAO.UAS organisation in accordance with point ML.UAS.201, the obligations of each party shall be established as follows:

(1) **Obligations of the Part-CAO.UAS organisation:**

(i) have the UA type included in its scope of work;

(ii) respect all the conditions listed below with regard to managing the continuing airworthiness of the UAS:

(A) develop and approve the UAS maintenance programme;

(B) once it has been approved, provide the owner with a copy of the UAS maintenance programme, and also a copy of the justifications for any deviations from the design approval holder's (DAH) recommendations;

(C) establish and order the necessary maintenance to ensure appropriate bridging with the former UAS maintenance programme;

(D) organise that all maintenance be carried out by an approved maintenance organisation;

(E) organise that all applicable ADs be applied;

(F) organise that all defects discovered during maintenance, airworthiness reviews or reported by the owner be corrected by an approved maintenance organisation or, if permitted, by independent certifying staff;

(G) coordinate scheduled maintenance, the application of ADs, the maintenance of components subject to airworthiness limitations, and component inspection requirements;

(H) inform the owner each time the UAS is to be brought to an approved maintenance organisation;

(I) manage and archive all UAS continuing airworthiness records;

(iii) organise the approval of any modification to the UAS in accordance with Annex I (Part 21) to Regulation (EU) No 748/2012 before the particular modification is embodied;

(iv) organise the approval of any repair to the UAS in accordance with Annex I (Part 21) to Regulation (EU) No 748/2012 before the particular repair is carried out;

(v) inform the competent authority of the Member State of Registry whenever the UAS is not presented by the owner for maintenance as requested by the contracted Part-CAO.UAS organisation;

(vi) inform the competent authority of the Member State of Registry whenever the contract has not been respected;

(vii) ensure that the airworthiness review of the UA is carried out, when necessary, and ensure that the ARC is issued;

(viii) send within 10 days a copy of any ARC issued or extended to the competent authority of the Member State of Registry;

(ix) carry out all occurrence reporting mandated by applicable regulations;

(x) inform the competent authority of the Member State of Registry whenever the contract is denounced by either party.

(2) **Obligations of the owner:**

(i) have a general understanding of the UAS maintenance programme;

(ii) have a general understanding of this Annex;

(iii) present the UAS for maintenance as directed by the contracted Part-CAO.UAS organisation;

(iv) not modify the UA without first consulting the contracted Part-CAO.UAS organisation;

(v) inform the contracted Part-CAO.UAS organisation of all maintenance exceptionally carried out without the knowledge and control of the contracted Part-CAO.UAS organisation;

(vi) report to the contracted Part-CAO.UAS organisation through the logbook all defects found during operations;

(vii) inform the competent authority of the Member State of Registry whenever the contract is denounced by either party;

(viii) inform the competent authority of the Member State of Registry and the contracted Part-CAO.UAS organisation whenever the aircraft is sold;

(ix) carry out all occurrence reporting mandated by applicable regulations;

(x) inform on a regular basis the contracted Part-CAO.UAS organisation about the aircraft flying hours and any other utilisation data, as agreed with the contracted Part-CAO.UAS organisation;

(xi) inform the Part-CAO.UAS organisation of any non-compliance with operational requirements that may affect the continuing airworthiness of the UAS;

(xii) inform the Part-CAO.UAS organisation of any operational requirement (e.g. specific approvals) necessary to be fulfilled in order to maintain the aircraft in the required configuration.

Appendix II — Airworthiness review certificate (EASA Form 15d)

AIRWORTHINESS REVIEW CERTIFICATE (ARC)

(for unmanned aircraft (UA) that comply with Part-ML.UAS)

ARC reference: ……..

Pursuant to Regulation (EU) 2018/1139 of the European Parliament and of the Council:

[NAME OF THE COMPETENT AUTHORITY]

hereby certifies that:

☐ … it has performed an airworthiness review in accordance with Annex I (Part-ML.UAS) to Commission Delegated Regulation (EU) …/…, of the following UA:

[or]

☐ … the following new UA:

UA manufacturer: …… UA manufacturer designation: ……

UA registration: ……UA serial number: ……

and is considered airworthy at the time of the review.

Date of issue: ..... Expiry date: ……

Airframe flight hours (FH) on the date of the review (*): ……

Signed: ..... Authorisation No (if applicable): ……..

[OR]

[NAME OF APPROVED ORGANISATION, ADDRESS and APPROVAL REFERENCE] (**)

hereby certifies that it has performed an airworthiness review in accordance with Annex I (Part-ML.UAS) to Commission Delegated Regulation (EU) …/…, of the following UA:

UA manufacturer: ……UA manufacturer designation: ……..

UA registration: ……UA serial number: ……

and is considered airworthy at the time of the review.

Date of issue: ..... Expiry date: ……

Airframe flight hours (FH) on the date of the review (*): ……..

Signed: ..... Authorisation No (if applicable): ……..

==========

First extension: The UA complies with the conditions of point ML.UAS.901(c) of Annex II (Part-ML.UAS) to Commission Delegated Regulation (EU) …/….

Date of issue: ..... Expiry date: ……

Airframe flight hours (FH) on the date of the issue (*): ……

Signed: ..... Authorisation No: .....

Company name: ..... Approval reference: .....

==========

Second extension: The UA complies with the conditions of point ML.UAS.901(c) of Annex II (Part-ML.UAS) to Commission Delegated Regulation (EU) .../....

Date of issue: ..... Expiry date: .....

Airframe flight hours (FH) on the date of issue (*): .....

Signed: ..... Authorisation No: .....

Company name: ..... Approval reference: .....

(*) Except for balloons and airships.

(**) The issuer of the form may tailor it to their needs by deleting the name, the certifying statement, the reference to the subject aircraft and the issuance details that are not relevant for their use.

EASA Form 15d — Issue 1

Appendix III — EASA Form 1 fill-in instructions

These instructions relate only to the use, for UAS maintenance purposes, of the EASA Form 1 as specified in Appendix II to Annex I (Part-M) to Regulation (EU) No 1321/2014.

Attention is drawn to the instructions specified in Appendix II to Annex I (Part-M) to Regulation (EU) No 1321/2014 which covers the use of the EASA Form 1 for maintenance purposes in manned aviation, and the instructions specified in Appendix I to Annex I (Part 21) to Regulation (EU) No 748/2012 which covers the use of the EASA Form 1 for production purposes.

1. PURPOSE AND USE

1.1. The primary purpose of the certificate is to declare the airworthiness of the maintenance work undertaken on UAS components (hereafter referred to as 'item(s)').

1.2. Correlation must be established between the certificate and the item(s). The originator must retain the certificate in a form that allows the verification of the original data.

1.3. The certificate is acceptable to many airworthiness authorities, but may be dependent on the existence of bilateral agreements and/or the policy of a particular airworthiness authority. The 'approved design data' mentioned in this certificate means it is approved by the airworthiness authority of the importing country.

1.4. The certificate is not a delivery or shipping note.

1.5. UA are not to be released using the certificate.

1.6. The certificate does not constitute approval to install the item(s) but helps the end user determine its airworthiness approval status.

1.7. A mixture of production- and maintenance-released items is not permitted with the same certificate.

2. GENERAL FORMAT

2.1. The certificate must comply with the defined format, including block numbers, and the location of each block. The size of each block may, however, be amended to suit the individual application, but not to the extent that would render the certificate unrecognisable.

2.2. The certificate must be in 'landscape' orientation, but the overall size may be significantly increased or decreased as long as the certificate remains recognisable and legible. If in doubt, please consult your competent authority.

2.3. The user/installer responsibility statement can be placed on either side of the form.

2.4. All printing must be clear and legible to allow easy reading.

2.5. The certificate may either be pre-printed or computer generated, but in either case the printing of lines and characters must be clear and legible and in accordance with the defined format.

2.6. The certificate should be in English and, if appropriate, in one or more other languages.

2.7. The details to be entered on the certificate may be either machine/computer printed or handwritten, using capital letters and must allow easy reading.

2.8. Limit the use of abbreviations to a minimum, to aid clarity.

2.9. The space remaining on the reverse side of the certificate may be used by the originator for any additional information, but must not include any certification statement. Any use of the reverse side of the certificate must be referenced in the appropriate block on the front side of the certificate.

3. COPIES

3.1. There is no restriction on the number of copies of the certificate sent to the customer or retained by the originator.

4. ERROR(S) ON A CERTIFICATE

4.1. If an end user finds an error(s) on a certificate, the end user must inform in writing the originator. The originator may issue a new certificate only if the error(s) can be verified and corrected.

4.2. The new certificate must have a new tracking number, signature, and date.

4.3. The request for a new certificate may be honoured without reverification of the item's (items') condition. The new certificate is not a statement of the current condition and should refer to the previous certificate in Block 12 with the following statement: 'This certificate corrects the error(s) in Block(s) [enter block(s) corrected] of the certificate [enter original tracking number] dated [enter original issue date] and does not cover conformity/condition/release to service.'

Both certificates should be retained according to the retention period associated to the first certificate.

5. COMPLETION OF THE CERTIFICATE BY THE ORIGINATOR

Block 1: Approving competent authority / country

State the name and the country of the competent authority under whose jurisdiction this certificate is issued. When the competent authority is the Agency, only 'EASA' must be stated.

Block 2: EASA Form 1 header

'AUTHORISED RELEASE CERTIFICATE

EASA FORM 1'

Block 3: Form Tracking Number

Enter the unique number established by the numbering system/procedure of the organisation identified in Block 4; this may include alphanumeric characters.

Block 4: Organisation Name and Address

Enter the full name and address of the approved organisation that releases the work covered by this certificate. Logos, etc., are permitted if the logo can be contained within the block.

Block 5: Work Order / Contract / Invoice

To facilitate customer traceability of the item(s), enter the work order number, contract number, invoice number, or similar reference number.

Block 6: Item

Enter line item numbers when there is more than one line item. This block allows easy cross-referencing to the *Remarks* in Block 12.

Block 7: Description

Enter the name or description of the item. Preference should be given to the term used in the instructions for continued airworthiness (ICAs) or maintenance data (e.g. illustrated parts catalogue, aircraft maintenance manual, service bulletin, component maintenance manual).

Block 8: Part Number

Enter the part number as it appears on the item or tag/packaging. In case of an engine or propeller, the type designation may be used.

Block 9: Quantity

State the quantity of items.

Block 10: Serial Number

If the item is required by applicable regulations to be identified with a serial number, enter it here. Additionally, any other serial number not required by applicable regulations may also be entered. If there is no serial number identified on the item, enter 'N/A'.

Block 11: Status/Work

The following describes the permissible entries for Block 11. Enter only one of these terms — where more than one may be applicable, use the one that most accurately describes the majority of the work performed and/or the status of the article.

(i)	Overhauled	Means a process that ensures the item is in complete conformity with all the applicable service tolerances specified in the maintenance data. The item will be at least disassembled, cleaned, inspected, repaired as necessary, reassembled and tested in accordance with the data specified above.
(ii)	Repaired	Rectification of defect(s) using an applicable standard ([1]).
(iii)	Inspected/Tested	Examination, measurement, etc., in accordance with an applicable standard ([1]) (e.g. visual inspection, functional testing, bench testing etc.).
(iv)	Modified	Alteration of an item to conform to an applicable standard ([1]).

Block 12: Remarks

Describe the work identified in Block 11, either directly or by reference to supporting documentation, necessary for the user or installer to determine the airworthiness status of the item(s) in relation to the work being certified. If necessary, a separate sheet may be used and referenced from the main EASA Form 1. Each statement must clearly identify which item(s) in Block 6 it relates to.

Examples of information to be entered in Block 12 are:

(i) maintenance data used, including revision status and reference,

(ii) compliance with airworthiness directives (ADs) or service bulletins (SBs),

(iii) repairs carried out,

(iv) modifications carried out,

(v) replacement parts installed,

(vi) status of life-limited parts,

(vii) deviations from the customer work order,

(viii) release statements other than those referred to in point 145.A.50 of Annex II (Part-145) to Regulation (EU) No 1321/2014,

(ix) information needed to support shipment with shortages or reassembly after delivery.

Include the following component CRS statement:

'Certifies that, unless otherwise specified in this block, the work identified in Block 11 and described in this block has been accomplished in accordance with the requirements of Annex II (Part-CAO.UAS) to Delegated Regulation (EU) …/…, and in respect to that work the item is considered ready for release to service.

THIS IS NOT A RELEASE UNDER ANNEX II (PART-145) TO REGULATION (EU) No 1321/2014.'

If printing the data from an electronic EASA Form 1, any appropriate data that is not fit for other blocks should be entered in this block.

Blocks 13a–13e

General requirements for Blocks 13a-13e: Not used for maintenance release. Shade, darken, or otherwise mark to preclude inadvertent or unauthorised use.

Block 14a

Tick the box 'other regulations specified in Block 12' and enter the Part-CAO.UAS CRS statement in Block 12. If the maintenance is also released by the organisation under Annex II (Part-145) to Regulation (EU) 1321/2014, tick also the box 'Part-145.A.50 Release to Service'.

If other regulations than Part-CAO.UAS and Part-145 are meant with the tick in the box 'other regulations', then these regulations must be identified in Block 12. At least one box must be marked, or both boxes may be marked, as appropriate.

The certification statement 'unless otherwise specified in this block' is intended to address the following cases:

(a) where maintenance could not be completed;

(b) where the accomplishment of the maintenance deviated from the relevant regulatory requirements;

(c) where maintenance has been carried out in accordance with a requirement other than those specified in Part-145 or in Part-CAO.UAS; in this case, Block 12 shall specify the particular regulation.

Block 14b: Authorised Signature

This block shall be completed with the signature of the authorised person. Only persons specifically authorised under the rules and policies of the competent authority are permitted to sign this block. To aid recognition, a unique number identifying the authorised person may be added.

Block 14c: Certificate/Approval Ref. No

Enter the certificate/approval number/reference. This number/reference is issued by the competent authority.

Block 14d: Name

Enter the name of the person that signs Block 14b in a legible form.

Block 14e: Date

Enter the date on which Block 14b is signed; the date must be in the format dd = 2-digit day, mmm = first 3 letters of the month, yyyy = 4-digit year

User/Installer Responsibilities

Place the following statement on the certificate to notify end users that they are not relieved of their responsibilities concerning the installation and use of any item accompanied by the form:

‘THIS CERTIFICATE DOES NOT AUTOMATICALLY CONSTITUTE AUTHORITY TO INSTALL.

WHERE THE USER/INSTALLER PERFORMS WORK IN ACCORDANCE WITH REGULATIONS OF AN AIRWORTHINESS AUTHORITY DIFFERENT THAN THE AIRWORTHINESS AUTHORITY SPECIFIED IN BLOCK 1, IT IS ESSENTIAL THAT THE USER/INSTALLER ENSURES THAT HIS/HER AIRWORTHINESS AUTHORITY ACCEPTS ITEMS FROM THE AIRWORTHINESS AUTHORITY SPECIFIED IN BLOCK 1.

STATEMENTS IN BLOCKS 13A AND 14A DO NOT CONSTITUTE INSTALLATION CERTIFICATION. IN ALL CASES AIRCRAFT MAINTENANCE RECORDS MUST CONTAIN AN INSTALLATION CERTIFICATION ISSUED IN ACCORDANCE WITH THE NATIONAL REGULATIONS BY THE USER/INSTALLER BEFORE THE AIRCRAFT MAY BE FLOWN.’

3.2.3. Draft Annex II (Part-CAO.UAS) to Commission Delegated Regulation (EU) …/…

ANNEX II

(PART-CAO.UAS)

CAO.UAS.1 General

For the purpose of this Annex:

(a) the competent authority shall be the authority specified in point AR.UAS.GEN.010(b) of Annex I (Part-AR.UAS) to Implementing Regulation (EU) …/…;

(b) 'owner' means the person that is accountable for the continuing airworthiness of the unmanned aircraft system (UAS), including, as applicable:

(1) the registered owner of the UAS;

(2) the lessee in the case of a leasing contract;

(3) the operator.

CAO.UAS.010 Scope

With respect to UAS operated in the 'specific category' of UAS operations as defined in Article 5 of Implementing Regulation (EU) 2019/947 and for which an airworthiness certificate has been issued to the UA in accordance with Article 7(2) of Regulation (EU) 2019/947, this Annex sets out the requirements to be met by an organisation to qualify for the issue or continuation of an approval certificate for the continuing airworthiness management or maintenance of the UAS and components, or a combination of these activities.

CAO.UAS.015 Application

The organisation shall apply for the issue of, or a change to, a Part-CAO.UAS approval to the competent authority in a form and manner established by that authority.

CAO.UAS.017 Means of compliance

(a) An organisation may use any alternative means of compliance to establish compliance with this Regulation.

(b) If an organisation wishes to use an alternative means of compliance, it shall, prior to using it, provide the competent authority with a full description. The description shall include any revisions to manuals or procedures that may be relevant, as well as an explanation indicating how compliance with this Regulation is achieved.

The organisation may use that alternative means of compliance subject to the prior approval by the competent authority.

CAO.UAS.020 Terms of approval and scope of work

(a) The organisation shall specify the scope of work in its organisation manual, as provided for in point CAO.UAS.025.

(b) For the maintenance of components that are different from complete engines, the scope of work shall be classified in accordance with the following ratings:

(1) C1: air conditioning and pressurisation;

(2) C2: auto flight;

(3) C3: communications and navigation;

(4) C4: doors and hatches;

(5) C5: electrical power and lights;

(6) C6: equipment;

(7) C7: engine;

(8) C8: flight controls;

(9) C9: fuel;

(10) C10: helicopter and rotors;

(11) C11: helicopter transmission;

(12) C12: hydraulic power;

(13) C13: indicating and recording system;

(14) C14: landing gear;

(15) C15: oxygen;

(16) C16: propellers;

(17) C17: pneumatic and vacuum systems;

(18) C18: protection from ice/rain/fire;

(19) C19: windows;

(20) C20: structural;

(21) C21: water ballast; and

(22) C22: propulsion augmentation.

(b) The organisation shall comply with the terms of approval attached to the organisation certificate issued by the competent authority, and with the scope of work specified in the organisation manual.

CAO.UAS.025 Organisation manual

(a) The organisation shall establish and maintain a manual that specifies the necessary information and procedures for the personnel of the organisation to perform their duties and for the organisation to show how it complies with this Regulation.

(b) The manual shall include directly or by reference the following information:

(1) a statement signed by the accountable manager confirming that the organisation will at all times work in accordance with the requirements of this Annex and the organisation manual;

(2) the detailed scope of work of the organisation for each privilege;

(3) an organisation chart identifying the title(s) and name(s) of the person(s) referred to in points (a), (b) and (c) of point CAO.UAS.035, and showing the lines of responsibility between these persons;

(4) a general description and location of the facilities,

and where applicable:

(5) scope and procedure for work performed at a location other than the approved facilities;

(6) a list of certifying staff with their scope of authorisation;

(7) a list of staff responsible for the approval of the UAS maintenance programme;

(8) a list of airworthiness review staff with their scope of authorisation;

(9) scope and procedure for maintenance on UA carried out and released remotely from the CU;

(c) The initial issue of the manual shall be approved by the competent authority.

(d) Amendments to the manual shall be handled in accordance with point CAO.UAS.105.

CAO.UAS.030 Facilities and storage

(a) The organisation shall ensure that the facility to be used, including office accommodation, allows it to carry out all the planned work.

(b) In addition, where the scope of approval of the organisation includes maintenance activities, the organisation shall ensure that:

(1) specialised workshops, hangars and bays provide adequate protection from contamination and the environment;

(2) secure storage facilities are provided for components, equipment, tools and materials, which ensure that unserviceable components and materials are segregated from all serviceable items.

(c) Relevant instructions for storage are complied with, and access to the storage facilities is restricted only to authorised personnel.

CAO.UAS.035 Personnel requirements

(a) The organisation shall appoint an accountable manager that has the authority to ensure that all activities of the organisation can be financed and carried out in accordance with this Regulation.

(b) The accountable manager shall nominate a person or group of persons with the responsibility to ensure that the continuing airworthiness activities are carried out in accordance with the organisation manual.

(c) The accountable manager shall nominate a compliance-monitoring manager with the responsibility to manage the compliance-monitoring function referred to in point CAO.UAS.100.

(d) The persons nominated in accordance with points CAO.UAS.035(b) and (c) shall have a responsibility to the accountable manager and direct access to him/her. They shall be able to demonstrate appropriate knowledge, background and experience to discharge their responsibilities.

(e) All personnel involved in continuing airworthiness tasks shall be authorised for the work intended to be carried out. The organisation shall ensure that:

(1) they have the appropriate knowledge, background and experience for their scope of authorisation;

(2) they receive a copy of that authorisation;

(3) they remain competent within their scope of authorisation.

(f) The organisation shall have sufficient and appropriately qualified staff to allow it carry out the planned work.

(g) The organisation shall establish an initial training for the maintenance staff to ensure they will carry out the intended maintenance safely.

(h) Personnel that carry out specialised tasks, such as welding, or non-destructive testing (NDT) inspection other than colour-contrast inspections shall be qualified in accordance with an officially recognised standard.

CAO.UAS.040 Certifying staff

(a) In order to sign a certificate of release to service after maintenance on UA, CU and components, or after CU installation, the organisation shall authorise relevant certifying staff.

(b) Certifying staff intended to release maintenance performed on UA and CU, or certify CU installation, shall receive an initial training relevant to the particular UA and CU to be stated in the authorisation. The organisation shall ensure that they have acquired a minimum of 3 months of practical maintenance experience with similar UA or CU before receiving their certification authorisation.

(c) The organisation shall ensure that certifying staff periodically receive sufficient and adequate recurrent training to ensure that they have up-to-date knowledge of relevant technologies, organisation procedures, and human factors issues.

CAO.UAS.045 Airworthiness review staff

(a) In order to carry out airworthiness reviews, the organisation shall authorise relevant airworthiness review staff that shall comply with all the following requirements:

(1) they have acquired at least 1 year of experience in continuing airworthiness;

(2) they are authorised as certifying staff or have acquired at least 2 years of experience in continuing airworthiness in addition to the experience referred to in point (1);

(3) they have received appropriate aeronautical-maintenance training.

(b) Before the organisation issues an airworthiness review staff authorisation to a candidate, that person shall perform an airworthiness review under the supervision of the competent authority or under the supervision of a person that is already authorised as airworthiness review staff by the organisation. If this airworthiness review under supervision is satisfactory, that person shall be authorised as airworthiness review staff by the compliance-monitoring manager.

CAO.UAS.050 Components, equipment and tools

(a) The organisation shall have, or have access to, equipment and tools that are adequate to discharge its responsibilities.

(b) The organisation shall ensure that the equipment and tools it uses are controlled and calibrated to an officially recognised standard. It shall keep records of such calibrations and the standards used.

(c) As regards maintenance, the organisation shall inspect, classify and appropriately segregate all incoming components received in accordance with points ML.UAS.501 and ML.UAS.504 of Annex I (Part-ML.UAS), as applicable.

CAO.UAS.055 Maintenance data and work orders

(a) The organisation shall have access to and use applicable current maintenance data which is necessary for the performance of maintenance.

(b) Maintenance data is specified in point ML.UAS.401(b) of Annex I (Part-ML.UAS).

(c) Before the commencement of maintenance, a written work order shall be agreed between the organisation and the person or organisation requesting the maintenance, in a manner that establishes the maintenance to be carried out.

CAO.UAS.060 Maintenance standards

(a) All maintenance shall be carried out in accordance with the requirements of Subparts D, E, F and H of Annex I (Part-ML.UAS).

(b) When performing maintenance, the organisation shall comply with the following requirements:

(1) ensure that the area where maintenance is carried out is well organised and clean (free of dirt or contaminants);

(2) use the methods, techniques, standards and instructions specified in the maintenance data and work orders referred to in point CAO.UAS.055;

(3) use the tools, equipment and materials specified in point CAO.UAS.050;

(4) ensure that maintenance is performed in accordance with any environmental limitations specified in the maintenance data referred to in point CAO.UAS.055;

(5) ensure that proper facilities are used in case of inclement weather or lengthy maintenance;

(6) ensure that the risk of errors during maintenance is minimised, in particular the risk of errors repeated in identical maintenance tasks;

(7) ensure that an error-capturing method is implemented after the performance of any critical maintenance task;

(8) perform a general verification after the completion of maintenance in order to ensure that the UA, CU or component is clear of all tools, equipment and any extraneous parts and materials, and that all access panels removed have been refitted.

CAO.UAS.065 Certification of UA maintenance

Upon completion of the maintenance carried out on an UA in accordance with this Regulation, the organisation shall certify such maintenance in accordance with point ML.UAS.801 of Annex I (Part-ML.UAS).

CAO.UAS.070 Certification of component maintenance

(a) Upon completion of the maintenance carried out on UA components in accordance with this Regulation, the organisation shall certify such maintenance in accordance with point ML.UAS.802 of Annex I (Part-ML.UAS).

(b) Upon completion of the maintenance carried out in accordance with this Regulation, on CU components referred to in point ML.UAS.520(d) of Annex I (Part-ML.UAS), the organisation shall certify such maintenance in accordance with point ML.UAS.804 of Annex I (Part-ML.UAS).

(c) Points (a) and (b) do not apply to components fabricated in accordance with point CAO.UAS.095(a)(5).

CAO.UAS.071 Certification of CU maintenance

Upon completion of the maintenance carried out on the CU in accordance with this Regulation, the organisation shall certify such maintenance in accordance with point ML.UAS.803 of Annex I (Part-ML.UAS).

CAO.UAS.075 Continuing airworthiness management

(a) All continuing airworthiness management shall be carried out in accordance with the requirements of Subpart C of Annex I (Part-ML.UAS).

(b) For every UAS managed, the organisation shall:

(1) develop and control the UAS maintenance programme, and approve the initial issue and its amendments;

(2) provide a copy of the UAS maintenance programme to the owner;

(3) ensure that modifications and repairs comply with point ML.UAS.304 of Annex I (Part-ML.UAS);

(4) ensure that all maintenance is released in accordance with Subpart H of Annex I (Part-ML.UAS);

(5) ensure that all applicable ADs and all operational requirements with a continuing airworthiness impact are implemented;

(6) ensure that all defects are rectified by an appropriately approved maintenance organisation;

(7) ensure that the UAS is made available for maintenance to an appropriately approved maintenance organisation, in accordance with the UAS maintenance programme and whenever necessary;

(8) coordinate the scheduled maintenance and the application of ADs in order to ensure the work is carried out properly;

(9) manage and archive all continuing airworthiness records;

(10) ensure that the mass-and-balance statement reflects the current status of the UA.

CAO.UAS.080 Continuing airworthiness management data

(a) The organisation shall have access to and use applicable current continuing airworthiness management data which is necessary for the performance of continuing airworthiness management tasks.

(b) This data is specified in point ML.UAS.401(b) of Annex I (Part-ML.UAS).

CAO.UAS.085 Airworthiness review

The organisation shall perform any airworthiness review in accordance with point ML.UAS.903 of Annex I (Part-ML.UAS).

CAO.UAS.090 Record-keeping

(a) The organisation shall retain the following records as applicable to the privileges held:

(1) Maintenance

Copy of the certificate of release to service (CRS) together with all supporting documents necessary to demonstrate that all maintenance requirements have been met; the organisation shall provide a copy of each CRS to the owner of the UAS, together with a copy of any specific repair or modification data used for the repairs or modifications carried out.

(2) CU installation

Copy of the CRS together with all supporting documents necessary to demonstrate that all installation requirements have been met; the organisation shall provide a copy of the CRS to the owner of the UAS, together with a copy of any specific installation data.

(3) Continuing airworthiness management

The records required by point ML.UAS.305 of Annex I (Part-ML.UAS).

(4) Airworthiness review

Copy of each airworthiness review certificate (ARC) issued or extended, together with all supporting documents.

(b) The organisation shall retain personnel records that are necessary to demonstrate the qualification of its staff as well as copies of their authorisations. It shall retain certifying staff and airworthiness staff records for a period of at least 2 years after the person has left the organisation, or after the authorisation issued to that person has been withdrawn.

(c) The organisation shall, upon staff request, grant them access to their personnel records as detailed in point (b) and a copy of these records upon leaving the organisation.

(d) The organisation shall retain the records:

(1) referred to in point (a)(1), and any associated maintenance data, for a period of 3 years from the date on which UA, CU or component maintenance has been released;

(2) referred to in point (a)(2) until 2 years after the CU has been permanently withdrawn from service;

(3) referred to in point (a)(3) for the period specified in point ML.UAS.305 of Annex I (Part-ML.UAS);

(4) referred to in point (a)(4) until 2 years after the UA has been permanently withdrawn from service.

(e) Compliance-monitoring records shall be kept for a minimum period of 2 years.

(f) All records shall be stored in a manner that ensures protection from damage, alteration, and theft.

(g) Where the continuing airworthiness management of an UAS is transferred to another organisation or person, all the records retained under points (a)(2) to (a)(4) shall be transferred to that organisation or person. If that transfer is made towards another Part-CAO.UAS organisation, point (d) shall apply to that organisation from the moment of the transfer.

(h) Where the organisation terminates its operation, all retained records shall be transferred as follows:

(1) the records referred to in point (a)(1) shall be transferred to the last owner or customer of the respective UAS or component, or shall be stored as specified by the competent authority;

(2) the records referred to in points (a)(2) to (a)(4) shall be transferred to the owner of the UAS.

CAO.UAS.095 Privileges of the organisation

In accordance with the organisation manual, the organisation shall be granted the following privileges:

(a) Maintenance

(1) Maintain UA, CU or components specified in the scope of work and at the locations specified in the organisation manual.

(2) Arrange for the performance of specialised services by a subcontracted organisation appropriately qualified under the control of the Part-CAO.UAS organisation, in accordance with the appropriate procedures set out in the organisation manual.

(3) Under the conditions specified in the procedure referred to in point CAO.UAS.025(b)(5), maintain UA, CU or components specified in the scope of work at a location not listed in the organisation manual.

(4) Issue certificates of release to service (CRS) upon completion of the maintenance in accordance with point CAO.UAS.065, CAO.UAS.070 or CAO.UAS.071.

(5) The organisation may fabricate, in conformity with maintenance data, a restricted range of parts for use in the course of undergoing maintenance work within its own facilities, as indicated in the organisation manual.

(b) Release of CU installation

An organisation approved for CU maintenance may carry out and certify the installation of the CU in accordance with point ML.UAS.805 of Annex I (Part-ML.UAS).

(c) Continuing airworthiness management

(1) Manage the continuing airworthiness of any UAS specified in the scope of work.

(2) Approve the UAS maintenance programme in accordance with point ML.UAS.302(b)(2) of Annex I (Part-ML.UAS).

(3) Arrange for the performance of limited continuing airworthiness tasks by a subcontracted organisation subject to the compliance-monitoring function of the Part-CAO.UAS organisation, as listed in the organisation certificate.

(4) Extend an ARC in accordance with point ML.UAS.901(c) of Annex I (Part-ML.UAS).

(d) Airworthiness review

An organisation whose approval includes the privileges referred to in point (a) or (b), may be approved to carry out airworthiness reviews in accordance with point CAO.UAS.085 and issue the related ARC.

(e) A Part-CAO.UAS organisation may be approved for one or more privileges.

CAO.UAS.100 Compliance monitoring and organisational review

(a) To ensure that the organisation continuously meets the requirements of this Regulation, the organisation shall establish a compliance-monitoring function.

(b) That function shall independently monitor:

(1) the compliance of the organisation manual with this Regulation;

(2) the compliance of the organisation's activities with the organisation manual.

(c) The organisation shall also ensure that all contracted maintenance tasks are carried out in accordance with the contract or work order.

(d) Provided that all the following conditions are met, the organisation may replace the compliance-monitoring function by regular organisational reviews not requiring independence:

(1) the organisation does not exceed 10 full-time equivalent staff involved in maintenance;

(2) the organisation does not exceed 5 full-time equivalent staff involved in continuing airworthiness management.

In that case, the organisation shall not subcontract continuing airworthiness management tasks to other parties.

CAO.UAS.102 Protection of software, data and hardware

(a) The organisation shall protect software, data and network connections used for continuing airworthiness activities.

(b) Without prejudice to point CAO.UAS.120, the organisation shall ensure that any information security incident or vulnerability, which may represent a significant risk to aviation safety, is reported to its competent authority.

In addition:

(1) when such an incident or vulnerability affects an aircraft or associated system or component, the organisation shall also report it to the design approval holder;

(2) when such an incident or vulnerability affects a system or constituent used by the organisation, the organisation shall report it to the organisation responsible for the design of the system or constituent.

(c) The reporting referred to in point (b) shall be made as soon as possible, but not exceeding 72 hours from the time the condition has been known to the organisation, unless exceptional circumstances prevent this.

CAO.UAS.105 Changes to the organisation

(a) The following changes to the organisation shall require prior approval by the competent authority:

(1) changes to the certificate, including the terms of approval of the organisation;

(2) changes of the persons referred to in points CAO.UAS.035(a) to (c);

(3) changes to the procedure set out in point (b).

(b) Any other changes shall be managed by the organisation and notified to the competent authority in accordance with a procedure provided for in the organisation manual. The organisation shall submit the description of the changes and the corresponding amendment of the organisation manual to the competent authority within 15 days from the day on which the change took place.

CAO.UAS.110 Continued validity of an approval certificate

(a) An approval certificate shall be issued for an unlimited duration and shall remain valid subject to compliance with all the following conditions:

(1) the organisation remains in compliance with the requirements of this Annex, taking into account the provisions of point CAO.UAS.115 related to the handling of findings;

(2) the organisation has ensured that access is granted to the competent authority as specified in point CAO.UAS.112;

(3) the approval certificate has not been surrendered by the organisation, or suspended or revoked by the competent authority;

(b) Upon surrender or revocation of the approval certificate by the competent authority, the organisation shall return the approval certificate to the competent authority without delay.

CAO.UAS.112 Access

For the purpose of verifying compliance with the relevant requirements of this Annex, the organisation shall ensure that access to any facility, aircraft, document, records, data, procedures or to any other material relevant to its activity subject to certification is granted to any person authorised by the competent authority.

CAO.UAS.115 Findings and observations

(a) After receiving a notification of a finding in accordance with point AR.UAS.GEN.350 of Annex I (Part-AR.UAS) to Implementing Regulation (EU) …/…, the organisation shall adopt a corrective

action plan and demonstrate to the satisfaction of the competent authority that it has taken the necessary corrections and corrective action to address the finding within the time period set by that authority.

(b) The observations received in accordance with point AR.UAS.GEN.350(f) of Annex I (Part-AR.UAS) to Implementing Regulation (EU) …/… shall be given due consideration by the organisation. The organisation shall record the decisions it has taken in respect of those observations.

CAO.UAS.120 Occurrence reporting

(a) The organisation shall establish and maintain an occurrence reporting system, including mandatory and voluntary reporting. Organisations that have their principal place of business in a Member State shall ensure that the occurrence reporting system complies with the requirements of Regulation (EU) No 376/2014 and Regulation (EU) 2018/1139, as well as with the delegated and implementing acts adopted on the basis of those Regulations.

(b) Without prejudice to Article 14(a) of Implementing Regulation (EU) 2019/947, the organisation shall report to its competent authority and to the design approval holder of the UAS or component any safety-related event or condition of an UAS or component identified by the organisation which endangers or, if not corrected or addressed, could endanger an UAS or any other person, and in particular any accident or serious incident.

(c) When the organisation is contracted for maintenance, the organisation shall also report any such event or condition that affects an UAS to the organisation responsible for the continuing airworthiness management of that UAS in accordance with point ML.UAS.201 of Annex I (Part-ML.UAS). For events or conditions that affect components, the organisation shall report to the person or organisation that requested the maintenance.

(d) When the organisation is contracted for continuing airworthiness management, the organisation shall also report any such event or condition that affects an UA to the owner that has contracted the Part-CAO.UAS organisation.

3.3. Draft Commission Implementing Regulation (EU) …/…

3.3.1. Draft cover regulation

COMMISSION IMPLEMENTING REGULATION (EU) …/… of […] laying down competent authority requirements and administrative procedures for the certification, oversight and enforcement of the continuing airworthiness of unmanned aircraft systems

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to 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[45], and in particular Article 17(1), point (g), Article 62(14) and (15) and Article 72(5) thereof,

Whereas:

[…]

HAS ADOPTED THIS REGULATION:

Article 1 Subject matter and scope

This Regulation establishes the requirements and administrative procedures to be fulfilled by the competent authority for the implementation and enforcement of Delegated Regulation (EU) …/….

Article 2 Definitions

For the purposes of this Regulation, the definitions in Regulation (EU) 2018/1139 apply.

In addition, the following definitions also apply:

(a) ‘unmanned aircraft system (UAS)’ means an unmanned aircraft (UA) and the equipment to remotely control it;

(b) ‘command unit (CU)’ means the equipment or items of equipment to control unmanned aircraft as defined in Article 3(32) of Regulation (EU) 2018/1139, which ensures the control or monitoring of the unmanned aircraft during any phase of flight; the command unit does not

[45] 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).

include any ground-, air- or space-based equipment or items of equipment supporting the command and control (C2) link service;

(c) 'component' means any engine, propeller, part, or any element of the CU;

(d) 'continuing airworthiness' means all of the processes ensuring that, at any time in its operating life, the UAS complies with the applicable airworthiness requirements and is in a condition for safe operation;

(e) 'maintenance' means any one or a combination of the following activities: overhaul, repair, inspection, replacement, modification or defect rectification of an UAS or component, with the exception of pre-flight inspection;

(f) 'organisation' means a natural person, a legal person or part of a legal person. Such an organisation may be established at more than one location whether or not within the territory of the Member States;

(g) 'pre-flight inspection' means the inspection carried out before flight to ensure that the UA is fit for the intended flight;

(h) 'principal place of business' means the head office or the registered office of the undertaking from which the principal financial functions and the operational control of the activities referred to in this Regulation are exercised.

Article 3 Competent authorities

1. A Member State shall designate one or more entities as the competent authority within its territory with the necessary powers and allocated responsibilities for the performance of certification, oversight and enforcement tasks in accordance with this Regulation and with Delegated Regulation (EU) …/….

The administration and management systems of the competent authority of a Member State and of the Agency shall comply with the requirements specified in Annex I to this Regulation.

1. When a Member State designates more than one entity as competent authority with the necessary powers and allocated responsibilities for the performance of certification, oversight and enforcement tasks in accordance with this Regulation and with Delegated Regulation (EU) …/…, the following requirements shall be complied with:

(a) the areas of competence of each entity shall be clearly defined, in particular in terms of responsibilities and geographic limitations;

(b) coordination shall be established between those entities in order to ensure the effective performance of certification, oversight and enforcement tasks within their respective areas of competence.

2. A Member State shall ensure that the personnel of its competent authority do not perform certification, oversight and enforcement activities when there are indications that this could result, directly or indirectly, in a conflict of interest, in particular when relating to family or financial interest.

3. When it is necessary to carry out certification, oversight or enforcement tasks under this Regulation, the competent authority shall be empowered to:

(a) examine the records, data, procedures, and any other material relevant to the execution of the certification, oversight or enforcement tasks;

(b) make copies or extracts from such records, data, procedures and other material;

(c) request an oral explanation on-site from any of the personnel of those organisations;

(d) access relevant premises, operating sites or means of transport;

(e) perform audits, investigations, assessments, inspections, including unannounced inspections, in respect of those organisations;

(f) take or initiate enforcement measures as appropriate.

4. The powers referred to in point 3 shall be exercised in compliance with the applicable legal provisions of the relevant Member State.

Article 4 Entry into force

This Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels, [date].

For the Commission
The President
Ursula VON DER LEYEN

3.3.2. Draft Annex I (Part-AR.UAS) to draft Commission Implementing Regulation (EU) …/…

ANNEX I (PART-AR.UAS)

SUBPART GEN — GENERAL REQUIREMENTS

AR.UAS.GEN.005 Scope

This Annex establishes the conditions for the performance of certification, oversight and enforcement tasks as well as the administrative and management system requirements to be followed by the competent authority that is responsible for the implementation and enforcement of Delegated Regulation (EU) …/….

AR.UAS.GEN.010 Competent authority

For the purpose of this Annex, the competent authority shall be:

(a) for the oversight of the continuing airworthiness of individual UA and the issue of airworthiness review certificates, 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.

(b) for the oversight of an organisation as specified in Delegated Regulation (EU) …/…:

(i) the authority designated by the Member State where that organisation's principal place of business is located, or by another Member State if the responsibility has been reallocated to that Member State in accordance with Article 64 of Regulation (EU) 2018/1139;

(ii) the Agency if the responsibility of the Member State where that organisation's principal place of business is located has been reallocated in accordance with Articles 64 or 65 of Regulation (EU) 2018/1139.

AR.UAS.GEN.115 Oversight documentation

The competent authority shall provide all the legislative acts, standards, rules, technical publications, and related documents to the relevant personnel in order to allow them to perform their tasks and to discharge their responsibilities.

AR.UAS.GEN.120 Means of compliance

(a) The Agency shall develop acceptable means of compliance (AMC) that may be used to establish compliance with Regulation (EU) 2018/1139 and its delegated and implementing acts.

(b) Alternative means of compliance may be used to establish compliance with this Regulation.

(c) Competent authorities shall inform the Agency of any alternative means of compliance used by organisations under their oversight or by themselves for establishing compliance with this Regulation.

AR.UAS.GEN.125 Information to the Agency

(a) The competent authority of a Member State shall notify the Agency in case of any significant problems with the implementation of Regulation (EU) 2018/1139 and its delegated and implementing acts within 30 days from the time the authority became aware of the problems.

(b) Without prejudice to Regulation (EU) No 376/2014[46] and its delegated and implementing acts, the competent authority shall provide the Agency as soon as possible with any safety-significant information stemming from the occurrence reports stored in the national database pursuant to Article 6(6) of Regulation (EU) No 376/2014.

(c) The competent authority of a Member State shall provide the Agency as soon as possible with safety-significant information stemming from information security reports it has received pursuant to point CAO.UAS.102(b) of Annex II (Part-CAO.UAS) to Delegated Regulation (EU) …/….

[46] Regulation (EU) No 376/2014 of the European Parliament and of the Council of 3 April 2014 on the reporting, analysis and follow-up of occurrences in civil aviation, amending Regulation (EU) No 996/2010 of the European Parliament and of the Council and repealing Directive 2003/42/EC of the European Parliament and of the Council and Commission Regulations (EC) No 1321/2007 and (EC) No 1330/2007 (OJ L 122, 24.4.2014, p. 18).

AR.UAS.GEN.135 Immediate reaction to a safety problem

(a) Without prejudice to Regulation (EU) No 376/2014 and its delegated and implementing acts, the competent authority shall implement a system to appropriately collect, analyse and disseminate safety information.

(b) The Agency shall implement a system to appropriately analyse any relevant safety information received and, without undue delay, provide the relevant authority of the Member States and the Commission with any information, including recommendations or corrective actions to be taken, that is necessary for them to react in a timely manner to a safety problem involving products, parts, appliances, persons or organisations that are subject to Regulation (EU) 2018/1139 and its delegated and implementing acts.

(c) Upon receiving the information referred to in points (a) and (b), the competent authority shall take adequate measures to address the safety problem.

(d) The competent authority shall immediately notify the measures taken under point (c) to all persons or organisations which need to comply with them under Regulation (EU) 2018/1139 and its delegated and implementing acts. The competent authority shall also notify those measures to the Agency and, when combined action is required, to the other Member States concerned.

AR.UAS.GEN.135A Immediate reaction to an information security incident or vulnerability with an impact on aviation safety

(a) Without prejudice to Regulation (EU) No 376/2014 and its delegated and implementing acts, the competent authority shall implement a system to appropriately collect, analyse, and disseminate information related to information security incidents and vulnerabilities with a potential impact on aviation safety reported by organisations. This shall be done in coordination with any other relevant authorities responsible for information security or cybersecurity within a Member State to increase the coordination and compatibility of reporting schemes.

(b) The Agency shall implement a system to appropriately analyse any relevant safety-significant information received in accordance with point AR.UAS.GEN.125(c), and without undue delay provide the Member States and the European Commission with any information, including recommendations or corrective actions to be taken, necessary for them to react in a timely manner to an information security incident or vulnerability with a potential impact on aviation safety, involving products, parts, non-installed equipment, persons or organisations subject to Regulation (EU) 2018/1139 and its delegated and implementing acts.

(c) Upon receiving the information referred to in points (a) and (b), the competent authority shall take adequate measures to address the potential impact of the information security incident or vulnerability on aviation safety.

(d) The measures taken in accordance with point (c) shall be immediately notified to all persons or organisations that need to comply with them pursuant to Regulation (EU) 2018/1139 and its delegated and implementing acts. The competent authority of a Member State shall also notify those measures to the Agency and, when combined action is required, to the competent authorities of the other Member States concerned.

AR.UAS.GEN.200 Management system

(a) The competent authority shall establish and maintain a management system, including as a minimum:

(1) documented policies and procedures to describe its organisation, the means and methods for establishing compliance with Regulation (EU) 2018/1139 and its delegated and implementing acts. The procedures shall be kept up to date, and serve as the basic working documents within that competent authority for all its related tasks;

(2) a sufficient number of personnel to perform its tasks and discharge its responsibilities. A system shall be in place to plan the availability of personnel in order to ensure the proper completion of all tasks;

(3) personnel that are qualified to perform their allocated tasks and have the necessary knowledge and experience, and receive initial and recurrent training to ensure continuing competency;

(4) adequate facilities and office accommodation for personnel to perform their allocated tasks;

(5) a function to monitor the compliance of the management system with the relevant requirements, and the adequacy of the procedures, including the establishment of an internal audit process and a safety risk management process; compliance-monitoring shall include a feedback system of audit findings to the senior management of the competent authority to ensure the implementation of corrective actions, as necessary;

(6) a person or group of persons having a responsibility to the senior management of the competent authority for the compliance-monitoring function.

(b) The competent authority shall, for each field of its activity, including the management system, appoint one or more persons with the overall responsibility for the management of the relevant task(s).

(c) The competent authority shall establish procedures for the participation in a mutual exchange of all necessary information and assistance with any other competent authorities concerned, whether from the same Member State or from other Member States, including on the following:

(1) all findings raised and any follow-up actions taken as a result of the oversight of persons and organisations that carry out activities in the territory of a Member State, but certified by the competent authority of another Member State or by the Agency;

(2) information stemming from mandatory and voluntary occurrence reporting as required by point CAO.UAS.120 of Annex II (Part-CAO.UAS) Delegated Regulation (EU) …/….

(d) A copy of the procedures related to the management system and their amendments shall be made available to the Agency for the purpose of standardisation.

(e) In addition to the requirements of point (a), the management system established and maintained by the competent authority shall comply with Annex I (Part-IS.AR) to Implementing Regulation (EU) …/… in order to ensure the proper management of information security risks which may have an impact on aviation safety.

AR.UAS.GEN.205 Allocation of tasks

(a) The competent authority may allocate tasks related to the initial certification or the continuing oversight of organisations that are subject to Regulation (EU) 2018/1139 and its delegated and

implementing acts to qualified entities. When allocating tasks, the competent authority shall ensure that it has:

(1) put a system in place to initially and continuously assess whether the qualified entity complies with Annex VI to Regulation (EU) 2018/1139; that system and the results of the assessments shall be documented;

(2) established a written agreement with the qualified entity, approved by both parties at the appropriate management level, which stipulates:

(i) the tasks to be performed;

(ii) the declarations, reports and records to be provided;

(iii) the technical conditions to be met when performing such tasks;

(iv) the related liability coverage;

(v) the protection of the information acquired when carrying out such tasks.

(b) The competent authority shall ensure that the internal audit process and safety risk management process established according to point AR.UAS.GEN.200(a)(5) cover all the certification and continuing oversight tasks performed by the qualified entity on its behalf.

(c) For the certification and oversight of the organisation's compliance with point CAO.UAS.102 of Annex II (Part-CAO.UAS) to Delegated Regulation (EU) …/…, the competent authority may allocate tasks to qualified entities in accordance with point (a), or to any relevant authority responsible for information security or cybersecurity within the Member State; when allocating tasks, the competent authority shall ensure that:

(1) all aspects related to aviation safety are coordinated and taken into account by the qualified entity or the relevant authority;

(2) the results of the certification and oversight activities performed by the qualified entity or the relevant authority are integrated in the overall certification and oversight files of the organisation;

(3) its own information security management system established in accordance with point AR.UAS.GEN.200(e) covers all the certification and continuing oversight tasks performed on its behalf.

AR.UAS.GEN.210 Changes in the management system

(a) The competent authority shall have a system in place to identify the changes that affect its capability to perform its tasks and discharge its responsibilities as defined in Regulation (EU) 2018/1139 and its delegated and implementing acts. That system shall enable the competent authority to take any action that is necessary to ensure that its management system remains adequate and effective.

(b) The competent authority shall update in a timely manner its management system to reflect any changes to Regulation (EU) 2018/1139 and its delegated and implementing acts so as to ensure its effective implementation.

(c) The competent authority shall notify the Agency of any changes that affect its capability to perform its tasks and discharge its responsibilities as provided for in Regulation (EU) 2018/1139 and its delegated and implementing acts.

AR.UAS.GEN.220 Record-keeping

(a) The competent authority shall establish a record-keeping system that allows the adequate storage, accessibility and reliable traceability of:

(1) the management system's documented policies and procedures;

(2) the training, qualifications and authorisations of its personnel;

(3) the allocation of tasks, covering the elements required by point AR.UAS.GEN.205, as well as the details of tasks allocated;

(4) certification processes and continuing oversight of certified organisations, including:

(i) the application for an organisation certificate;

(ii) the competent authority's continuing oversight programme, including all the assessments, audits and inspection records;

(iii) the organisation certificate, including any changes to it;

(iv) a copy of the oversight programme, listing the dates when audits are due and when audits were carried out;

(v) copies of all formal correspondence;

(vi) recommendations for the issue or continuation of a certificate, details of findings raised and actions taken by the organisations to close those findings, including the date of closure, exemptions, enforcement actions and observations;

(vii) any assessment, audit and inspection report issued by another competent authority pursuant to point AR.UAS.GEN.300(d);

(viii) copies of all the organisation's expositions or manuals, and of any amendments to them;

(ix) copies of any other documents approved by the competent authority;

(5) with respect to the UAS under the oversight of the competent authority, the UAS oversight process, including:

(1) the UA certificate of airworthiness;

(2) ARCs;

(3) reports from the airworthiness reviews carried out directly by the competent authority;

(4) all relevant correspondence relating to the UA;

(5) details of any exemption and enforcement action(s);

(6) any document approved by the competent authority pursuant to this Annex or Regulation (EU) No 965/2012.

(6) documents that support the use of alternative means of compliance;

(7) safety information provided in accordance with point AR.UAS.GEN.125 and follow-up measures;

(8) the use of safeguard and flexibility provisions in accordance with Articles 70, 71(1) and 76(4) of Regulation (EU) 2018/1139.

(b) The competent authority shall maintain a list of all the organisation certificates it has issued.

(c) All the records referred to in points (a) and (b) shall be kept for a minimum period of 5 years, subject to applicable data protection law, except for the records referred to in point (a)(5) which shall be retained for 2 years after the aircraft has been permanently withdrawn from service.

(d) All the records referred to in points (a) and (b) shall be made available, upon request, to the competent authority of another Member State or to the Agency.

AR.UAS.GEN.300 Oversight principles

(a) The competent authority shall verify:

(1) compliance with the requirements that are applicable to organisations or UAS prior to issuing a certificate, approval or authorisation, as applicable;

(2) continued compliance with the applicable requirements of the organisations it has certified;

(3) continued compliance with the requirements applicable to UAS under its oversight;

(4) the implementation of appropriate safety measures mandated by the competent authority in accordance with points AR.UAS.GEN.135(c) and (d).

(b) This verification shall:

(1) be supported by documentation specifically intended to provide personnel that are responsible for oversight with guidance to perform their functions;

(2) provide the organisations concerned with the results of oversight activities;

(3) be based on assessments, audits, inspections, surveys and, if needed, unannounced inspections;

(4) provide the competent authority with the evidence needed in case further action is required, including the measures provided for in point AR.UAS.GEN.350 and AR.UAS.GEN.351.

(c) The competent authority shall establish the scope of the oversight set out in points (a) and (b), taking into account the results of past oversight activities and the safety priorities.

(d) If the facilities of an organisation are located in more than one Member State, the competent authority, as defined in point AR.UAS.GEN.010, may agree to have the oversight tasks performed by the competent authority(ies) of the Member State(s) where the facilities are located. Any organisation that is subject to such an agreement shall be informed of its existence and of its scope.

(e) For any oversight activity performed at facilities located in a Member State other than the Member State where the organisation has its principal place of business, the competent authority, as defined in point AR.UAS.GEN.010, shall inform the competent authority of that Member State before performing any on-site audit or inspection of the facilities.

(f) The competent authority shall collect and process any information deemed necessary for performing oversight activities.

AR.UAS.GEN.305 Oversight programme — organisations

(a) The competent authority shall establish and maintain an oversight programme covering the oversight activities required by point AR.UAS.GEN.300.

(b) For organisations that are certified by the competent authority, the oversight programme shall take into account the specific nature of the organisation, the complexity of its activities, the results of past certification or oversight activities, or both, and it shall be based on the assessment of the associated risks. It shall include, within each oversight planning cycle:

(1) assessments, audits and inspections, including, as appropriate:

(i) management system assessments and process audits;

(ii) product audits of a relevant sample of the maintenance carried out by the organisation;

(iii) sampling of the airworthiness reviews performed;

(iv) unannounced inspections;

(2) meetings convened between the accountable manager and the competent authority to ensure that both parties remain informed about all significant issues.

(c) For organisations that are certified by the competent authority, the oversight planning cycle shall not exceed 24 months.

(d) Notwithstanding point (c), the oversight planning cycle may be extended to 36 months if the competent authority has established that during the previous 24 months:

(1) the organisation has demonstrated that it can effectively identify aviation safety hazards and manage the associated risks;

(2) the organisation has continuously demonstrated compliance with point CAO.UAS.105 of Annex II (Part-CAO.UAS) to Delegated Regulation (EU) …/… and it has full control over all changes;

(3) no level 1 findings have been issued;

(4) all corrective actions have been implemented within the time period that was accepted or extended by the competent authority as provided for in point AR.UAS.GEN.350.

Notwithstanding point (c), the oversight planning cycle may be further extended to a maximum of 48 months if, in addition to the conditions provided in points (d)(1) to (4), the organisation has established, and the competent authority has approved, an effective continuous system for reporting to the competent authority on the safety performance and regulatory compliance of the organisation itself.

(e) The oversight planning cycle may be shortened if there is evidence that the safety performance of the organisation has decreased.

(f) The oversight programme shall include records of the dates when assessments, audits, inspections and meetings are due, and when assessments, audits, inspections and meetings have been effectively carried out.

(g) Upon completion of each oversight planning cycle, the competent authority shall issue a recommendation report on the continuation of the approval, reflecting the results of the oversight.

AR.UAS.GEN.310 Initial certification procedure — organisations

(a) Upon receiving an application from an organisation for the initial issue of a certificate, the competent authority shall verify the organisation's compliance with the applicable requirements.

(b) A meeting with the accountable manager of the organisation shall be convened at least once during the investigation for initial certification to ensure that that person understands his or her role and accountability.

(c) The competent authority shall record all the findings issued, closure actions, as well as the recommendations for the issue of the certificate.

(d) The competent authority shall confirm to the organisation in writing all the findings raised during the verification. For initial certification, all findings must be corrected to the satisfaction of the competent authority before the certificate is issued.

(e) When satisfied that the organisation complies with the applicable requirements, the competent authority shall:

(1) issue the certificate in accordance with Appendix I to this Annex;

(2) formally approve the organisation manual.

(f) The certificate reference number shall be included on the organisation certificate in a manner specified by the Agency.

(g) The certificate shall be issued for an unlimited duration. The privileges and the scope of the activities that the organisation is approved to conduct, including any limitations as applicable, shall be specified in the terms of approval attached to the certificate.

(h) To enable the organisation to implement changes without prior competent authority approval in accordance with point CAO.UAS.105 of Annex II (Part-CAO.UAS) to Delegated Regulation (EU) …/…, the competent authority shall approve the relevant organisation manual procedure that sets out the scope of such changes and describes how such changes shall be managed and notified to the competent authority.

AR.UAS.GEN.330 Changes — organisations

(a) Upon receiving an application for a change that requires prior approval, the competent authority shall verify the organisation's compliance with the applicable requirements before issuing the approval.

(b) The competent authority shall establish the conditions under which the organisation may operate during the change unless the competent authority determines that the organisation certificate needs to be suspended.

(c) When it is satisfied that the organisation complies with the applicable requirements, the competent authority shall approve the change.

(d) Without prejudice to any additional enforcement measures, if the organisation implements changes requiring prior approval without having received the approval of the competent authority in accordance with point (c), the competent authority shall consider the need to suspend, limit or revoke the organisation certificate.

(e) For changes not requiring prior approval, the competent authority shall include the review of such changes in its continuing oversight in accordance with the principles set forth in point AR.UAS.GEN.300. If any non-compliance is found, the competent authority shall notify the organisation, request further changes to be made, and act in accordance with point AR.UAS.GEN.350.

AR.UAS.GEN.350 Findings, corrective actions and observations — organisations

(a) The competent authority shall have a system in place to analyse findings for their safety significance.

(b) A level 1 finding shall be issued by the competent authority when any significant non-compliance is detected with the applicable requirements of Regulation (EU) 2018/1139 and its delegated and implementing acts, with the organisation's procedures and manuals, or with the organisation certificate including the terms of approval, which lowers safety, or seriously endangers flight safety.

Level 1 findings shall also include:

(1) any failure to grant the competent authority access to the organisation's facilities referred to in point CAO.UAS.112 of Annex II (Part-CAO.UAS) to Delegated Regulation …/… during normal operating hours and after two written requests;

(2) obtaining the organisation certificate or maintaining its validity by falsification of the submitted documentary evidence;

(3) any evidence of malpractice or fraudulent use of the organisation certificate;

(4) the lack of an accountable manager.

(c) A level 2 finding shall be issued by the competent authority when any non-compliance is detected with the applicable requirements of Regulation (EU) 2018/1139 and its delegated and implementing acts, with the organisation's procedures and manuals, or with the organisation certificate including the terms of approval, which is not classified as a level 1 finding.

(d) When a finding is detected during oversight or by any other means, the competent authority shall, without prejudice to any additional action required by Regulation (EU) 2018/1139 and its delegated and implementing acts, communicate in writing the finding to the organisation and request corrective action to address the non-compliance identified. If a level 1 finding directly relates to an aircraft, the competent authority shall inform the competent authority of the Member State where the aircraft is registered.

(1) If there are any level 1 findings, the competent authority shall take immediate and appropriate action to prohibit or limit the activities of the organisation concerned and, if appropriate, it shall take action to revoke the certificate, or to limit or suspend it in whole or in part, depending on the extent of the level 1 finding, until successful corrective action has been taken by the organisation.

(2) If there are any level 2 findings, the competent authority shall:

(i) grant the organisation a corrective action implementation period that is appropriate to the nature of the finding, and that in any case shall initially not be longer than 3 months. The period shall commence from the date of the written communication of the finding to the organisation requesting corrective action to address the non-compliance identified. At the end of that period, and subject to the nature of the finding, the competent authority may extend the 3-month period provided a corrective action plan has been agreed with the competent authority;

(ii) assess the corrective action plan and implementation plan proposed by the organisation, and if the assessment concludes that they are sufficient to address the non-compliance, accept them.

(3) If the organisation fails to submit an acceptable corrective action plan, or fails to perform the corrective action within the time period initially accepted or further extended by the competent authority, the finding shall be raised to level 1 and action shall be taken as laid down in point (d)(1).

(4) The competent authority shall record all the findings it has raised or that have been communicated to it in accordance with point (e) and, where applicable, the enforcement measures it has applied, as well as all corrective actions and the dates of the action closure for all the findings.

(e) Without prejudice to any additional enforcement measures, when an authority performing the oversight tasks pursuant to point AR.UAS.GEN.300(d) identifies any non-compliance with the applicable requirements of Regulation (EU) 2018/1139 and its delegated and implementing acts by an organisation certified by the competent authority of another Member State or the Agency, it shall inform that competent authority and provide an indication of the level of the finding.

(f) The competent authority may issue observations for any of the following cases that do not require level 1 or level 2 findings:

(1) for any item whose performance has been assessed to be ineffective;

(2) when it has been identified that an item has the potential to cause a non-compliance under points (b) or (c);

(3) when suggestions or improvements are of interest to the overall safety performance of the organisation.

The observations issued under this point shall be communicated in writing to the organisation and recorded by the competent authority.

AR.UAS.GEN.351 Findings and corrective actions — UAS

(a) The competent authority shall have a system in place to analyse findings for their safety significance.

(b) A level 1 finding is any finding of significant non-compliance of the UAS with the requirements of Annex I (Part-ML) to Delegated Regulation (EU) …/…, which lowers safety or seriously endangers flight safety.

(c) A level 2 finding is any finding of non-compliance of the UAS with the requirements of Annex I (Part-ML) to Delegated Regulation (EU) …/…, which is not classified as a level 1 finding.

(d) If during aircraft surveys or by other means evidence is found that shows non-compliance of the UAS with the requirements of Annex I (Part-ML.UAS) to Delegated Regulation (EU) …/…, the competent authority shall:

(1) for level 1 findings, require appropriate corrective action to be taken before further flight, and immediately revoke or suspend the ARC; and

(2) for level 2 findings, impose the corrective action appropriate to the nature of the finding.

AR.UAS.GEN.355 Suspension, limitation and revocation of a certificate

The competent authority shall:

(a) suspend a certificate when it considers that there are reasonable grounds that such action is necessary to prevent a credible threat to aircraft safety;

(b) suspend, revoke or limit a certificate if such action is required pursuant to point AR.UAS.GEN.350 or AR.UAS.GEN.351;

(c) suspend or limit, in whole or in part, an organisation certificate if unforeseeable circumstances beyond the control of the competent authority prevent its inspectors from discharging their oversight responsibilities over the oversight planning cycle.

SUBPART CAW — AIRWORTHINESS OF UA

AR.UAS.CAW.005 Scope

This Subpart establishes the requirements to be fulfilled by the competent authority when performing its tasks and discharging its responsibilities with regard to the oversight of the continuing airworthiness of the UA subject to Delegated Regulation (EU) …/…, and the issue of airworthiness review certificates (ARCs).

AR.UAS.CAW.302 UAS maintenance programme

In case the person that performs the review of the UAS maintenance programme informs the competent authority, in accordance with point ML.UAS.302(e) of Annex I (Part-ML.UAS) to Delegated Regulation (EU) …/…, that he or she does not agree with the amendments to the UAS maintenance programme, the competent authority shall decide which amendments to the UAS maintenance programme are necessary, and shall raise the corresponding findings defined in point AR.UAS.GEN.351 and, if necessary, act in accordance with point AR.UAS.GEN.355.

AR.UAS.CAW.303 UA continuing airworthiness monitoring

(a) The competent authority shall develop a survey programme following a risk-based approach to monitor the airworthiness status of the UA fleet on its register, and of their command units (CUs).

(b) The survey programme shall include product surveys of a sample of UA and CU, and shall cover all aspects of airworthiness key risk elements.

(c) The product survey shall sample the airworthiness standards achieved, on the basis of the applicable requirements, and identify any findings.

(d) Any findings identified shall be categorised in accordance with point AR.UAS.GEN.351 and confirmed in writing to the person or organisation that is responsible in accordance with point ML.UAS.201 of Annex I (Part-ML.UAS) to Delegated Regulation (EU) …/….

(e) The competent authority shall record all findings and closure actions.

(f) If during aircraft monitoring evidence is found that shows non-compliance with this or other Annexes, the finding shall be dealt with as provided for by the relevant Annex.

(g) If so required to ensure appropriate enforcement action, the competent authority shall exchange information on non-compliances identified in accordance with point (f) with other competent authorities.

AR.UAS.CAW.902 Airworthiness review conducted by the competent authority

(a) When the competent authority conducts the airworthiness review and issues the ARC set out in Appendix IV to this Annex (EASA Form 15c), the competent authority shall conduct an

airworthiness review in accordance with point ML.UAS.903 of Annex I (Part-ML) to Delegated Regulation (EU) …/….

(b) The competent authority shall have airworthiness review staff to conduct airworthiness reviews. Such staff shall comply with all the following requirements:

(1) they have acquired at least 3 years of experience in continuing airworthiness;

(2) they have obtained an aeronautical degree or licence, or equivalent qualification;

(3) they have received appropriate aeronautical-maintenance training;

(4) they hold a position that authorises them to sign on behalf of the competent authority.

Notwithstanding points (b)(1) to (b)(4), the requirement of point (b)(2) may be replaced by 3 years of experience in continuing airworthiness, in addition to the experience already required by point (b)(1).

(c) The competent authority shall maintain a record of all airworthiness review staff, which shall include details of any appropriate qualification held together with a summary of the relevant continuing airworthiness management experience and training.

(d) During the performance of the airworthiness review, the competent authority shall have access to the applicable data as specified in points ML.UAS.305 and ML.UAS.401 of Annex I (Part-ML) to Delegated Regulation (EU) …/….

(e) Staff that conduct the airworthiness review shall issue an airworthiness review certificate (EASA Form 15d), as set out in Appendix II to Annex I (Part-ML.UAS) to Delegated Regulation (EU) …/…, upon the satisfactory completion of the airworthiness review.

(f) Whenever circumstances reveal the existence of a potential safety threat, the competent authority shall conduct the airworthiness review and issue the ARC itself.

APPENDICES TO ANNEX I (PART-AR.UAS)

Appendix I — Part-CAO.UAS certificate — EASA Form 3-CAO.UAS

(a) Within the approval class(es) and rating(s) established by the competent authority, the scope of work specified in the organisation manual defines the exact limits of the approval. It is therefore essential that the approval class(es) and rating(s) and the organisation's scope of work match.

(b) An aircraft rating, in relation to maintenance privileges, means that the Part-CAO.UAS organisation may carry out maintenance on the aircraft and any component (including engines) in accordance with aircraft maintenance data or, if agreed by the competent authority, in accordance with component maintenance data, only while such components are fitted to the aircraft. Nevertheless, such aircraft-rated organisation may temporarily remove a component for maintenance in order to improve access to that component except when its removal generates the need for additional maintenance that the organisation is not approved to perform. This will be subject to a control procedure in the organisation manual to be approved by the competent authority.

(c) An engine rating (turbine, piston, or electrical) means that the Part-CAO.UAS organisation may carry out maintenance on uninstalled engine and engine components in accordance with engine maintenance data or, if agreed by the competent authority, in accordance with component maintenance data, only while such components are fitted to the engine. Nevertheless, such engine-rated organisation may temporarily remove a component for maintenance in order to improve access to that component except when its removal generates the need for additional maintenance that the organisation is not approved to perform. An engine-rated organisation may also carry out maintenance on an installed engine during UA maintenance subject to a control procedure in the organisation manual to be approved by the competent authority.

(d) A component rating (other than complete engines) means that the Part-CAO.UAS organisation may carry out maintenance on uninstalled components (excluding complete engines) intended for fitment to the UA, engine or CU. That organisation may also carry out maintenance on an installed component (other than complete engines) during UA maintenance or at an engine maintenance facility subject to a control procedure in the organisation manual to be approved by the competent authority.

(e) A non-destructive testing (NDT) rating is a self-contained rating not necessarily related to a specific UA, engine, or other component. The NDT rating is only necessary for a Part-CAO.UAS organisation that carries out NDT as a particular task for another organisation. A Part-CAO.UAS organisation approved with an aircraft, engine or component rating may carry out NDT on products it maintains subject to the organisation manual containing NDT procedures, without the need for an NDT rating.

Page 1 of 2

[MEMBER STATE (*)]
A Member of the European Union (**)

CAO.UAS CERTIFICATE

Reference: [MEMBER STATE CODE (*)].CAO.UAS.[XXXX]

Pursuant to 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 to Commission Implementing Regulation (EU) .../... and Commission Delegated Regulation .../... and subject to the conditions specified below, the [COMPETENT AUTHORITY OF THE MEMBER STATE (*)] hereby certifies:

[COMPANY NAME AND ADDRESS]

as a Part-CAO.UAS organisation in compliance with Annex II (Part-CAO.UAS) to Commission Delegated Regulation (EU) .../...

CONDITIONS:

(a) This approval is limited to the scope specified in the attached terms of approval and in the 'Scope of work' section of the organisation manual, as referred to in Annex II (Part-CAO.UAS) to Commission Delegated Regulation (EU) .../...;

(b) This approval requires compliance with the procedures specified in the organisation manual;

(c) This approval is valid whilst the approved Part-CAO.UAS organisation remains in compliance with Annex II (Part-CAO.UAS) to Commission Delegated Regulation (EU) .../...;

(d) Where the approved Part-CAO.UAS organisation subcontracts the service of one or several organisations, this approval remains valid subject to such organisation(s) fulfilling applicable contractual obligations;

(e) Subject to compliance with the foregoing conditions, this approval shall remain valid for an unlimited duration unless the approval has previously been surrendered, superseded, suspended or revoked.

Date of original issue of the approval certificate: .....

Date of this revision of the approval certificate: .....

Revision No: .....

Signed: .....

For the competent authority: [COMPETENT AUTHORITY OF THE MEMBER STATE (*)]

(*) Or 'EASA', if EASA is the competent authority.

(**) Delete for non-EU Member States or EASA.

EASA Form 3-CAO.UAS — Issue 1

PART-CAO.UAS ORGANISATION

TERMS OF APPROVAL

Reference: [MEMBER STATE CODE (*)].CAO.UAS.XXXX

Organisation: [COMPANY NAME AND ADDRESS]

CLASS	RATING	PRIVILEGES (***)
UAS (**)	UAS (**)	□ UA maintenance □ CU maintenance □ CU installation □ Continuing airworthiness management □ Airworthiness review
COMPONENTS (**)	Complete engine (**)	□ Maintenance
	Components other than complete engines (**)	
SPECIALISED SERVICES (**)	Non-destructive testing (NDT) (**)	□ NDT

List of subcontracted organisation(s) that carry out continuing airworthiness tasks

These terms of approval are limited to the products, parts and appliances, and to the activities specified in the 'Scope of work' section of the organisation manual,

Organisation manual reference: .....

Date of original issue of the organisation manual: .....

Date of last approved revision: .....Revision No: .....

Signed: .....

For the competent authority: [COMPETENT AUTHORITY OF THE MEMBER STATE (*)]

(*) Or 'EASA', if EASA is the competent authority.

(**) Delete as appropriate if the organisation is not approved.

(***) Select as appropriate.

EASA Form 3-CAO.UAS — Issue 1

3.4. Proposed amendments to Commission Delegated Regulation (EU) 2019/945

Article 2 — Definitions

[…]

(38) 'command unit' (~~'~~CU~~'~~) means the equipment or items ~~system~~ of equipment to control unmanned aircraft remotely as defined ~~in point 32 of~~ Article 3(32) of Regulation (EU) 2018/1139 which ~~supports~~ ensures the control or the monitoring of the unmanned aircraft during any phase of flight~~, with the exception of any infrastructure~~ the command unit does not include any ground-, air- or space-based equipment or items of equipment that support(s)~~ing~~ the command and control (C2) link service;

(39) 'C2 link service' means a communication service supplied by a third party, providing ~~command and control~~ the data link between the unmanned aircraft and the CU for the purpose of managing the flight;

[…]

Article 40 - Requirements for UAS operated in the 'certified' and 'specific' categories except when conducted under a declaration

1. The design, production and maintenance of UAS shall be certified if the UAS meets any of the following conditions:

   (a) it has a characteristic dimension of 3 m or more, and is designed to be operated over assemblies of people unless the aircraft is lighter than air;

   […]

   (d) it is intended to be used in the 'specific' category of operations defined in Article 5 of Implementing Regulation (EU) 2019/947 and the competent authority, when evaluating in accordance with Article 12(1) of Implementing Regulation (EU) 2019/947, the ~~in the operational authorisation to be issued by the competent authority, following a~~ risk assessment conducted in accordance with Article 11 of Implementing Regulation (EU) 2019/947 ~~provided for in Article 11 of Implementing Regulation (EU) 2019/947~~, considers that the risk of the operation cannot be adequately mitigated without the certification of the UAS, unless the UAS is specifically designed or modified for research, experimental or scientific purposes, and is likely to be produced in very limited numbers.

2. A UAS that meets the conditions specified in point 1 ~~A UAS subject to certification~~ shall comply with the applicable requirements set out in Commission Regulation (EU) No 748/2012[47], Commission Regulation (EU) 2015/640[48] and Delegated Regulation (EU) …/… ~~Commission Regulation (EU) No 1321/2014~~[49].

[47] Commission Regulation (EU) No 748/2012 of 3 August 2012 laying down implementing rules for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations (OJ L 224, 21.8.2012, p. 1).

[48] Commission Regulation (EU) 2015/640 of 23 April 2015 on additional airworthiness specifications for a given type of operations and amending Regulation (EU) No 965/2012 (OJ L 106, 24.4.2015, p. 18).

[49] ~~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).~~

2a. UAS certified for reasons other than those specified in point 1 shall comply with the applicable requirements set out in Commission Regulation (EU) No 748/2012 and in Commission Regulation (EU) 2015/640.

[…]

3.5. Proposed amendments to Commission Implementing Regulation (EU) 2019/947

Article 2 — Definitions

[…]

(26) 'command unit' (~~'~~CU~~'~~) means the equipment or items ~~system~~ of equipment to control unmanned aircraft remotely as defined in ~~point 32 of~~ Article 3(32) of Regulation (EU) 2018/1139 which ~~supports~~ ensures the control or the monitoring of the unmanned aircraft during any phase of flight.~~, with the exception of any infrastructure~~; the command unit does not include any ground-, air- or space-based equipment or items of equipment that support(s)~~ting~~ the command and control (C2) link service;

(27) 'C2 link service' means a communication service supplied by a third party, providing ~~command and control~~ the data link between the unmanned aircraft and the CU for the purpose of managing the flight;

[…]

Article 7 — Rules and procedures for the operation of UAS

[…]

2. UAS operations in the 'specific' category shall comply with the operational limitations set out in the operational authorisation as referred to in Article 12 or the authorisation as referred to in Article 16, or in a standard scenario defined in Appendix 1 to the Annex as declared by the UAS operator.

This paragraph shall not apply where the UAS operator holds an LUC with the appropriate privileges.

UAS operations in the 'specific' category shall be subject to the applicable operational requirements laid down in Commission Implementing Regulation (EU) No 923/2012[50].

The operator of an UAS that meets the conditions specified in point 1(d) of Article 40 of Delegated Regulation (EU) 2019/945 shall obtain:

(i) a certificate of airworthiness or restricted certificate of airworthiness issued in accordance with Subpart H of Annex I (Part 21) to Commission Regulation (EU) No 748/2012;

(ii) a noise certificate in accordance with Subpart I of Annex I (Part 21) to Commission Regulation (EU) No 748/2012.

[…]

Article 12 — Authorising operations in the 'specific' category

[…]

2. The competent authority shall grant an operational authorisation when:

(a) the evaluation in point 1 concludes that:

[50] 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).

~~(a)~~i. the operational safety objectives take account of the risks of the operation;

~~(b)~~ii. the combination of mitigation measures concerning the operational conditions to perform the operations, the competence of the personnel involved and the technical features of the unmanned aircraft, are adequate and sufficiently robust to keep the operation safe in view of the identified ground and air risks;

(b) for UAS that are or will be certified pursuant to point 1(d) of Article 40 of Delegated Regulation (EU) 2019/945, the UAS have:

i. a valid certificate of airworthiness or a restricted certificate of airworthiness and, if applicable, a valid noise certificate; or

ii. if the certificate of airworthiness or the restricted certificate of airworthiness is invalid, flight conditions approved according to Subpart P of Annex I to Regulation (EU) No 748/2012;

(c) […]

[…]

4. The operational authorisation granted by the competent authority shall detail:

[…]

(c) the following information:

[…]

vii. the certificate of airworthiness or restricted certificate of airworthiness and noise certificate, if such certificates have been issued;

viii. the flight conditions approved in accordance with Commission Regulation (EU) No 748/2012 in case the UAS meets the conditions defined in point 1(d) of Article 40 of Commission Delegated Regulation (EU) 2019/945 and its certificate of airworthiness or restricted certificate of airworthiness is not valid.

[…]

Article 19 — Safety information

[…]

3. Without prejudice to Regulation (EU) No 376/2014, the UAS operator of an unmanned aircraft whose design is certified shall report to the design approval holder of the UAS or of the component any safety-related event or condition of the UAS or the component identified by the organisation. In particular, the UAS operator shall report any accident or serious incident involving the UAS or the component, which endangers or, if not corrected or addressed, could endanger the UAS or any person.

[…]

UAS.SPEC.100 Use of certified equipment and certified unmanned aircraft

(1) If the UAS operator~~ion~~ uses~~is using~~ an unmanned aircraft for which a certificate of airworthiness or a restricted certificate of airworthiness has~~ve~~ been issued, the UAS operator shall ensure that the UAS complies with Delegated Regulation (EU) …/….

(2) If the UAS operator ~~or~~ uses~~ing~~ certified equipment~~,~~ on a UA for which neither a certificate of airworthiness nor a restricted certificate of airworthiness has been issued:~~,~~

(i) the UAS operator shall record the operation or service time in accordance either with the instructions and procedures applicable to the certified equipment, or with the organisational approval or the operational authorisation;~~.~~

(ii)~~(2)~~ ~~T~~the UAS operator shall follow the instructions referred to in the ~~unmanned aircraft certificate or~~ equipment certificate, and also comply with any applicable airworthiness ~~or operational~~ directives issued by the Agency.

3.6. Proposed amendments to Commission Regulation (EU) No 965/2012

3.6.1. Draft cover regulation

Article 1 Subject matter and scope

[…]

8. This Regulation lays down detailed rules for innovative air mobility (IAM) operations with VTOL-capable aircraft referred to in points (b)(i) and (ii) of Article 2(1) of Regulation (EU) 2018/1139.

Article 2 Definitions

[…]

(1a) 'rotorcraft means a power-driven, heavier-than-air aircraft that depends principally for its support in flight on the lift generated by up to two rotors;

(1aa) 'helicopter' means a heavier-than-air aircraft supported in flight chiefly by the reactions of the air on ~~one or more~~ up to two power-driven rotors on substantially vertical axes;

[…]

Rationale:

The proposed definition of 'VTOL-capable aircraft' also requires a change in the existing definition of 'helicopter' in Commission Regulation (EU) No 965/2012, in Implementing Regulation (EU) 923/2012 and in Commission Regulation (EU) 1178/2011 in order to ensure a clear distinction between those two definitions of 'aircraft'. In particular, it is proposed to limit the definition of 'helicopter' to 'heavier-than-air aircraft supported in flight chiefly by the reactions of the air on up to two power-driven rotors on substantially vertical axes'. This would imply that aircraft configurations with more than two power-driven rotors should be initially classified as 'VTOL-capable aircraft' for the purpose of the above-mentioned Regulations.

Consequently, to ensure a coherent organisation of the aircraft categories, it is necessary also to introduce in the above-mentioned Regulations the definition of 'rotorcraft' to make sure that helicopters and gyrocopters are considered a subcategory of rotorcraft.

(12) 'innovative air mobility (IAM) operations' means commercial and non-commercial operations with VTOL-capable aircraft in congested (urban) and non-congested areas;

(13) 'VTOL-capable aircraft' means a power-driven, heavier-than-air aircraft, other than aeroplane or rotorcraft, capable of performing vertical take-offs and landings by means of lift or thrust units used to provide lift during the take-off and landing;

Rationale:

The proposed definition is built on the basis of the existing definition in SC VTOL, and focuses exclusively on the physics of the TOL phase while disregarding any implication at system level or in relation to levels of automation or autonomy. It is meant to be sufficiently technology-agnostic so that appropriate operational or training requirements can be defined on the basis of the specific aircraft design.

(14) 'VEMS flight' means a flight with a VTOL-capable aircraft that operates under a VEMS approval, where immediate and rapid transportation is essential and the purpose of which is either to:

(a) facilitate emergency medical assistance by carrying one or more of the following:

(i) medical personnel;

(ii) medical supplies (equipment, blood, organs, drugs);

(iii) ill or injured persons and other persons directly involved;

or

(b) perform any operation where a person is at imminent or anticipated health risk from the environment and either:

(i) needs to be rescued or provided with supplies; or

(ii) persons, animals or equipment need to be transported to/from the VEMS operating site.

[…]

Article 5 Air operations

[…]

1b. Operators shall only operate VTOL-capable aircraft in the context of IAM operations as specified in Annexes III and IX to this Regulation.

2. Operators shall comply with the relevant provisions of Annex V when operating:

[…]

(g) helicopters used for offshore operations (HOFO);~~,~~

(h) VTOL-capable aircraft used for:

(i) operations using performance-based navigation (PBN);

(ii) the transport of dangerous goods (DGs);

(iii) operations with the aid of night-vision imaging systems (NVIS);

(iv) emergency medical service operations (VEMS).

[…]

5. Training organisations referred to in Article 10a of Regulation (EU) No 1178/2011 and having their principal place of business in a Member State shall, when conducting flight training into, within or out of the Union, operate:

(a) complex motor-powered aeroplanes and helicopters in accordance with the provisions specified in Annex VI;

(b) other aeroplanes and helicopters in accordance with the provisions specified in Annex VII;~~.~~

(c) VTOL-capable aircraft in accordance with the requirements specified in Annex IX.

[…]

7. Flights taking place immediately before, during or immediately after specialised operations with aeroplanes and helicopters and directly connected to those operations shall be operated in

accordance with paragraphs 3, 4 and 6, as applicable. Except for crew members, persons other than those indispensable to the mission shall not be carried on board.

[…]

Rationale:

With regard to point 2(h):

NVIS operations with VTOL-capable aircraft should be possible under certain conditions regarding aircraft equipment, number of crew members, training, etc. Especially for VEMS, where VFR operations at night to/from a VEMS operating site are to be conducted, a crew composition of at least one pilot and one NVIS technical crew member would be necessary. If the medical doctor plays the role of a VEMS technical crew member (option studied by ADAC), it will be necessary that the doctor also obtain NVIS-related training.

On the other hand, for pilots in VFR operations at night, the two-dimensional nature of the NVG image necessitates frequent reference to the flight instruments for spatial and situational awareness information. Therefore, any basic NVIS training syllabus should include some instruction on basic instrument flight.

Therefore, the matter will be reassessed in the future, and it is likely that NVIS operations will be included at a later stage when the required level of performance has been achieved.

As regards low-visibility operations (LVOs), the requirements for precision departures and approaches relative to aircraft equipment, runway facilities and visual aids, LVO procedures as well as the minimum number of pilots, seem today quite inappropriate for the existing VTOL technology. The matter will be reassessed in the future once the VTOL technology will have sufficiently evolved.

Article 7 Air operator certificates

[…]

3. Operators of VTOL-capable aircraft engaged in IAM operations shall be issued with an air operator certificate pursuant to this Regulation.

Article 8 Flight time limitations

1. CAT operations with aeroplanes shall be subject to the requirements of Subpart FTL of Annex III.

[…]

3.6.2. Annex I – Definitions for terms used in Annexes II to ~~VIII~~ IX

[…]

(21) 'clearway' means a defined rectangular area on the ground or on water under the control of the appropriate authority, selected or prepared as a suitable area over which an aircraft ~~aeroplane~~ may make a portion of its initial climb to a specified height;

[…]

(31) 'critical phases of flight' in the case of helicopters or VTOL-capable aircraft means taxiing, hovering, take-off, final approach, missed approach, ~~the~~ landing and any other phases of flight as determined by the pilot-in-command or the commander;

[…]

(39) 'distance DR' means the horizontal distance that the helicopter or the VTOL-capable aircraft has travelled from the end of the take-off distance available;

[…]

(48) 'final approach and take-off area (FATO)' means a defined area for helicopter or VTOL-capable aircraft operations~~,~~ over which the final phase of the approach manoeuvre to hover or land is completed, and from which the take-off manoeuvre is commenced. In the case of helicopters operating in performance class 1 and VTOL-capable aircraft, the defined area includes the rejected take-off area available;

[…]

(50a) 'flight time' means:

[…]

(c) for VTOL-capable aircraft, the total time between the moment the lift or thrust units are powered for the purpose of taking off until the moment the aircraft finally comes to rest at the end of the flights and the lift or thrust units are stopped;

[…]

(53) 'ground emergency service personnel' means any ground emergency service personnel (such as police officers, firefighters,~~policemen, firemen,~~ etc.) involved with helicopter emergency medical services (HEMSs) or with emergency medical services with VTOL-capable aircraft (VEMS) and whose tasks are to any extent pertinent to the operations;

[…]

(69) 'hostile environment' means:

(a) an area in which:

(i) a safe forced landing cannot be accomplished because the surface is inadequate; or

(ii) the helicopter or VTOL-capable aircraft occupants cannot be adequately protected from the elements; or

[…]

[…]

(70) 'landing decision point (LDP)' means:

(a) in the case of helicopters, the point used in determining landing performance from which, an engine failure having been recognised at this point, the landing may be safely continued or a balked landing initiated;

(b) in the case of VTOL-capable aircraft, a point along the landing flight path, which is defined as the last point from which a balked landing may be initiated; after LDP, a balked landing is not assured. If the VTOL-capable aircraft is certified in the category 'Enhanced', then a landing should be possible following a CFP before or after the LDP.

(71) 'landing distance available' means:

(a) in the case of aeroplanes (LDA), the length of the runway which is declared available by the State of the aerodrome and suitable for the ground run of an aeroplane landing;

(b) in the case of helicopters (LDAH), the length of the FATO plus any additional area declared available by the State of the aerodrome and suitable for the helicopter to complete the landing manoeuvre from a defined height; and

(c) in the case of VTOL-capable aircraft (LDAV), the length of the FATO plus any additional area declared available and suitable for the VTOL-capable aircraft to complete the landing manoeuvre from a defined height;

(71a) 'landing distance required' means:

(1) in the case of helicopters (LDRH), the horizontal distance required to land and come to a full stop from a point of 15 m (50 ft) above the landing surface; and

(2) in the case of VTOL-capable aircraft (LDRV), the horizontal distance required to land and come to a full stop from a point of 15 m (50 ft) above the landing surface;

[…]

(78) 'medical passenger' means a medical person carried in a helicopter during a HEMS flight or in a VTOL-capable aircraft during a VEMS flight, including but not limited to doctors, nurses and paramedics;

[…]

(82) 'non-hostile environment' means an environment in which:

(a) a safe forced landing can be accomplished;

(b) the helicopter or the VTOL-capable aircraft occupants can be protected from the elements; and

(c) search and rescue response/capability is provided consistent with the anticipated exposure.

In any case, those parts of a congested area with adequate safe forced landing areas shall be considered non-hostile;

[…]

(102) 'rejected take-off distance available ~~(RTODAH)~~' means:

(a) in the case of helicopters (RTODAH), the length of the final approach and take-off area declared available and suitable for helicopters operated in performance class 1 to complete a rejected take-off; or

(b) in the case of VTOL-capable aircraft (RTODAV), the length of the FATO declared available and suitable for VTOL-capable aircraft to complete a rejected take-off in accordance with the category ('Enhanced' or 'Basic') in which it is certified;

(103) 'rejected take-off distance required ~~(RTODRH)~~' means:

(a) in the case of helicopters (RTODRH), the horizontal distance required from the start of the take-off to the point where the helicopter comes to a full stop following an engine failure and rejection of the take-off at the take-off decision point;

(b) in the case of VTOL-capable aircraft (RTODRV), the horizontal distance required from the start of the take-off to the point where the VTOL-capable aircraft comes to a full stop following a CFP being recognised at TDP;

[…]

(111) 'take-off decision point (TDP)' means

(a) in the case of helicopters, the point used in determining take-off performance from which, an engine failure having been recognised at this point, either a rejected take-off may be made or a take-off safely continued;

(b) in the case of VTOL-capable aircraft, the first point defined by a combination of speed and height from which continued take-off may be made meeting the certified minimum performance (CMP) following a CFP and is the last point in the take-off path from which a rejected take-off is assured;

[…]

(113) 'take-off distance available' ~~(TODAH)' in the case of helicopters~~ means:

(a) in the case of helicopters (TODAH), ~~means~~ the length of the final approach and take-off area plus, if provided, the length of helicopter clearway declared available and suitable for helicopters to complete the take-off;

(b) in the case of VTOL-capable aircraft (TODAV), the length of the FATO plus, if provided, the length of a clearway declared available and suitable for VTOL-capable aircraft to complete the take-off;

(114) 'take-off distance required' ~~(TODRH)'in the case of helicopters~~ means:

(a) in the case helicopters (TODRH), ~~means~~ the horizontal distance required from the start of the take-off to the point at which take-off safety speed (VTOSS), a selected height and a positive climb gradient are achieved, following failure of the critical engine being recognised at the TDP, the remaining engines operating within approved operating limits;

(b) in the case of VTOL-capable aircraft (TODRV), the projected horizontal distance from the start of the take-off to the point at which safe obstacle clearance and a positive climb gradient are achieved, following a critical failure for performance (CFP) recognised at the TDP;

(115) 'take-off flight path' means:

(a) the vertical and horizontal path, with the critical engine inoperative, from a specified point in the take-off for aeroplanes to 1 500 ft above the surface and for helicopters to 1 000 ft above the surface;

(b) in the case of VTOL-capable aircraft, the vertical and horizontal path that extends from the take-off point to a point at which the aircraft is at 305 m (1 000 ft) above the take-off

elevation or at such other height above the take-off elevation that allows the aircraft to clear all obstacles;

(116) 'take-off mass' means the mass including everything and everyone carried at the commencement of the take-off for helicopters or for VTOL-capable aircraft, and take-off run for aeroplanes;

[…]

(118) 'technical crew member' means a crew member in commercial air transport HEMS, VEMS, HHO or NVIS operations other than a flight or cabin crew member, assigned by the operator to duties in the aircraft or on the ground for the purpose of assisting the pilot during HEMS, VEMS, HHO or NVIS operations, which may require the operation of specialised on-board equipment;

[…]

(130) 'automatic take-off/landing procedures' means the procedures carried out by on-board systems that permit an aircraft to automatically take off/land in accordance with the established minima without any input from the pilot;

(131) 'ground movement' means the movement of the VTOL-capable aircraft on the movement area of an aerodrome by an external equipment or accessory that is not powered by the aircraft;

(132) 'ground personnel' means personnel other than flight crew members that are assigned tasks for the ground movement of the VTOL-capable aircraft and have been trained in the relevant operational and safety procedures;

(133) 'category Basic' means a certification category for VTOL-capable aircraft according to which the aircraft meets the requirements for controlled emergency landing following a critical failure for performance;

(134) 'category Enhanced' means a certification category for VTOL-capable aircraft according to which the aircraft meets the requirements for continued safe flight and landing following a critical failure for performance.

(135) 'certified minimum performance (CMP)' means, in relation to VTOL-capable aircraft, the set of performance data obtained by considering the effect of single failures and combinations of failures that are not extremely improbable on nominal performance parameters;

(136) 'continued safe flight and landing (CSFL)' means, in relation to a VTOL-capable aircraft certified in the category Enhanced, that the aircraft is capable of continued controlled flight and landing at a vertiport, possibly using emergency procedures, without requiring exceptional piloting skills or strength;

(137) 'controlled emergency landing (CEL)' means, in relation to a VTOL-capable aircraft certified in the category Basic, that the aircraft is capable of performing a controlled landing, possibly using emergency procedures, without requiring exceptional piloting skills or strength; upon landing, some damage to the aircraft may occur.

(138) 'critical failure for performance (CFP)' means, in relation to VTOL-capable aircraft, a failure or combination of failures that results in the maximum degradation for a given flight phase and

performance parameter; the set of critical failures for performance is used to establish the certified minimum performance (CMP).

(139) 'limited overwater operation' means an operation with a VTOL-capable aircraft that is conducted for a limited flight time over water.

(140) 'predefined routes' means specific routes, geographical areas (e.g. UAS geographical zones) or corridors which a national competent authority may establish in its territory for use by UAS or VTOL-capable aircraft operators where operations may be conducted within acceptable air and ground risks and under specified conditions;

(141) 'VEMS crew member' means a technical crew member (TCM) that is assigned to a VEMS mission for the purpose of assisting the pilot during the flight operation and attending to any person in need of medical assistance;

(142) 'VEMS operating base' means an aerodrome/vertiport at which the VTOL-capable aircraft, its flight crew and VEMS crew members are on standby for VEMS operations;

(143) 'VEMS operating site' means a site selected by the pilot-in-command during a VEMS flight for VEMS operations, landing and take-off;

(144) 'vertiport' means an area of land, water, or structure used or intended to be used for the landing and take-off and movement of VTOL-capable aircraft;

(145) 'VTOL take-off safety speed (V_{TOSS})' means the minimum speed at which climb shall be achieved with a CFP recognised at the TDP in the case of VTOL-capable aircraft in the category Enhanced;

(146) 'VTOL-capable aircraft in manned configuration' means a VTOL-capable aircraft piloted by at least one pilot on board;

(147) 'urban air mobility (UAM)' means a subset of IAM operations conducted into, within or outside congested (urban) areas.

Rationale

The title of Annex I is changed due to the introduction of new Annex X (Part-IAM), which contains the requirements for manned VTOL-capable aircraft operations within congested (urban) and outside non-congested areas.

3.6.3. Annex II (Part-ARO)

[…]

SECTION I — CERTIFICATION OF COMMERCIAL AIR TRANSPORT OPERATORS AND OF INNOVATIVE AIR MOBILITY OPERATORS

[…]

SECTION II — APPROVALS

ARO.OPS.200 Specific approval procedure

[…]

(b) When satisfied that the operator has demonstrated compliance with the applicable requirements, the competent authority shall issue the approval or amend it ~~the approval~~. The approval shall be specified in:

(1) the operations specifications, as established in Appendix II, for commercial air transport operations and for any IAM operation with VTOL-capable aircraft; or

[…]

ARO.OPS.224 Approval of fuel/energy schemes for IAM operations

(a) The competent authority shall approve the fuel/energy scheme proposed by the operator of VTOL-capable aircraft provided the operator demonstrates compliance with the requirements of points UAM.OP.VCA.150 to 165 of Annex IX.

(b) In addition, the competent authority shall:

(1) assess whether the VTOL-capable aircraft operator's management system and safety risk management process can support the implementation of the proposed individual fuel/energy scheme; and

(2) establish an oversight plan to carry out periodic assessments of the operator's current fuel/energy scheme to verify compliance of the scheme or decide whether the scheme should be amended or revoked.

Appendix I to Annex II (Part-ARO)

AIR OPERATOR CERTIFICATE
(Approval schedule for air transport operators)

Type(s) of operation:
Commercial air transport (CAT) ☐ Passengers~~;~~ ☐ Cargo~~;~~
Innovative air mobility (IAM) ☐ Passengers ☐ Cargo

☐ Other ([1]): ……

([4])	State of the Operator ([2]) Issuing Authority ([3])	([5])
AOC # ([6]): 	Operator Name ([7]) Dba Trading Name ([8]) Operator postal address ([10]): Telephone ([11]): Fax: ~~E-~~Email:	Operational Points of Contact: ([9]) Contact details~~,~~ at which operational management may~~can~~ be contacted without undue delay, are listed in …… ([12]).

This certificate attests ~~certifies~~ that …… ([13]) is authorised to perform commercial air transport operations / innovative air mobility operations / other types of operations, as defined in the attached

operations specifications, in accordance with the operations manual~~, Annex V to~~ and Regulation (EU) 2018/1139 and its delegated and implementing acts.	
Date of issue ([14]):	Name and Signature ([15]): Title:

([1]) Other type of transportation to be specified.

([2]) Replaced by the name of the State of the operator.

([3]) Replaced by the identification of the issuing competent authority.

([4]) For use by~~of~~ the competent authority.

([5]) For use by~~of~~ the competent authority.

([6]) Approval reference, as issued by the competent authority.

([7]) Replaced by the operator's registered name.

([8]) Operator's trading name, if different. Insert 'Dba' (for 'Doing business as') before the trading name.

([9]) The contact details include ~~the~~ telephone and fax numbers, including the country code, and the email address (if available) at which operational management may~~can~~ be contacted without undue delay for issues relating~~ed~~ to flight operations, airworthiness, flight and cabin crew members' competency, dangerous goods and other matters as appropriate.

([10]) Operator's address of the principal place of business~~ address~~.

([11]) Operator's principal place of business telephone and fax details, including the country code. Email to be provided, if available.

([12]) Insertion of the controlled document, carried on board, in which the contact details are listed, with the appropriate paragraph or page reference. E.g.: 'Contact details … are listed in the operations manual, gen/basic, ~~c~~Chapter 1, 1.1'; or '… are listed in the operations specifications, page 1'; or '… are listed in an attachment to this document'.

([13]) Operator's registered name.

([14]) Issue date of the AOC (dd-mm-yyyy).

([15]) Title, name and signature of the competent authority representative. In addition, an official stamp may be applied to~~n~~ the AOC.

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Appendix II to Annex II (Part-ARO)

OPERATIONS SPECIFICATIONS **(subject to the approved conditions in the operations manual)**			
Issuing authority contact details Telephone ([1]): _____; Fax: _____; ~~E-~~Email: _____			
AOC ([2]):	Operator name ([3]):	Date ([4]):	Signature:
Dba trading name Operations specifications#:			
Aircraft model ([5]): Registration marks ([6]):			
Type(s) of operation~~s~~: Commercial air transport (CAT) ☐ Passengers ☐ Cargo			

Innovative air mobility (IAM) ☐ Passengers ☐ Cargo ☐ Others ([7]): _____				
Area of operation ([8]):				
Special limitations ([9]):				
Specific approvals:	Yes	No	Specification ([10])	Remarks
Dangerous goods	☐	☐		
Low-visibility operations ☐ N/A Take-off Approach and landing Operational credits	☐ ☐ ☐	☐ ☐ ☐	RVR ([11]):... m CAT ([12]) .... DA/H: ft, RVR: ...m CAT([13]) .... DA/H: ft, RVR: ...m	
RVSM ([14]) ☐ N/A	☐	☐		
ETOPS ([15]) ☐ N/A	☐	☐	Maximum diversion time ([16]): minutes.	
Complex navigation specifications for PBN operations ([17])	☐	☐		([18])
Minimum navigation performance specification	☐	☐		
Operations with ~~of~~ single-engined turbine aeroplane at night or in IMC (SET-IMC)	☐	☐	([19])	
Helicopter / VTOL-capable aircraft operations with the aid of night-vision imaging systems	☐	☐		
Helicopter hoist operations	☐	☐		
Helicopter / VTOL-capable aircraft emergency medical service operations	☐	☐		
Helicopter offshore operations	☐	☐		
Cabin crew training ([20])	☐	☐		
Issue of CC attestation ([21])	☐	☐		
Use of type B EFB applications	☐	☐	([22])	
Continuing airworthiness	☐	☐	([23])	
Others ([24])				

(1) Telephone number ~~contact details~~ of the competent authority, including the country code. Email address to be provided, ~~as well as~~ and fax, if available.
(2) Insertion of associated air operator certificate (AOC) number.
(3) Insertion of the operator's registered name and the operator's trading name, if different. Insert 'Dba' before the trading name (for 'Doing business as').
(4) Issue date of the operations specifications (dd-mm-yyyy) and signature of the competent authority representative.
(5) Insertion of ICAO designation of the aircraft make, model and series, or master series, if a series has been designated (e.g. Boeing-737-3K2 or Boeing-777-232). VTOL-capable aircraft make, model and series, as applicable.
(6) The registration marks are listed either in the operations specifications or in the operations manual. In the latter case, the related operations specifications must make a reference to the related page in the operations manual. In case not all specific approvals apply to the aircraft model, the registration marks of the aircraft may be entered in the ~~r~~'Remarks' column to the related specific approval.
(7) Other type of transportation to be specified (e.g. emergency medical service).
(8) Listing of geographical area(s) of authorised operation (by geographical coordinates or specific routes, flight information region, or national or regional boundaries).
(9) Listing of applicable special limitations (e.g. VFR only, Day only, etc.).
(10) List in this column the most permissive criteria for each approval or the approval type (with appropriate criteria).

(11) Insertion of approved minimum take-off RVR in metres. One line per approval may be used if different approvals are granted.
(12) Insertion of applicable precision approach category: CAT II or CAT III. Insertion of minimum RVR in metres and DH in feet. One line is used per listed approach category.
(13) Insertion of applicable operational credit: SA CAT I, SA CAT II, EFVS, etc. Insertion of minimum RVR in metres and DH in feet. One line is used per listed operational credit.
(14) The Not Applicable (N/A) box may be ticked~~checked~~ only if the aircraft maximum ceiling is below FL290.
(15) 'Extended range operations (ETOPS)' currently applies only to two-engined aircraft. Therefore, the Not Applicable (N/A) box may be checked if the aircraft model has ~~less~~ or more than two engines.
(16) The threshold distance may also be listed (in NM), as well as the engine type.
(17) Performance-based navigation (PBN): one line is used for each complex PBN specific approval (e.g. RNP AR APCH), with the appropriate limitations listed in the 'Specifications' or 'Remarks' columns, or in both. Procedure-specific approvals of specific RNP AR APCH procedures may be listed in the operations specifications or in the operations manual. In the latter case, the related operations specifications must contain~~have~~ a reference to the related page in the operations manual.
(18) Specify if the specific approval is limited to certain runway ends or aerodromes, or both.
(19) Insertion of the particular airframe or engine combination.
(20) Approval to deliver~~conduct~~ the training course and administer the examination to be completed by applicants for a cabin crew attestation as specified in Annex V (Part-CC) to Regulation (EU) No 1178/2011.
(21) Approval to issue cabin crew attestations as specified in Annex V (Part-CC) to Regulation (EU) No 1178/2011.
(22) Insertion of the list of type B EFB applications together with the reference of the EFB hardware (for portable EFBs). This list is contained either in the operations specifications or in the operations manual. In the latter case, the related operations specifications must make a reference to the related page in the operations manual.
(23) The name of the person or organisation responsible for ensuring that the continuing airworthiness of the aircraft is maintained and a reference to the regulation that requires the work~~,~~ (i.e. Subpart G of Annex I (Part-M) to Regulation (EU) No 1321/2014).
(24) Other approvals or data may be entered here, using one line (or one multi-line block) per authorisation (e.g. short-landing operations, steep-approach operations, reduced required landing distance, helicopter operations to or from a public interest site, helicopter operations over a hostile environment located outside a congested area, helicopter operations without a safe forced landing capability, operations with increased bank angles, maximum distance from an adequate aerodrome for two-engined aeroplanes without an ETOPS approval).

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3.6.4. Annex III (Part-ORO)

ORO.GEN.005 Scope

This Annex establishes the requirements to be met~~followed~~ by an air operator that conducts~~ing~~:

(a) commercial air transport (CAT) operations ~~(CAT)~~;

(b) commercial specialised operations;

(c) non-commercial operations with complex motor-powered aircraft;

(d) non-commercial specialised operations with complex motor-powered aircraft;~~.~~

(e) innovative air mobility (IAM) operations.

Rationale:

Innovative air mobility (IAM) operations are intended to cover all operations with VTOL-capable aircraft, in manned or unmanned configuration, in congested (urban) and/or non-congested areas. A dedicated annex (Annex IX) will address these operations, with a gradual approach starting with manned VTOL-capable aircraft operations.

[…]

ORO.GEN.140 Access

[…]

(b) Access to the aircraft mentioned ~~under~~ in point (a) shall:

(i) in the case of CAT, include the possibility to enter and remain in the aircraft during flight operations unless otherwise decided by the commander for the flight crew compartment in accordance with point CAT.GEN.MPA.135 of Annex IV in the interest of safety;

(ii) in the case of IAM operations, include the possibility to enter and remain in the aircraft during flight operations unless otherwise decided by the pilot-in-command in accordance with IAM.GEN.MVCA.135 of Annex IX in the interest of safety.

[…]

ORO.AOC.100 Application for an air operator certificate

(a) Without prejudice to Regulation (EC) No 1008/2008 of the European Parliament and the Council[51], prior to commencing commercial air transport or IAM operations, the operator shall apply for and obtain an air operator certificate (AOC) issued by the competent authority.

(b) The operator shall provide the following information to the competent authority:

[…]

(5) the names of the nominated persons required by point ORO.ACO.135(a) of this Annex together with their qualifications and experience;

(6) a copy of the operations manual required by point ORO.MLR.100 of this Annex;

(7) a statement that all the documentation sent to the competent authority has~~ve~~ been verified by the applicant and found to comply ~~in compliance~~ with the applicable requirements.

(c) Applicants shall demonstrate to the competent authority that:

(1) for CAT operations, they comply with the essential requirements of Annex V to Regulation (EU) 2018/1139, this Annex (Part-ORO), Annex IV (Part-CAT) and Annex V (Part-SPA) to this Regulation, and Annex I (Part-26) to Regulation (EU) 2015/640[52];

(1a) for IAM operations, they comply with the essential requirements of Annex V to Regulation (EU) 2018/1139, this Annex III (Part-ORO), Annex V (Part-SPA) and Annex X (Part-IAM) to this Regulation, and with Annex I (Part-26) to Regulation (EU) 2015/640;

[51] Regulation (EC) No 1008/2008 of the European Parliament and of the Council of 24 September 2008 on common rules for the operation of air services in the Community (Recast) (OJ L 293, 31.10.2008, p. 3).

[52] Commission Regulation (EU) 2015/640 of 23 April 2015 on additional airworthiness specifications for a given type of operations and amending Regulation (EU) No 965/2012 (OJ L 106, 24.4.2015, p. 18).

(2) all aircraft they operate~~d~~ have been issued with a certificate of airworthiness (CofA) in accordance with Regulation (EU) No 748/2012 or are dry-leased in accordance with point ORO.AOC.110(d); and

(3) ~~its~~ their organisation and management are suitable and properly matched to the scale and scope of the operation.

[…]

ORO.AOC.125 Non-commercial operations of an AOC holder with aircraft listed on its AOC

(a) The AOC holder may conduct non-commercial operations in accordance with Annex VI (Part-NCC) or Annex VII (Part-NCO) with ~~aircraft~~ aeroplanes or helicopters listed in the operations specifications of its AOC or in its operations manual, provided that the AOC holder describes such operations in detail in the operations manual, including the following:

[…]

ORO.MLR.100 Operations manual – general

[…]

(b) The content of the OM shall reflect the requirements set out in this Annex, in Annex IV (Part-CAT), Annex V (Part-SPA), Annex VI (Part-NCC) ~~and~~, Annex VIII (Part-SPO) and Annex X (Part-IAM), as applicable, and shall not contravene the conditions contained in the operations specifications to the air operator certificate (AOC), the SPO authorisation or the declaration and the list of specific approvals, as applicable.

[…]

ORO.MLR.101 Operations manual — structure for commercial air transport and IAM operations

[…]

ORO.MLR.115 Record-keeping

(a) The following records shall be stored for at least 5 years~~:~~.

(1) for CAT and IAM operators, records of the activities referred to in point ORO.GEN.200;

[…]

ORO.FC.005 Scope

This Subpart establishes the requirements on flight crew training, experience and qualifications to be met by the operator of complex motor-powered aircraft or VTOL-capable aircraft, ~~related to flight crew training, experience and qualification~~ and comprises:

(a) SECTION 1 specifying common requirements ~~applicable to both non-commercial operations of complex motor-powered aircraft and any commercial operation~~;

(b) SECTION 2 specifying additional requirements applicable to commercial air transport operations with the exception of commercial air transport operations of passengers conducted

under VFR by day, starting and ending at the same aerodrome or operating site and within a local area specified by the competent authority, with:

(1) single-engined propeller-driven aeroplanes that have~~ing~~ an MCTOM of 5 700 kg or less and an MOPSC of 5 or less~~less~~; or

(2) other-than-complex motor-powered helicopters, single-engined, with an MOPSC of 5 or ~~less~~.

(c) SECTION 3 specifying additional requirements for commercial specialised operations and for those referred to in points (b)(1) and (2).

(d) SECTION 4 specifying additional requirements for IAM operations with manned VTOL-capable aircraft.

ORO.FC.105 Designation as pilot-in-command/commander

(a) In accordance with point 8.6 of Annex V to Regulation (EU) 2018/1139, one pilot amongst the flight crew, qualified as pilot-in-command in accordance with Annex I (Part-FCL) to Regulation (EU) No 1178/2011, shall be designated by the operator as pilot-in-command or, for commercial air transport operations with complex motor-powered aircraft, as commander.

[…]

(c) In the case of commercial operations of aeroplanes and helicopters, and for IAM operations, the pilot-in-command/commander or the pilot to whom the conduct of the flight may be delegated shall have had initial familiarisation training in~~on~~ the route or area to be flown and in~~on~~ the aerodromes, facilities and procedures to be used and shall maintain this knowledge as follows:

[…]

ORO.FC.120 Operator conversion training

(a) ~~In the case of aeroplane or helicopter operations, the~~The flight crew member shall complete the operator conversion training course before commencing unsupervised line flying:

[…]

ORO.FC.145 Provision of training, checking and assessment

[…]

(c) In the case of CAT and IAM operations, training and checking programmes, including syllabi and the use of ~~the~~ means to deliver the programme such as individual flight simulation training devices (FSTDs) and other training solutions, shall be approved by the competent authority.

[…]

ORO.FC.146 Personnel providing training, checking and assessment

[…]

(f) Notwithstanding point (b), the aircraft/FSTD training and the demonstration of competence/operator proficiency check may be conducted by a suitably qualified pilot-in-command/commander nominated by the operator for any of the following operations:

(1) specialised operations;

(2) CAT operations of aeroplanes meeting the criteria defined in point ORO.FC.005(b)(2);

(3) IAM operations with VTOL-capable aircraft by day and over routes navigated by reference to visual landmarks.

[…]

SECTION 4 — ADDITIONAL REQUIREMENTS FOR IAM OPERATIONS WITH MANNED VTOL-CAPABLE AIRCRAFT

ORO.FC.400 Composition of flight crew

(a) The minimum flight crew in IAM operations with manned VTOL-capable aircraft shall not be less than that specified in the operations manual considering the minimum number specified in the flight manual or other documents associated with the certificate of airworthiness of the aircraft.

(b) For single-pilot operations under IFR or at night, the requirements of point ORO.FC.402 of this Annex shall be complied with.

Point (a) transposes ICAO Annex 6 SARP 9.1.1:

'9.1.1. The number and composition of the flight crew shall not be less than that specified in the operations manual. The flight crews shall include flight crew members in addition to the minimum numbers specified in the flight manual or other documents associated with the certificate of airworthiness, when necessitated by considerations related to the type of aeroplane used, the type of operation involved and the duration of flight between points where flight crews are changed.'

In addition, the purpose of point (b) is to ensure compliance with point ORO.FC.402.

ORO.FC.402 Single-pilot operations under IFR or at night

For single-pilot operations with manned VTOL-capable aircraft under IFR or at night, the following shall be complied with:

(a) The operator shall include in the operations manual a pilot conversion and recurrent training programme that includes the additional requirements for single-pilot operations. The pilot shall have undertaken training on the operator's procedures regarding:

(1) engine management and emergency handling;

(2) use of normal, abnormal and emergency checklists;

(3) air traffic control (ATC) communication;

(4) departure and approach procedures;

(5) autopilot management, if applicable;

(6) use of simplified in-flight documentation;

(7) single-pilot crew resource management (CRM).

(b) The pilot shall have gained the following prior experience:

(1) 25 hours of total IFR flight experience in the relevant operating environment; and

(2) 25 hours of flight experience as single pilot on VTOL-capable aircraft, of which 10 hours may be flown under supervision, including 5 sectors of IFR line flying under supervision using single-pilot procedures; and

(3) shall have completed during the preceding 90 days:

(i) 5 IFR flights as single pilot, including 3 instrument approaches, carried out on a VTOL-capable aircraft approved for this purpose; or

(ii) an IFR instrument approach check as single pilot on a VTOL-capable aircraft or in an FSTD representing that aircraft.

ORO.FC.430 Recurrent training and checking — operator proficiency check

(a) Operator proficiency check

(1) Flight crew members shall complete operator proficiency checks to demonstrate their competence in carrying out normal, abnormal and emergency procedures, covering the relevant aspects associated with the specialised tasks described in the operations manual.

(2) Appropriate consideration shall be given when operations are performed under IFR or at night.

(3) The validity period of the operator proficiency check shall be 12 calendar months.

(b) Emergency and safety equipment training and checking

The validity period of an emergency and safety equipment check shall be 12 calendar months.

[…]

ORO.TC.100 Scope

This Subpart establishes the requirements to be met by the operator when operating an aircraft with technical crew members in commercial air transport helicopter emergency medical service (HEMS), VEMS, night-vision imaging system (NVIS) operations or helicopter hoist operations (HHO).

ORO.TC.105 Conditions for assignment to duties

(a) Technical crew members in commercial air transport HEMS, VEMS, HHO or NVIS operations shall only be assigned duties provided ~~if~~ they:

(1) are at least 18 years of age;

(2) are physically and mentally fit to safely discharge their assigned duties and responsibilities;

(3) have completed all applicable training required by this Subpart to perform their assigned duties;

(4) have been checked ~~as~~ and found to be proficient to perform all their assigned duties in accordance with the procedures specified in the operations manual.

[…]

ORO.TC.120 Operator conversion training

[…]

(b) The ~~O~~operator conversion training shall include:

(1) the location and use of all safety and survival equipment carried on board ~~the~~ aircraft;

(2) all normal and emergency procedures;

(3) on-board equipment used to carry out duties in the aircraft or on the ground for the purpose of assisting the pilot during HEMS, VEMS, HHO or NVIS operations.

[…]

ORO.TC.130 Familiarisation flights

Following the completion of the operator conversion training, each technical crew member shall undertake familiarisation flights prior to operating as a required technical crew member in HEMS, VEMS, HHO or NVIS operations.

[…]

ORO.FTL.100 Scope

This Subpart establishes the requirements to be met by an operator and its flight and cabin crew (aircrew) members with regard to flight and duty time limitations and rest requirements for ~~crew members~~ aircrew in commercial air transport (CAT) operations with aeroplanes.

[…]

3.6.5. Annex V (Part-SPA)

SPA.GEN.100 Competent authority

(a) The competent authority for issuing a specific approval shall be:

(1) for the commercial operator, the authority of the Member State in which the operator has its principal place of business;

(2) for the non-commercial operator, the authority of the State in which the operator has its principal place of business, is established or resides~~is residing~~;

(3) for the operator of VTOL-capable aircraft in IAM operations, the authority of the Member State in which that operator has its principal place of business.

[…]

SPA.PBN.100 PBN operations

(a) An approval is required for each of the following PBN specifications:

(1) RNP AR APCH; and

(2) RNP 0.3 for helicopter operations or for operations with VTOL-capable aircraft.

[…]

SPA.MNPS.100 MNPS operations

Aircraft other than VTOL-capable aircraft shall only be operated in designated minimum navigation performance specifications (MNPS) airspace in accordance with regional supplementary procedures, where minimum navigation performance specifications are established, if the operator has been granted an approval by the competent authority to conduct such operations.

[…]

SPA.RVSM.100 RVSM operations

Aircraft other than VTOL-capable aircraft shall only be operated in designated airspace where a reduced vertical separation minimum of 300 m (1 000 ft) applies between flight level (FL) 290 and FL 410, inclusive, if the operator has been granted an approval by the competent authority to conduct such operations.

[…]

SPA.LVO.100 Low visibility operations and operations with operational credits

The operator of aircraft other than VTOL-capable aircraft shall conduct the following operations only if they are approved by the competent authority:

[…]

SPA.DG.100 Transport of dangerous goods

Except as provided for in Annex IV (Part-CAT), Annex VI (Part-NCC), Annex VII (Part-NCO) ~~and~~, Annex VIII (Part-SPO) and Annex IX (Part-IAM) to this Regulation, the operator shall only transport dangerous goods by air if the operator has been approved by the competent authority.

[…]

SUBPART H: ~~HELICOPTER~~ OPERATIONS WITH NIGHT-VISION IMAGING SYSTEMS

SPA.NVIS.100 Night vision imaging system (NVIS) operations

(a) Helicopters or VTOL-capable aircraft shall only be operated under VFR at night with the aid of NVIS if the operator has been approved for such operations by the competent authority.

(b) To obtain such approval by the competent authority, the operator shall:

(1) operate in commercial air transport (CAT) or in IAM operations and hold ~~a CAT~~ an AOC in accordance with Annex III (Part-ORO);

(2) demonstrate to the competent authority:

(i) compliance with the applicable requirements contained in this Subpart;

(ii) the successful integration of all elements of the NVIS.

SPA.NVIS.110 Equipment requirements for NVIS operations

(a) Before conducting NVIS operations, each helicopter / VTOL-capable aircraft and all associated NVIS equipment shall have been issued with the relevant airworthiness approval in accordance with Regulation (EU) No 748/2012.

(b) *Radio altimeter*. The helicopter / VTOL-capable aircraft shall be equipped with a radio altimeter capable of emitting an audio warning below a pre-set height and an audio and visual warning at a height selectable by the pilot, instantly discernible during all phases of NVIS flight.

(c) *Aircraft NVIS compatible lighting*. To mitigate the reduced peripheral vision cues and the need to enhance situational awareness, the following shall be provided:

(1) NVIS-compatible instrument panel flood-lighting, if installed, that can illuminate all essential flight instruments;

(2) NVIS-compatible utility lights;

(3) portable NVIS-compatible flashlight; and

(4) a means for removing or extinguishing internal NVIS-incompatible ~~non-compatible~~ lights.

(d) *Additional NVIS equipment*. The following additional NVIS equipment shall be provided:

(1) a back-up or secondary power source for the night vision goggles (NVG);

(2) a helmet with the appropriate NVG attachment.

(e) All required NVGs on an NVIS flight shall be of the same type, generation and model.

(f) Continuing airworthiness

(1) Procedures for continuing airworthiness shall contain the information necessary for carrying out ongoing maintenance and inspections on NVIS equipment installed in the helicopter / VTOL-capable aircraft and shall cover, as a minimum:

(i) helicopter / VTOL-capable aircraft windscreens and transparencies;

(ii) NVIS lighting;

(iii) NVGs; and

(iv) any additional equipment that supports NVIS operations.

(2) Any subsequent modification or maintenance to the aircraft shall be in compliance with the NVIS airworthiness approval.

[…]

SPA.NVIS.130 Crew requirements for NVIS operations

[…]

(d) *Recency*. All pilots and NVIS technical crew members that conduct~~ing~~ NVIS operations shall have completed 3~~three~~ NVIS flights in the last 90 days. Recency may be re-established on a training flight in the helicopter / VTOL-capable aircraft or an approved full flight simulator (FFS) / flight simulator representing the VTOL-capable aircraft, which shall include the elements of point (f)(1).

[…]

SPA.EFB.100 Use of electronic flight bags (EFBs) — operational approval

(a) A commercial air transport operator of aeroplanes and helicopters or an IAM operator shall only use a type B EFB application if the operator has been granted an approval by the competent authority for such use.

[…]

SUBPART O — EMERGENCY MEDICAL SERVICE OPERATIONS WITH VTOL-CAPABLE AIRCRAFT (VEMS)

SPA.VEMS.100 Emergency medical service operations with VTOL-capable aircraft (VEMS operations)

(a) VTOL-capable aircraft shall only be operated for the purpose of emergency medical services (VEMS) operations, in manned configuration, provided the operator has been granted an approval by the competent authority.

(b) To obtain such approval by the competent authority, the operator shall:

(1) hold an AOC in accordance with Annex III (Part-ORO); and

(2) demonstrate to the competent authority compliance with the requirements contained in this Subpart.

(c) Night operations to non-pre-surveyed VEMS operating sites outside congested areas with sufficient artificial ambient light shall be conducted under an approval in accordance with point SPA.NVIS.100.

SPA.VEMS.110 Equipment requirements for VEMS operations

(a) The installation of all VTOL-capable-aircraft dedicated medical equipment and any subsequent modifications and, where appropriate, its operation shall be approved in accordance with Regulation (EU) No 748/2012.

(b) For VFR flights over routes or areas navigated by reference to visual landmarks, the VTOL-capable aircraft shall be equipped with a device that provides a moving map display with own-ship position and obstacles. The map and obstacle database(s) shall be kept up to date.

(c) For single-pilot operations at night, the VTOL-capable aircraft shall be equipped with an autopilot.

(d) For VEMS operations by day, the VTOL-capable aircraft shall be equipped with means of measuring and displaying to the pilot the attitude and the stabilised heading.

(e) For VEMS operations, the VTOL-capable aircraft shall be equipped with a radio altimeter capable of emitting an audio warning below a pre-set height and an audio and visual warning at a height selectable by the pilot, instantly discernible during all phases of NVIS flight.

(f) In addition to point UAM.IDE.MVCA.350 of Annex IX, VTOL-capable aircraft employed in VEMS missions shall be equipped with an ADS-B Out capable device.

(g) Instruments and equipment required in points (c) to (f) shall be airworthiness approved.

(h) The operator shall ensure that all relevant information is documented in the minimum equipment list (MEL).

SPA.VEMS.115 Communication

In addition to the requirements for instruments and equipment applicable to VTOL-capable aircraft in manned configuration, VTOL-capable aircraft that conduct VEMS flights shall have communication equipment capable of conducting two-way communication with the organisation for which the VEMS operation is conducted and, where possible, to communicate with ground emergency service personnel at the scene of the operation.

SPA.VEMS.120 Operating minima

The VMC minima for the dispatch and en-route phase of the VEMS flight shall be as defined by the applicable airspace requirements. If during the en-route phase the weather conditions fall below the VMC minima:

(1) VTOL-capable aircraft certified for flights only under VFR shall abandon the flight or return to base;

(2) VTOL-capable aircraft certified for IFR operations may abandon the flight, return to base, or convert in all respects to a flight conducted under IFR, provided the flight crew are suitably qualified.

SPA.VEMS.125 Performance requirements for VEMS operations

(a) The VEMS operating site features shall provide for adequate clearance from all obstructions and provide for safe operations. For night operations, the VTOL-capable aircraft lighting system shall adequately illuminate the landing site and surrounding obstacles.

(b) VEMS operations shall only be conducted if the safe continuation of the flight to a suitable aerodrome or operating site is ensured in the event of a critical failure for performance.

SPA.VEMS.130 Crew requirements

(a) *Selection*. The operator shall establish criteria for the selection of flight crew members for VEMS operations, taking prior crew experience into account.

(b) (Reserved)

(c) *Operational training*. Successful completion of operational training in accordance with the VEMS procedures contained in the operations manual.

(d) *Flight training by sole reference to instruments.* Pilots that conduct VEMS operations without valid instrument rating shall complete flight training to proficiency by sole reference to instruments in a VTOL-capable aircraft or in an FSTD to acquire the skills to avoid unintended entry into IMC conditions. The validity period of this training shall be 6 calendar months.

(e) Crew composition

(1) *Day flight*. The minimum crew for day flight shall be either of the following:

(i) 2 pilots; or

(ii) 1 pilot and 1 VEMS technical crew member;

(iii) 1 pilot only if one of the situations below apply; once the crew is reduced to 1 pilot, the pilot-in-command shall only operate to/from VEMS operating sites if they have previously had an in-flight reconnaissance with 2 crew members during the same VEMS mission.

(A) The commander is required to fetch additional medical supplies, refuel, or reposition while the VEMS technical crew member provides medical assistance on the ground.

(B) The patient requires the assistance of the VEMS technical crew member during the transport.

(2) *Night flight*. The minimum crew for night flight shall be either of the following:

(i) 2 pilots; or

(ii) 1 pilot and 1 VEMS technical crew member;

(iii) 1 pilot if all the following conditions are met:

(A) the patient requires the assistance of the VEMS technical crew member during the transport; and

(B) both the departure and destination sites are aerodromes.

(3) The operator shall ensure that the continuity of a crew concept is maintained throughout the VEMS mission.

(f) Flight and technical crew training and checking

(1) Training and checking shall be conducted in accordance with a detailed syllabus approved by the competent authority and included in the operations manual.

(2) Crew members

(i) All relevant elements of the crew training programme shall improve knowledge of the VEMS working environment and equipment; improve crew coordination; and include measures to minimise the risks associated with en-route transit in low-visibility conditions, the selection of VEMS operating sites, and approach and departure profiles.

(ii) The measures referred to in (f)(2)(i) shall be assessed during:

(A) VMC day proficiency checks, or VMC night proficiency checks when night VEMS operations are undertaken by the operator; and

(B) line checks.

(iii) the VEMS components of the proficiency checks and line checks referred to in (f)(2)(ii) shall both have a validity period of 12 calendar months.

SPA.VEMS.135 Briefing of medical passengers and of other personnel

(a) *Medical passengers*. Prior to any VEMS flight, or series of VEMS flights, medical passengers shall be briefed to ensure they are familiar with the VEMS working environment and equipment, can operate on-board emergency equipment, and can take part in normal and emergency entry and exit procedures.

(b) *Ground emergency service personnel*. Where ground emergency service personnel are employed, the operator shall take all necessary measures to ensure that such personnel are familiar with the VEMS working environment and equipment, and the risks associated with ground operations at an airborne EMS operating site.

(c) *Medical patient*. Notwithstanding point UAM.OP.MVCA.170 of Annex IX, a briefing shall only be held if the medical condition of the medical patient renders this practicable.

SPA.VEMS.140 Information, procedures and documentation

(a) The operator shall assess, mitigate and minimise the risks associated with the VEMS environment as part of its risk analysis and management process. The operator shall describe its mitigating measures, including operating procedures, in the operations manual.

(b) The operator shall ensure that the VEMS commander assesses specific risks associated with a particular VEMS flight.

(c) Relevant extracts from the operations manual shall be made available to the organisation for which VEMS operations shall be provided.

SPA.VEMS.145 Facilities at the operating base

(a) If crew members are required to be on standby with a reaction time of less than 45 minutes, dedicated suitable accommodation shall be provided in the vicinity of each operating base.

(b) At each operating base, the flight crew shall be granted access to facilities for obtaining current and forecast weather information and shall be provided with adequate communications with the appropriate air traffic service (ATS) units. Adequate facilities shall be available for the planning of all related tasks.

SPA.VEMS.155 Fuel/energy scheme — fuel/energy planning and in-flight replanning

Notwithstanding point UAM.OP.VCA.155(c)(5) of Annex IX, the final reserve fuel/energy for VEMS operations shall not be less than the equivalent amount of fuel/energy that is needed to:

(1) perform a go-around, a short repositioning to another landing area, an in-flight reconnaissance, and another approach;

(2) manage an abnormal or emergency situation that occurs in the situation described in point (1).

The operator shall specify the minimum final reserve fuel/energy in the operations manual (OM).

SPA.VEMS.195 Fuelling / defuelling / battery charging while passengers are embarking, on board, or disembarking

A refuelling / defuelling / battery-charging procedure while passengers are embarking, on board, or disembarking shall be established by the operator.

SPA.VEMS.280 Aircraft tracking system

The operator shall establish and maintain a monitored aircraft tracking system for VEMS operations for the entire duration of the VEMS flight.

3.6.6. Draft Annex IX (Part-IAM)

ANNEX IX (PART-IAM)

SUBPART A — GENERAL REQUIREMENTS

IAM.GEN.100 Scope

This Annex shall apply to the following operations in congested or outside congested areas:

(a) commercial and non-commercial air transport of passengers and/or cargo with VTOL-capable aircraft, in manned configuration.

(b) (Reserved)

SECTION 1

VTOL-CAPABLE AIRCRAFT (VCA)

IAM.GEN.VCA.050 Scope

Section 1 contains general requirements for the operation of VTOL-capable aircraft in any configuration (manned/unmanned) and in any area (congested/non-congested).

IAM.GEN.055 Competent authority

The competent authority of an operator shall be the authority designated by the Member State in which the aircraft operator has its principal place of business or the Agency in accordance with Article 65 of Regulation (EU) 2018/1139 of the European Parliament and of the Council.

IAM.GEN.VCA.100 Pilot responsibilities

(a) The pilot shall be responsible for the proper execution of their duties that are:

(1) related to the safety of the aircraft and its occupants; and

(2) specified in the operations manual (OM) of the aircraft operator.

(b) The pilot shall:

(1) report to the pilot-in-command any fault, failure, malfunction or defect which the pilot believes may affect the airworthiness or the safe operation of the aircraft, including emergency systems, if not already reported by another crew member;

(2) report to the pilot-in-command any incident that endangered, or could have endangered, the safety of the operation, if not already reported by another crew member;

(3) comply with the relevant requirements of the operator's occurrence-reporting schemes;

(4) comply with the flight time, duty time and rest requirements applicable to their activities;

(5) not disable or switch off the flight recorder during flight, and shall not intentionally erase its recordings.

(c) The pilot shall not perform duties related to the operation of aircraft:

(1) when under the influence of psychoactive substances or when unfit due to injury, fatigue, medication, sickness or other similar causes;

(2) if they do not fulfil applicable medical requirements;

(3) if they are in any doubt of being able to accomplish their assigned duties;

(4) if they know or suspect they suffer from fatigue as referred to in point 7.5 of Annex V to Regulation (EU) 2018/1139 or otherwise feel unfit to the extent that the flight may be endangered.

IAM.GEN.VCA.105 Responsibilities of the pilot-in-command (PIC)

(a) In addition to complying with point UAM.GEN.VCA.100, the PIC shall, as soon as they assume the commander's functions at the assigned station until they hand over the commander's functions or leave the assigned station at the end of the flight:

(1) be responsible for the safety of all crew members, passengers and cargo on board aircraft;

(2) be responsible for the operation and safety of the VTOL-capable aircraft when the lift or thrust units are powered;

(3) have the authority to give all commands and take any appropriate actions for the purpose of ensuring the safety of the VTOL-capable aircraft and of the persons and/or property carried in it;

(4) ensure that all passengers are briefed on the location of emergency exits and the location and use of relevant safety and emergency equipment, as applicable;

(5) ensure that all operational procedures and checklists are complied with in accordance with the operations manual of the aircraft operator;

(6) not permit any crew member to perform any activity during critical phases of flight, except duties required for the safe operation of the aircraft;

(7) ensure that the flight recorder is not disabled nor switched off during the flight and that its recordings are not intentionally erased;

(8) decide on the acceptance of the aircraft with unserviceability in accordance with the configuration deviation list (CDL) or the minimum equipment list (MEL) and the aircraft technical logbook;

(9) ensure that the pre-flight inspection has been carried out in accordance with the applicable continuing airworthiness requirements;

(10) be satisfied that the relevant emergency equipment remains easily accessible for immediate use;

(11) record, at the termination of the flight, in accordance with the continuing airworthiness record system requirements, utilisation data and all known or suspected defects of the aircraft to ensure continued flight safety.

(b) The PIC shall, in an emergency situation that requires immediate decision and action, take any action they consider necessary under the given circumstances. In such cases, the PIC may deviate from the rules, operational procedures and methods in the interest of safety.

(c) Whenever the aircraft in flight has manoeuvred in response to collision avoidance alerts generated by the DAA system installed on the aircraft, the PIC shall submit a report to the competent authority.

(d) The PIC shall, as soon as possible, report to the appropriate air traffic service (ATS) unit any hazardous weather or flight conditions encountered that are likely to affect the safety of other aircraft.

IAM.GEN.VCA.110 Authority of the pilot-in-command (PIC)

The operator shall take all reasonable measures to ensure that all persons carried on board aircraft obey all lawful commands given by the PIC for the purpose of ensuring the safety of the aircraft and of the persons or property carried therein.

IAM.GEN.VCA.120 Common language

The operator's personnel involved in the operations shall communicate with each other in a common language.

IAM.GEN.VCA.130 Powering on of lift or thrust units

VTOL-capable aircraft lift or thrust units shall only be powered on for the purpose of flight by a qualified pilot at the aircraft controls.

IAM.GEN.VCA.140 Portable electronic devices (PEDs)

The operator shall not permit any person to use a PED on board aircraft that could adversely affect the performance of the aircraft's systems and equipment, and shall take all reasonable measures to prevent such use.

IAM.GEN.VCA.141 Use of electronic flight bags (EFBs)

(a) Where an EFB is used, the operator shall ensure that it does not adversely affect the performance of the aircraft systems or equipment, or the ability of the pilot to operate the aircraft.

(b) The operator shall not use a type B EFB application unless it is approved in accordance with Subpart M of Annex V (Part-SPA).

IAM.GEN.VCA.145 Information on emergency and survival equipment carried onboard aircraft

The operator of VTOL-capable aircraft shall have a list that contains information on the emergency and survival equipment carried on board for immediate communication to rescue coordination centres (RCCs).

IAM.GEN.VCA.155 Carriage of weapons of war and munitions of war

The operator shall not accept weapons of war or munitions of war for carriage by air.

Rationale:
Considering the business concepts for VTOL-capable-aircraft operations, the carriage of weapons of war on board should be an exception rather than a normal operation. This, coupled with security risks, suggests that such carriage should not be permitted. Where this is needed, the flexibility provisions established by Regulation (EU) 2018/1139 may be used.

IAM.GEN.VCA. 160 Carriage of sporting weapons and ammunition

The operator shall not accept sporting weapons for carriage by air unless:

(a) they can be stowed in the aircraft in a place that is inaccessible to passengers during flight; and

(b) all ammunition is unloaded and carried separately from sporting weapons.

Rationale:
If sporting weapons cannot be stowed in a place that is not inaccessible with ammunition unloaded, then they shall not be accepted for carriage. Exemptions may be granted by the NCA on a case-by-case basis.

IAM.GEN.VCA.165 Method of carriage of persons

The operator shall take reasonable measures to ensure that no person is located in any part of the aircraft in flight that is not designed or designated for the accommodation of persons, except when that person takes action that is necessary for the safety of the aircraft or of any person, animal or goods therein.

IAM.GEN.VCA.170 Psychoactive substances

(a) The operator shall take all reasonable measures to ensure that no person enters or is aboard the aircraft when under the influence of psychoactive substances to the extent that the safety of the aircraft or its occupants is likely to be endangered.

(b) The operator shall develop and implement an objective, transparent and non-discriminatory policy and procedure on the prevention and detection of misuse of psychoactive substances by the flight crew and other safety-sensitive personnel under its direct control, in order to ensure that the safety of the aircraft and its occupants is not endangered.

(c) In case flight crews and other personnel are tested positive to psychoactive substances, the operator shall inform its competent authority and the authority that is responsible for the flight crew and personnel concerned.

IAM.GEN.VCA.175 Endangering safety

(a) The operator shall take all reasonable measures to ensure that no person recklessly, intentionally or negligently acts or omits to act so as to:

(1) endanger an aircraft or a person(s) therein; or

(2) cause or permit an aircraft to endanger any person or property.

(b) The operator shall ensure that pilots undergo a psychological assessment before commencing flight operations in order to:

(1) identify the pilots' psychological attributes and suitability in respect of their work environment; and

(2) reduce the likelihood of pilots negatively interfering with the safe operation of the aircraft.

IAM.GEN.VCA.176 Pilot support programme

(a) The operator shall enable, facilitate and ensure access to a proactive and non-punitive support programme that will assist and support pilots in recognising, coping with, and overcoming any problem which might negatively affect their ability to safely exercise the privileges of their licence.

(b) Without prejudice to applicable national legislation on the protection of individuals with regard to the processing of personal data and on the free movement of such data, the protection of the confidentiality of data shall be a precondition for an effective support programme as it encourages the use of such a programme and ensures its integrity.

IAM.GEN.VCA.185 Information to be preserved on the ground

(a) The operator shall ensure that for the duration of each flight or series of flights:

(1) the information that is relevant to the flight and appropriate for the type of operation is preserved on the ground;

(2) that information is preserved until it has been duplicated at the place at which it will be stored; or, if this is impracticable,

(3) that information is carried onboard the aircraft and preserved in a fireproof container.

(b) The information referred to in point (a) includes:

(1) a copy of the operational flight plan;

(2) copies of the relevant part(s) of the aircraft technical log or aircraft logbook, as applicable;

(3) route-specific NOTAM documentation, if specifically edited by the operator;

(4) mass and balance documentation.

IAM.GEN.VCA.190 Provision of documentation and records

The PIC shall, within a reasonable time of being requested to do so by a person authorised by an authority, provide that person with the documentation required to be carried on board, in paper or digital media.

IAM.GEN.VCA.195 Handling of recording-system recordings: preservation, production, protection and use

(a) Following an accident, a serious incident or an occurrence identified by the investigating authority, the operator shall preserve the original recorded data of the recording system, as required under Subpart D of this Annex, for a period of 60 days or until otherwise directed by the investigating authority.

(b) The operator shall conduct operational checks and evaluations of the recordings to ensure the continued serviceability of the recording system.

(c) The operator shall ensure that the recordings of flight parameters and data link communication messages required to be recorded on the recording system are preserved. For the purpose of testing and maintaining the recording system, up to 1 hour of the oldest recorded material at the time of testing may be erased.

(d) The operator shall keep and maintain up to date the documentation that presents the necessary information to convert raw flight data into parameters expressed in engineering units.

(e) The operator shall make available any recording of the recording system that has been preserved, if so determined by the competent authority.

(f) Without prejudice to Regulation (EU) No 996/2010 of the European Parliament and of the Council[53]:

(1) Except for ensuring the serviceability of the recording system, the audio recordings shall not be disclosed or used, unless all the following conditions are fulfilled:

(i) a procedure related to the handling of such audio recordings and of their transcript is in place;

(ii) all pilots and maintenance personnel concerned have given their prior consent;

(iii) such audio recordings are used only for maintaining or improving safety;.

[53] Regulation (EU) No 996/2010 of the European Parliament and of the Council of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation and repealing Directive 94/56/EC (OJ L 295, 12.11.2010, p. 35).

(2) When inspecting the audio recordings of the recording system to ensure their serviceability, the operator shall protect the privacy of those audio recordings and make sure that they are not disclosed or used for purposes other than for ensuring the serviceability of the recording system.

(3) Flight parameters or data link messages recorded by the recording system shall not be used for purposes other than for the investigation of an accident or an incident which is subject to mandatory reporting, unless such recordings meet any of the following conditions:

(i) are used by the aircraft operator for airworthiness or maintenance purposes only;

(ii) are de-identified;

(iii) are disclosed under secure procedures.

(4) Except for ensuring the serviceability of the recording system, recorded images of the aircraft cabin shall not be disclosed or used unless all the following conditions are fulfilled:

(i) a procedure related to the handling of such image recordings is in place;

(ii) all pilots and maintenance personnel concerned have given their prior consent;

(iii) such image recordings are used only for maintaining or improving safety.

(5) When images of the aircraft cabin recorded by the recording system are inspected for ensuring the serviceability of that system, then:

(i) those images shall not be disclosed or used for purposes other than for ensuring the serviceability of the recording system;

(ii) if body parts of pilots or passengers are likely to be visible on the images, the operator shall ensure the privacy of those images.

IAM.GEN.VCA.200 Transport of dangerous goods

(a) The carriage of dangerous goods by air shall be conducted in accordance with Annex 18 to the Chicago Convention, as last amended and amplified by the *Technical instructions for the safe transport of dangerous goods by air* (TIs), including its supplements and any other addenda or corrigenda.

(b) The operator shall be approved for the carriage of dangerous goods by air in accordance with Subpart G of Annex V (Part-SPA), except when:

(1) those dangerous goods are not subject to the TIs in accordance with Part 1 of the TIs; or

(2) those dangerous goods are carried by passengers or pilots, or are in baggage, as provided for in Part 8 of the TIs.

(c) The operator shall establish procedures to ensure that all reasonable measures are taken to prevent dangerous goods from being carried on board inadvertently.

(d) All operator's personnel and aircraft passengers shall be provided with the necessary information about the carriage of dangerous goods on their aircraft in accordance with the TIs.

(e) Information notices about the carriage of dangerous goods shall be provided at acceptance points for cargo.

(f) Accidents and incidents with dangerous goods, as well as the discovery of undeclared or misdeclared dangerous goods, shall be reported to the appropriate authority in accordance with the TIs.

SECTION 2

VTOL-CAPABLE AIRCRAFT IN MANNED CONFIGURATION (MVCA)

IAM.GEN.MVCA.050 Scope

Section 2 establishes the requirements for the operation of VTOL-capable aircraft in manned configuration only, and shall apply in addition to Section 1 of Subpart A.

IAM.GEN.MVCA.135 Access to the pilot's assigned station

(a) The operator shall ensure that access to the pilot's assigned station in VTOL-capable aircraft is only granted to:

(1) the pilot and/or the pilot-in-command;

(2) representatives of the competent or inspecting authority, if this is required for the performance of their official duties; or

(3) other persons if this is in accordance with the operator's operations manual (OM).

(b) The pilot-in-command shall ensure that:

(1) access to the pilot's assigned station in the VTOL-capable aircraft does not cause distraction or interference with the operation of the flight; and

(2) all persons aboard the VTOL-capable aircraft are made familiar with the relevant safety procedures.

(c) The pilot-in-command shall make the final decision regarding the access to the pilot's station in the VTOL-capable aircraft.

IAM.GEN.MVCA.180 Documents, manuals and information to be carried on board each flight

(a) The following documents, manuals and information, in paper or digital media, shall be carried on each flight with a VTOL-capable aircraft and shall be easily accessible for inspection purposes:

(1) the aircraft flight manual (AFM), or equivalent document(s);

(2) the original certificate of registration of the aircraft;

(3) the original certificate of airworthiness (CofA);

(4) the noise certificate, including an English translation where one has been provided by the authority that is responsible for issuing the noise certificate;

(5) a certified true copy of the air operator certificate (AOC), including an English translation when the AOC has been issued in another language;

(6) the operations specifications relevant to the aircraft type, issued with the AOC, including an English translation when the operations specifications have been issued in another language;

(7) the original aircraft radio licence, if applicable;

(8) the third-party liability insurance certificate(s);

(9) the journey log, or equivalent, for the aircraft;

(10) the continuing airworthiness records, as applicable;

(11) details of the filed ATS flight plan, if applicable;

(12) current and suitable aeronautical charts for the route of the proposed flight and all routes along which it is reasonable to expect that the flight may be diverted;

(13) procedures and visual signals information for use by intercepting and intercepted aircraft;

(14) information concerning search and rescue services for the area of the intended flight, which shall be easily accessible in the aircraft;

(15) the current parts of the operations manual that are relevant to the duties of the pilots, which shall be easily accessible to those pilots;

(16) the MEL;

(17) appropriate notices to airmen (NOTAMs) and aeronautical information service (AIS) briefing documentation;

(18) appropriate meteorological information;

(19) cargo and/or passenger manifests;

(20) mass and balance documentation;

(21) the operational flight plan, where required;

(22) notification about special categories of passenger (SCPs), if applicable; and

(23) any other documentation that may be pertinent to the flight or is required by the States concerned with the flight.

(b) The documents, manuals, and information carried on each flight shall be accessible to authorised persons, usable, and reliable.

(c) Notwithstanding point (a), in case of loss or theft of the documents specified in points (a)(2) to (a)(8), the operation may continue until the flight reaches its destination or a place where replacement documents can be provided.

IAM.GEN.MVCA.181 Documents and information to be retained on the ground

Notwithstanding point UAM.GEN.MVCA.180, for operations conducted under visual flight rules (VFR) by day with manned VTOL-capable aircraft that take off and land at the same aerodrome within 24 hours, or remain within a local area specified in the operations manual, the following documents and information may be retained at the aerodrome instead of being carried on board each flight:

(a) noise certificate;

(b) aircraft radio licence;

(c) journey log, or equivalent;

(d) continuing airworthiness records;

(e) notices to airmen (NOTAMs) and aeronautical information service (AIS) briefing documentation;

(f) meteorological information;

(g) notification about special categories of passengers (SCPs), if applicable; and

(h) mass and balance documentation.

SECTION 3

VTOL-CAPABLE AIRCRAFT IN UNMANNED CONFIGURATION (UVCA)

(Reserved)

SUBPART B — OPERATING PROCEDURES

MODULE UAM-OP

SECTION 1

VTOL-CAPABLE AIRCRAFT (VCA)

UAM.OP.VCA.050 Scope

Section 1 of Module UAM-OP establishes the requirements for the operation of VTOL-capable aircraft in any configuration, where at least one segment of the flight takes place in a congested area.

UAM.OP.VCA.105 Use of aerodromes or operating sites

The operator shall use aerodromes, including heliports and vertiports, or operating sites:

(a) according to point UAM.OP.MVCA.107, for operations with VTOL-capable aircraft in manned configuration.

(b) (Reserved)

(c) (Reserved)

Rationale:

For the purpose of VTOL-capable-aircraft operations, aerodromes (including heliports and vertiports) and operating sites are considered. Vertiports are aerodromes predominantly used by and designed to accommodate VTOL-capable aircraft. Vertiports shall have adequate infrastructure and provide necessary services with regard to operations with VTOL-capable aircraft. Operating sites may only have a suitable surface for take-off/landing. Operations with passengers will only be possible to aerodromes. Cargo operations may use operating sites as well. 'Operating site' is defined in Regulation (EU) No 965/2012 as follows: '"operating site" means a site, other than an aerodrome, selected by the operator or pilot-in-command or commander for landing, take-off and/or external load operations.'

UAM.OP.VCA.125 Taxiing and ground movement

(a) The operator shall establish standard and contingency procedures for taxiing (air and ground) and for ground movement of VTOL-capable aircraft in order to ensure the safe operation of the aircraft at the aerodrome or operating site. In particular, the operator shall consider the risk of collision between aircraft being taxied or moved and another aircraft or other objects, as well as the risk of injuries to ground personnel. The operator's procedures shall be coordinated with the aerodrome operator, as applicable.

(b) VTOL-capable aircraft shall be taxied on the movement area of an aerodrome:

(1) by an appropriately qualified pilot at the controls of the aircraft; or

(2) in the case of ground taxi, by a person designated by the operator, after having received appropriate training and instructions, at the controls of the aircraft.

(c) The operator shall ensure that a ground movement of a VTOL-capable aircraft on the movement area of an aerodrome is carried out or supervised by personnel that have received appropriate training and instructions.

***Rationale**:*

'Taxiing' is the movement of a VTOL-capable aircraft on the movement area of an aerodrome under its own power, either on the ground by wheeled VTOL-capable aircraft or in the air. Ground taxiing may be performed by trained personnel other than pilots, whilst air taxi and hover taxi shall be performed by pilots.

'Ground movement' means the movement of a VTOL-capable aircraft on the movement area of an aerodrome with the support of external equipment or accessory that is not powered by the aircraft.

Point (c) also applies in the case of ground movement with automated/autonomous equipment. The automated/autonomous ground movement equipment still needs suitably trained personnel for the task, even if only monitoring the functioning of the systems.

UAM.OP.VCA.130 Noise-abatement procedures

(a) The operator shall establish appropriate operating procedures for noise abatement for each VTOL-capable aircraft type on its fleet, taking into account the need to minimise the effect of aircraft noise at aerodromes/operating sites.

(b) Such procedures shall:

(1) ensure that safety has priority over noise abatement; and

(2) be simple and safe to operate with no significant increase in flight crew workload during critical phases of flight.

UAM.OP.VCA.135 Routes and areas of operation

(a) The operator shall ensure that operations are only conducted along routes or within areas for which:

(1) space-based facilities, ground facilities and services, and meteorological services, adequate for the planned operation, are provided;

(2) surfaces are available that permit a landing to be executed in the case of critical failure for performance (CFP);

(3) the performance of the aircraft is adequate to comply with minimum flight altitude requirements;

(4) the equipment of the aircraft meets the minimum requirements for the planned operation; and

(5) appropriate maps and charts are available.

(b) The operator shall ensure that operations are conducted in accordance with any restriction on the routes or the areas of operation specified by the competent authority.

Rationale:

Point (a)(2): In VTOL certification, the concept equivalent to the 'one-engine-inoperative' in helicopters is critical failure for performance (CFP).

For the VTOL-capable aircraft category 'Enhanced', this requirement may be implemented through the selection of alternate aerodromes for the purpose of continued safe flight and landing (CSFL) following a CFP. For those VTOL-capable aircraft certified in the category 'Basic', the available surfaces (including aerodromes, operating sites and any other surface that may be used for landing) should allow for a controlled emergency landing (CEL) following a CFP.

UAM.OP.VCA.145 Establishment of minimum flight altitudes and lateral clearance distances

(a) For all route segments to be flown, the operator shall establish:

(1) minimum flight altitudes that provide the required vertical clearance from terrain and obstacles, taking into account the appropriate requirements of Subpart C of this Annex and the minima established by the State where the operation takes place;

(2) minimum lateral clearance distance from obstacles; and

(3) a method for the pilot to determine the altitudes and distances referred to in points (1) and (2).

(b) The method for establishing minimum flight altitudes and minimum lateral clearance distances shall be approved by the competent authority.

(c) Where the minimum flight altitudes and/or the minimum lateral clearance distances established by the operator and the State in which the operation takes place differ, the higher values shall apply.

UAM.OP.VCA.150 Fuel/energy scheme — general

(a) The operator shall establish, implement, and maintain a fuel/energy scheme that comprises policy and procedures for:

(1) fuel/energy planning and in-flight replanning;

(2) selection of aerodromes or operating sites; and

(3) in-flight fuel/energy management.

(b) The fuel/energy scheme shall:

(1) be appropriate for the intended operation; and

(2) correspond to the capacity of the operator to support its implementation.

(c) The fuel/energy scheme shall be included in the operations manual.

(d) The fuel/energy scheme and any change to it shall require prior approval by the competent authority.

Rationale:

Same approach as with that for point CAT.OP.MPA.190 'Fuel/energy scheme – helicopters' of Implementing Regulation (EU) 2021/1296[54].

UAM.OP.VCA.155 Fuel/energy scheme — fuel/energy planning and in-flight replanning

The operator shall ensure that:

(a) the aircraft carries a sufficient amount of usable fuel/energy and reserves to safely complete the planned flight and to allow for deviations from the planned operation;

(b) the planned amount of usable fuel/energy for the flight shall be based on:

(1) fuel/energy consumption data provided by the aircraft manufacturer or on current aircraft-specific data derived from a fuel/energy consumption monitoring system; and

(2) the operating conditions under which the flight is to be conducted, including but not limited to:

(i) performance required for the intended take-off profile, hover and fly to the destination and alternate, including the performance required for the intended landing profile;

(ii) anticipated masses;

(iii) anticipated meteorological conditions;

(iv) the effects of deferred maintenance items and/or configuration deviations;

(v) the expected departure and arrival routing, and anticipated delays;

(3) the efficiency and capacity of energy-storage devices for the planned operating conditions, considering degradation of those energy-storage devices, as appropriate;

(c) the pre-flight calculation of the usable fuel/energy and reserves for a flight includes:

(1) taxi fuel/energy that shall not be less than the amount expected to be used prior to take-off;

(2) trip fuel/energy that shall be the amount of fuel/energy that is needed to enable the aircraft to fly from take-off, or from the point of in-flight replanning, to landing at the

[54] Commission Implementing Regulation (EU) 2021/1296 of 4 August 2021 amending and correcting Regulation (EU) No 965/2012 as regards the requirements for fuel/energy planning and management, and as regards requirements on support programmes and psychological assessment of flight crew, as well as testing of psychoactive substances (OJ L 282, 5.8.2021, p. 5).

destination aerodrome or operating site, taking into account the operating conditions of point (b)(2);

(3) contingency fuel/energy that shall be the amount of fuel/energy needed to compensate for unforeseen factors;

(4) destination alternate fuel/energy: when a flight is operated with at least one destination alternate aerodrome or operating site, that shall be the amount of fuel/energy needed to fly from the destination aerodrome/operating site to the destination alternate aerodrome/operating site;

(5) final reserve fuel/energy that shall not be less than the amount of fuel/energy needed to:

(i) perform a go-around and another approach;

(ii) manage an abnormal or emergency situation that occurs during point (i).

The operator shall specify the minimum final reserve fuel/energy in the OM;

(6) additional fuel/energy: when a flight is operated with at least one en-route alternate aerodrome or operating site, that shall be the amount of fuel/energy to enable the VTOL-capable aircraft to perform a safe landing at an ERA aerodrome or en-route operating site considering the aircraft CMP in case of a CFP event; this additional fuel/energy is required only if the amount of fuel/energy that is calculated according to points (c)(2) to (c)(4) is not sufficient for such event;

(7) extra fuel/energy to take into account anticipated delays or specific operational constraints; and

(8) discretionary fuel/energy, if required by the pilot-in-command;

(d) in determining the final reserve fuel/energy:

(1) all the following is taken into consideration:

(i) conservative ambient conditions from the point of view of fuel/energy consumption;

(ii) an appropriate configuration/speed to perform the go-around and approach procedures;

(iii) a conservative fuel/energy consumption;

(2) adequate safety margins are applied to the following, as a minimum:

(i) differences in the fuel/energy consumption from the planned conditions to the actual conditions;

(ii) inaccuracy of the remaining usable fuel/energy indications;

(iii) conditions that may reduce the amount of usable fuel/energy;

(iv) human factors related to the flight crew managing a low fuel/energy situation;

(v) human factors related to the flight crew managing an abnormal/emergency situation;

(e) if a flight has to proceed along a route or to a destination aerodrome other than the route or destination aerodrome originally planned, in-flight replanning procedures for calculating the required usable fuel/energy include those referred to in point (b)(2) and points (c)(2) to (c)(7).

UAM.OP.VCA.160 Fuel/energy scheme — selection of aerodromes or operating sites

(a) The selection of aerodromes for the carriage of passengers by VTOL-capable aircraft in manned configuration shall be made in accordance with point UAM.OP.MVCA.181.

(b) (Reserved)

(c) (Reserved)

Rationale:

The selection of aerodromes/operating sites is part of the operator's fuel/energy scheme. As such, it should be part of the package of the implementing act that establishes the requirements for that scheme. At the same time, the selection of aerodromes/operating sites is an operating procedure dealing with flight preparation.

UAM.OP.VCA.165 Fuel/energy scheme — in-flight fuel/energy management

(a) The operator shall establish policy and procedures which ensure that in-flight fuel/energy checks and fuel/energy management are performed.

(b) The pilot-in-command shall monitor the amount of the remaining usable fuel/energy to ensure that it is protected and that it is not less than the fuel/energy required to proceed to an aerodrome or operating site where a safe landing can be performed.

(c) When a change to the clearance to a specific aerodrome or operating site at which the pilot-in-command has committed to land may result in landing with less than the planned final reserve fuel/energy, they shall advise the air traffic control (ATC) of a 'minimum fuel/energy' state by declaring 'MINIMUM FUEL'.

(d) The pilot-in-command shall declare a situation of 'fuel/energy emergency' by broadcasting 'MAYDAY MAYDAY MAYDAY FUEL' when the usable fuel/energy that is calculated to be available upon landing at the nearest aerodrome or operating site where a safe landing can be made is less than the planned final reserve fuel/energy.

UAM.OP.VCA.170 Special refuelling or defuelling of the aircraft

(a) Special refuelling or defuelling shall only be conducted if the operator:

(1) has developed standard operating procedures on the basis of a risk assessment; and

(2) has established a training programme for its personnel involved in such operations.

(b) Special refuelling or defuelling applies to:

(1) refuelling with an engine running, or rotors or propellers turning;

(2) refuelling/defuelling with passengers embarking, on board, or disembarking; and

(3) refuelling/defuelling with wide-cut fuel.

(c) Refuelling procedures with rotors or propellers turning, and any change to those procedures, shall require prior approval by the competent authority.

UAM.OP.VCA.190 Submission of ATS flight plan

The operator shall submit an ATS flight plan as required by the class of airspace in which the operation is conducted and the applicable rules of the air, as necessary for the intended operation.

Rationale:

Specific requirements on the submission of ATS flight plans for operations with manned VTOL-capable aircraft are placed under the MVCA section.

UAM.OP.VCA.210 Pilots at their assigned stations

(a) During take-off and landing, the pilot required to be on duty shall be at the assigned station.

(b) During all other phases of flight, the pilot required to be on duty shall remain at the assigned station unless absence is necessary for the performance of duties in connection with the operation or for physiological needs. Where absence is necessary for the above-mentioned reasons, the control of the aircraft shall be handed over to another suitably qualified pilot.

(c) During all phases of flight, the pilot required to be on duty shall remain alert. If a lack of alertness is experienced, appropriate countermeasures shall be taken. If unexpected fatigue is experienced, a controlled rest procedure, organised by the pilot-in-command, may be used if workload permits.

UAM.OP.VCA.245 Meteorological conditions

The operator shall ensure that the aircraft is operated within the weather operating limitations it is certified for, based on current and forecast weather for the entire duration of the flight.

In addition:

(a) The operator of manned VTOL-capable aircraft shall comply with point UAM.OP.MVCA.245.

(b) (Reserved)

(c) (Reserved)

UAM.OP.VCA.250 Ice and other contaminants — ground procedures

(a) The operator shall establish procedures to be followed when ground de-icing and anti-icing treatment and related inspections of the VTOL-capable aircraft are necessary for its safe operation.

(b) The pilot-in-command shall commence take-off only if the VTOL-capable aircraft is clear of any deposit that might adversely affect the performance or controllability of the aircraft in accordance with its AFM.

UAM.OP.VCA.255 Ice and other contaminants — flight procedures

(a) The operator shall establish procedures for flights in expected or actual icing conditions.

(b) The pilot-in-command shall only commence a flight or intentionally fly into expected or actual icing conditions if the VTOL-capable aircraft is certified and equipped to operate in such conditions.

(c) If actual icing exceeds the intensity of icing for which the aircraft is certified, or if an aircraft not certified for flight in known icing conditions encounters icing, the pilot-in-command shall exit the icing conditions without delay, if necessary by declaring an emergency to ATC.

Rationale:

Point UAM.OP.VCA.255 sets the objective — yet for some aircraft designs, inadvertent icing conditions might not be evaded by changing the level/corridor. The pilot-in-command shall either deviate from a flight path or terminate the flight, as the case may be. For this purpose, the operator must have procedures in place and the pilot-in-command must be trained in those procedures.

De-icing systems are usually heavy and bring with them high additional costs and high additional energy consumption. As VTOL-capable aircraft are usually smaller and lighter than other conventional aircraft, such a deployment may be difficult to implement technically. Nevertheless, the existence of a technical possibility for de-icing would be desirable and would further increase the availability of the onboard rescue equipment.

UAM.OP.VCA.260 Oil supply

The pilot-in-command shall only commence a flight, or continue in the event of in-flight replanning, when satisfied that the aircraft carries at least the planned amount of oil to complete the flight safely, taking into account expected operating conditions.

UAM.OP.VCA.265 Take-off conditions

Before commencing take-off, the pilot-in-command shall be satisfied that:

(a) the meteorological conditions at the aerodrome or operating site and the condition of the runway/FATO intended to be used will not prevent a safe take-off and departure; and

(b) the established aerodrome operating minima will be complied with.

UAM.OP.VCA.270 Minimum flight altitudes/heights

The pilot shall not fly below specified minimum flight altitudes/heights except when:

(a) necessary for take-off or landing; or

(b) descending in accordance with procedures approved by the competent authority.

UAM.OP.VCA.275 Simulated abnormal situations in flight

When carrying passengers or cargo, the pilot shall not simulate:

(a) abnormal or emergency situations that require the application of abnormal or emergency procedures; or

(b) flight in IMC by artificial means.

UAM.OP.VCA.290 Proximity detection

When undue proximity to the ground and/or obstacles located horizontally in relation to the VTOL-capable aircraft are detected by the pilot or by a proximity warning system, the pilot shall take corrective action immediately to establish safe flight conditions.

UAM.OP.VCA.295 Collision avoidance

When a detect and avoid (DAA) system is installed and active, the operator shall establish operational procedures and training programmes so that the pilot is appropriately trained and competent in the use of such equipment.

Rationale:

The implementing act only states the aircraft capability and does not refer to a particular system; the term 'DAA system' refers in general to a collision avoidance system in both manned and unmanned VTOL-capable-aircraft operations. An appropriate collision avoidance system may be required for operations with VTOL-capable aircraft depending on airspace requirements.

Collision avoidance can be achieved through electronic conspicuity devices (e.g. ACAS II, yet not applicable to small VTOL-capable aircraft; ADS-B applicable in the European airspace as from 2020 for aircraft above 5.7 t; or FLARM) or through the see-and-avoid principle. Predetermined VFR routes for operations with VTOL-capable aircraft may be established as part of the appropriate traffic organisation/management. VTOL routes may also be protected by geo-awareness service. VFR VTOL GNSS assistance for route adherence and enhanced see-and-avoid may also be used.

UAM.OP.VCA.300 Approach and landing conditions

Before commencing an approach operation, the pilot-in-command shall be satisfied that:

(a) the meteorological conditions at the aerodrome or operating site and the conditions of the runway/FATO intended to be used will not prevent a safe approach, landing or go-around, considering the performance information contained in the operations manual (OM);

(b) the established aerodrome operating minima shall be complied with.

UAM.OP.VCA.315 Reporting of flight hours

The operator shall make available to the competent authority the hours flown for each VTOL-capable aircraft operated during the previous calendar year.

SECTION 2

VTOL-CAPABLE AIRCRAFT IN MANNED CONFIGURATION (MVCA)

UAM.OP.MVCA.050 Scope

Section 2 of Module UAM-OP establishes the requirements for the operation of a VTOL-capable aircraft in manned configuration, and shall apply in addition to Section 1 of Module UAM-OP.

UAM.OP.MVCA.100 Use of air traffic services (ATS)

(a) The operator of a manned VTOL-capable aircraft shall ensure that:

(1) air traffic services (ATS) appropriate to the airspace in which the operation is conducted and the applicable rules of the air are used, whenever available, and in-flight operational instructions involving a change to the ATS flight plan are coordinated with the appropriate ATS unit before transmitted to the VTOL-capable aircraft;

(2) whenever the VTOL-capable aircraft enters a designated U-space airspace, the operation shall be conducted in accordance with the applicable rules of the air, and:

(i) the operational instructions from the ATS unit, if that U-space airspace interferes with controlled airspace; or

(ii) the aircraft has a functioning electronic conspicuity device if that U-space airspace interferes with uncontrolled airspace.

(b) Notwithstanding point (a)(1), for operations under VFR, the use of ATS is not required unless mandated by airspace requirements, provided that search and rescue service arrangements can be maintained.

Rationale:

— *point CAT.OP.MPA.100, and*

— *Implementing Regulation (EU) 2021/664[55] (the U-space Regulation).*

In the case of manned VTOL-capable aircraft that enter a U-space airspace established in controlled airspace, the ATC unit will segregate manned VTOL-capable aircraft from UAS by taking UAS and manned aircraft navigational performance into account, forcing UAS operators to discontinue their flights, vacate the restricted part of the U-space airspace, or conform with amended flight authorisations, as applicable.

In the case of manned VTOL-capable aircraft that enter a U-space airspace established in uncontrolled airspace, those aircraft must share their position with USSP and they must be equipped with an electronic conspicuity device sharing the aircraft position in a manner that is exploitable by all USSPs active in that particular U-space airspace. The pilot of the manned VTOL-capable aircraft ensures that their electronic conspicuity device operates correctly before entering the U-space airspace until the aircraft leaves the U-space airspace.

UAM.OP.MVCA.107 Adequate aerodrome

(a) The operator of VTOL-capable aircraft shall only use adequate aerodromes, including heliports or vertiports, for its normal operations, as well as for the purpose of diversion.

(b) The operator shall consider an aerodrome as adequate provided that at the expected time of use that aerodrome is:

(1) compatible with the dimensions and weight of the VTOL-capable aircraft;

(2) compatible with the VTOL-capable aircraft approach and departure paths;

(3) equipped with services and facilities necessary for the intended operation; and

(4) available.

(c) If approved to perform VEMS, the operator may, for the purpose of VEMS, use adequate operating sites taking into account:

(1) the aircraft performance requirements applicable for take-off and landing;

(2) operating site characteristics, including dimensions, obstacles, and surface condition;

(3) the safe separation of the VTOL-capable aircraft from people on the ground; and

[55] 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).

(4) privacy, data protection, liability, insurance, security, and environmental protection requirements.

UAM.OP.MVCA.110 Aerodrome operating minima

(a) The operator shall establish operating minima for each departure, destination and alternate aerodrome that is planned to be used in order to ensure separation of the VTOL-capable aircraft from terrain and obstacles and to mitigate the risk of a loss of visual references during the visual flight segment of instrument approach operations. These minima shall not be lower than those established for such aerodrome by the State in which it is located, except when specifically approved by that State. Any increment specified by the competent authority shall be added to the minima.

(b) The operator shall specify the method of determining aerodrome operating minima in the operations manual.

(c) The method used by the operator to establish aerodrome operating minima, and any change to that method, shall be approved by the competent authority.

UAM.OP.MVCA.125 Instrument departure and approach procedures

(a) The operator shall ensure that when instrument departure and approach procedures are flown, those procedures published by the State of the aerodrome for operations with manned VTOL-capable aircraft shall be used.

(b) Notwithstanding point (a), in controlled airspace, the pilot-in-command may accept ATC clearance to deviate from a published departure or arrival route, provided obstacle clearance criteria are observed and operating conditions are fully considered. In any case, the final approach shall be flown visually or in accordance with the established instrument approach procedures.

(c) Notwithstanding point (a), procedures other than those referred to in point (a) may be used if:

(1) the operator holds a specific approval for a PBN specification in accordance with Annex V (Part-SPA); or

(2) they are designed by the operator in compliance with the relevant aircraft airworthiness approval, aerodrome obstacle clearance criteria and navigation specifications for operation, and the operator has established standard operating procedures in the OM on the basis of a safety risk assessment.

Rationale:

Point (c)(2) covers the cases where an approach procedure for a particular aerodrome has not been established/published by the State in which that aerodrome is located; it allows the operator, under certain conditions, to design its own approach procedure.

UAM.OP.MVCA.126 Performance-based navigation (PBN)

The operator shall ensure that, when performance-based navigation (PBN) is required for the route or procedure to be flown:

(a) the relevant PBN navigation specification is stated in the AFM or other document that has been approved by the certifying authority of the VTOL-capable aircraft as part of an airworthiness assessment or is based on such approval; and

(b) the aircraft is operated in conformance with the relevant navigation specification and limitations in the AFM or other document as provided in point (a).

UAM.OP.MVCA.155 Carriage of special categories of passengers (SCPs)

(a) SCPs shall be carried under such conditions that ensure the safety of the aircraft and its occupants according to procedures established by the operator.

(b) SCPs shall not be allocated to, nor occupy, seats that permit direct access to emergency exits or where their presence could:

(1) impede crew members' duties;

(2) obstruct access to emergency equipment; or

(3) impede the emergency evacuation of passengers.

(c) The pilot-in-command shall be notified in advance when SCPs are to be carried on board.

UAM.OP.MVCA.160 Stowage of baggage and cargo

The operator shall establish procedures to ensure that:

(a) only baggage that can be adequately and securely stowed is taken into the passenger compartment; and

(b) all baggage and cargo on board the aircraft that might cause injury or damage, or obstruct aisles and exits if displaced, are stowed to prevent them from moving.

UAM.OP.MVCA.165 Passenger seating

The operator shall establish procedures to ensure that passengers are seated where, in the event that an emergency evacuation is required, they are able to assist and not hinder evacuation of the aircraft.

UAM.OP.MVCA.170 Passenger briefing

The operator shall ensure that passengers are:

(a) given safety briefings and demonstrations in a manner that facilitates the execution of the applicable procedures in the event of an emergency; and

(b) provided with safety briefing material on which picture-type instructions indicate the operation of emergency equipment and emergency exits likely to be used by passengers.

UAM.OP.MVCA.175 Flight preparation

(a) An operational flight plan (OFP) shall be completed for each intended flight taking into account the airspace and the applicable rules of the air, aircraft performance, operating limitations, and relevant expected conditions on the route to be followed and at the aerodrome to be used.

(b) The flight shall not be commenced unless the pilot-in-command is satisfied that:

(1) all items stipulated in point 2.c of Annex V to Regulation (EU) 2018/1139 concerning the airworthiness and registration of the aircraft, instrument and equipment, mass and centre of gravity (CG) location, baggage and cargo, and aircraft operating limitations can be complied with;

(2) the aircraft is not operated contrary to the provisions of the configuration deviation list (CDL);

(3) the parts of the operations manual that are required for the conduct of the flight are available;

(4) the documents, additional information and forms required to be available by point UAM.GEN.MVCA.180 are on board, unless permitted to be kept on the ground in accordance with point UAM.GEN.MVCA.181;

(5) current maps, charts and associated documentation or equivalent data are/is available for the intended operation of the aircraft, including any diversion that may reasonably be expected;

(6) space-based facilities, ground facilities and services that are required for the planned flight are available and adequate;

(7) the requirements specified in the operations manual in respect of fuel/energy, oil, oxygen, minimum safe altitudes, aerodrome operating minima and availability of alternate aerodrome can be complied with for the planned flight;

(8) any navigational database required for performance-based navigation is suitable and current;

(9) any additional operational limitations can be complied with;

(10) any load carried is properly distributed and safely secured;

(11) an air traffic service (ATS) flight plan has been approved and flight clearance has been granted in accordance with the applicable rules of the air and the class of airspace in which the operation is conducted.

UAM.OP.MVCA.181 Fuel/energy scheme — selection of aerodromes

(a) The pilot-in-command shall select and specify in the operational and, if so required, in the ATS flight plan one or more aerodromes so that at least two safe-landing options are available during normal operation until committing to land. The pilot-in-command shall commit to land at the destination aerodrome when the current assessment of the meteorological conditions, traffic, and other operational conditions indicates that a safe landing can be performed at the destination aerodrome at the estimated time of use.

(b) For the purpose of selecting aerodromes in accordance with point (a), the pilot-in-command shall consider whether:

(1) the actual and forecast weather conditions indicate that at the estimated time of use the conditions will be at or above the applicable aerodrome operating minima and the occupants will be protected after landing in case of adverse weather;

(2) adequate aerodromes are available;

(3) in abnormal or emergency conditions, the navigation capabilities and the certified minimum performance of the aircraft ensure continuous safe flight and landing;

(4) additional operational approvals are required and held.

(c) The pilot-in-command shall apply appropriate safety margins to flight planning in order to take into account possible deterioration of the meteorological conditions at the estimated time of landing compared to the available forecast.

(d) The pilot-in-command shall ensure that sufficient means are available to navigate and land at the destination aerodrome or at any alternate aerodrome in the case of a loss of the capability for the intended approach and landing operation.

UAM.OP.MVCA.190 Submission of ATS flight plan

(a) If an air traffic service (ATS) flight plan is not submitted because it is not required by the applicable rules of the air and the class of airspace in which the operation is conducted, adequate information shall be deposited in order to permit alerting services to be activated if required.

(b) When operating from a site where it is impossible to submit an ATS flight plan, the ATS flight plan shall be transmitted as soon as possible after take-off by the pilot-in-command or the operator.

UAM.OP.MVCA.195 Fuelling/defuelling while passengers are embarking, on board, or disembarking

(a) A VTOL-capable aircraft shall not be refuelled/defuelled with Avgas (aviation gasoline) or wide-cut type fuel or a mixture of these types of fuel when passengers are embarking, on board, or disembarking.

(b) For all other types of fuel, the necessary precautions shall be taken and the aircraft shall be properly manned by qualified personnel ready to initiate and direct passenger evacuation from the aircraft using the most practical and expeditious means available.

UAM.OP.MVCA.200 Charging of batteries while passengers are embarking, on board, or disembarking

When charging battery packs mounted on electric VTOL-capable aircraft while passengers are embarking, on board, or disembarking, the operator shall take the necessary precautions to avoid overcharge, overheat, short circuit and fire, and shall establish procedures to ensure that battery charging is otherwise not harmful to passengers embarking, on board, or disembarking.

UAM.OP.MVCA.215 Use of headsets

(a) Each pilot required to be on duty at the assigned station shall wear a headset with boom microphone or equivalent. The headset shall be used as the primary device for voice communications with ATS units.

(b) The boom microphone or equivalent shall be in a position that permits its use for two-way radio communications when the VTOL-capable aircraft is taxiing under its own power and whenever deemed necessary by the pilot-in-command.

UAM.OP.MVCA.220 Emergency evacuation assisting means

The operator shall establish procedures to ensure that before taxiing or ground movement, take-off and landing, and when safe and practicable to do so, all means of assistance for emergency evacuation that deploy automatically are armed.

UAM.OP.MVCA.225 Seats, safety belts and restraint systems

(a) *Pilots*

During take-off and landing, and whenever decided by the pilot-in-command in the interest of safety, each pilot shall be properly secured by all safety belts and restraint systems provided.

(b) *Passengers*

(1) Before take-off and landing, and during taxiing or ground movement, and whenever deemed necessary in the interest of safety, the pilot-in-command shall be satisfied that each passenger on board occupies a seat with their safety belt or restraint system properly secured.

(2) The operator shall make provisions for multiple occupancy of aircraft seats that is only allowed on specified seats. The pilot-in-command shall be satisfied that aircraft seats are not used for multiple occupancy other than by one adult and one infant that is properly secured by a supplementary loop belt or other restraint device.

UAM.OP.MVCA.230 Securing of passenger compartment

(a) The operator shall establish procedures to ensure that before taxiing or ground movement, take-off and landing, all exits and escape paths are unobstructed.

(b) The pilot-in-command shall ensure that before take-off and landing, and whenever deemed necessary in the interest of safety, all equipment and baggage are properly secured.

UAM.OP.MVCA.235 Life jackets

The operator shall establish procedures to ensure that, when operating a VTOL-capable aircraft over water, the duration of the flight and the conditions to be encountered are considered when deciding whether life jackets are to be worn by all aircraft occupants.

UAM.OP.MVCA.240 Smoking on board

The pilot-in-command shall not allow smoking on board at any time.

UAM.OP.MVCA.245 Meteorological conditions

(a) On IFR flights, the pilot-in-command shall only:

(1) commence the flight; or

(2) continue beyond the point from which a revised ATS flight plan applies in the event of in-flight replanning; or

(3) continue towards the planned destination aerodrome when information is available that indicates that the expected meteorological conditions, at the time of arrival, at the destination and/or destination alternate aerodrome(s), are at or above the aerodrome operating minima established in accordance with point UAM.OP.VCA.110.

(b) On VFR flights, the pilot-in-command shall only commence the flight when appropriate meteorological reports and/or forecasts indicate that the meteorological conditions along the part of the route to be flown under VFR will, at the appropriate time, be at or above the VFR limits.

UAM.OP.MVCA.285 Use of supplemental oxygen

The pilot-in-command shall ensure that all pilots engaged in the performance of duties essential to the safe operation of an aircraft during flight use supplemental oxygen continuously whenever the cabin altitude exceeds 10 000 ft for a period of more than 30 minutes and whenever the cabin altitude exceeds 13 000 ft.

UAM.OP.MVCA.305 Commencement and continuation of approach

(a) If the reported RVR and the controlling RVR for the runway/FATO to be used for landing are shorter than the required visual reference, then:

(1) the instrument approach operation shall be discontinued at any time if the required visual reference is not expected to be achieved in the final approach segment (FAS); or

(2) the pilot-in-command shall hold at the appropriate holding pattern, if available, until the reported RVR and controlling RVR are equal or greater than the required visual reference.

Whenever the approach is discontinued, the pilot-in-command shall divert to an alternate aerodrome where the required visual reference is expected to be met, taking into account fuel/energy reserves.

(b) If in the FAS the required visual reference is not established, then:

(1) for approach procedures for which DA/H or the MDA/H is defined, a missed approach shall be executed at or before the DA/H or the MDA/H;

(2) for approach procedures for which DA/H or the MDA/H is not defined, the pilot-in-command shall hold to wait for re-establishment of the required visual reference or a missed approach shall be executed as soon as practically possible.

(c) For approach procedures for which DA/H or the MDA/H is defined, if the required visual reference is not maintained after the DA/H or the MDA/H, then a go-around shall be promptly executed;

(d) For automatic approach and landing procedure (AALP) the operator shall comply with point UAM.OP.UVCA.305.

SECTION 3

VTOL-CAPABLE AIRCRAFT IN UNMANNED CONFIGURATION THAT CARRY PASSENGERS (UVCA)

(Reserved)

SECTION 4

VTOL-CAPABLE AIRCRAFT IN UNMANNED CONFIGURATION THAT CARRY CARGO (DVCA)

(Reserved)

MODULE NAM-OP

SECTION 1

VTOL-CAPABLE AIRCRAFT (VCA)

NAM.OP.VCA.050 Scope

(a) Section 1 of Module NAM-OP establishes only the specific requirements for the operation of VTOL-capable aircraft in any configuration, where all the segments of the flight take place outside a congested area.

(b) Where no specific requirement exists, the relevant Module UAM-OP requirements apply.

Rationale:

Operators that intend to conduct intercity operations with VTO-capable aircraft, including UAS, without flying over or taking off from / landing in congested (urban) areas, shall comply with Module-NAM-OP (operating procedures for non-urban, non-congested air mobility). Module NAP-OP is specifically relevant for lower-risk operations. Passenger operations and cargo deliveries may take place both in UAM and NAM.

NAM.OP.VCA.105 Use of aerodromes or operating sites

The operator shall use aerodromes, including heliports and vertiports, or operating sites depending on the type of operation.

NAM.OP.VCA.155 Fuel/energy scheme — fuel/energy planning and in-flight replanning

(a) Operations in NAM with VTOL-capable aircraft certified for the commercial air transport of passengers shall comply with point UAM.OP.VCA.155.

(b) Operations in NAM with VTOL-capable aircraft not certified for the commercial air transport of passengers shall comply with point UAM.OP.VCA.155, except for points (c)(4) and (6).

SECTION 2

VTOL-CAPABLE AIRCRAFT IN MANNED CONFIGURATION (MVCA)

NAM.OP.MVCA.050 Scope

(a) Section 2 of Module NAM-OP contains only the specific requirements for the operation of a VTOL-capable aircraft in manned configuration, where all segments of the flight are outside congested area, and applies in addition to Section 1 of Module NAM-OP.

(b) Where no specific requirement exists, the relevant implementing rules from Module UAM-OP apply.

NAM.OP.MVCA.181 Selection of aerodromes

(a) Operations in NAM with VTOL-capable aircraft certified for the commercial air transport of passengers shall comply with point UAM.OP. MVCA.181.

(b) For operations in NAM with VTOL-capable aircraft not certified for the commercial air transport of passengers, the pilot-in-command shall select and specify in the operational and, if so required, in the ATS flight plan at least one aerodrome/operating site where a safe landing may be performed.

***Rationale**:*

VTOL-capable aircraft that are certified in the SC VTOL category 'Enhanced' shall meet the requirements for continued safe flight and landing and shall be able to continue to the original intended destination or a suitable alternate aerodrome (vertiport) following a failure or a combination of failures whereas for SC VTOL category 'Basic', only controlled emergency landing requirements shall be met, in a similar manner to a controlled glide or autorotation.

If the vertiport is to be used by category 'Basic' VTOL-capable aircraft, it should be so located that a controlled emergency landing can be conducted at any time along the inbound and outbound routes, including the take-off and approach paths, without any undue risk to any person or property on the ground.

SECTION 3

VTOL-CAPABLE AIRCRAFT IN UNMANNED CONFIGURATION THAT CARRY PASSENGERS (UVCA)

(Reserved)

SECTION 4

VTOL-CAPABLE AIRCRAFT IN UNMANNED CONFIGURATION THAT CARRY CARGO (DVCA)

(Reserved)

SUBPART C — AIRCRAFT PERFORMANCE AND OPERATING LIMITATIONS

MODULE UAM-POL

UAM.POL.VCA.050 Scope

Module UAM-POL establishes the requirements for the performance and operating limitations of a VTOL-capable aircraft in any configuration, where at least one segment of the flight takes place in a congested area.

UAM.POL.VCA.100 Certification basis

The performance of VTOL-capable aircraft hall be certified in the appropriate certification category for the intended type of operation to be conducted.

Rationale:

The draft implementing act is operation-centric and considers the various certification standards. Some certification standards (such as SC VTOL) have already been developed and will be included in the related AMC. Today, the scope of SC VTOL covers small VTOL-capable aircraft with a passenger seating configuration of 9 or fewer and a maximum certified take-off mass of 3 175 kg (7 000 lb) or less.

The draft implementing act allows for a future inclusion of larger and heavier VTOL-capable aircraft.

Aircraft certified according to the following standards are considered to satisfy the performance criteria of Module UAM-POL as relevant for the intended type of operation:

— *SC VTOL category 'Enhanced': for the commercial air transport of passengers and/or cargo, including VEMS, and for non-commercial air transport of passengers and/or cargo in congested (urban) areas;*

— *or an equivalent certification basis or higher, as determined by EASA.*

UAM.POL.VCA.105 Aircraft performance data

VTOL-capable aircraft shall be operated in accordance with the certified performance data contained in the AFM.

UAM.POL.VCA.110 General performance requirements

(a) The mass of the VTOL-capable aircraft:

(1) at the start of the take-off; or

(2) in the event of in-flight replanning, at the point from which the revised operational flight plan applies,

shall not be greater than the mass at which the requirements of this Subpart can be complied with for the flight to be undertaken, considering expected reductions in mass as the flight proceeds and such fuel jettisoning as applicable.

(b) The approved performance data contained in the AFM shall be used to determine compliance with the requirements of this Subpart, supplemented as necessary with other data as prescribed in the relevant requirement. The operator shall specify such other data in the operations

manual. When applying the factors prescribed in this Subpart, any operational factors already incorporated in the AFM performance data shall be taken into account to avoid double application of factors.

(c) When showing compliance with the requirements of this Subpart, the following parameters shall be taken into account:

(1) the mass of the VTOL-capable aircraft;

(2) the configuration of the VTOL-capable aircraft;

(3) the environmental conditions, in particular:

(i) density altitude;

(ii) wind:

(A) except as provided in point (C), for take-off, take-off flight path and landing, the correction for wind shall be no more than 50 % of any reported steady headwind component of 5 kt or greater;

(B) where take-off and landing with a tailwind component is permitted in the AFM, and in all cases for the take-off flight path, the correction for tailwind shall be limited to a minimum value, as established in the AFM;

(C) where precise wind-measuring equipment enables the accurate measurement of wind velocity over the point of take-off and landing, wind components in excess of 50 % may be taken into account by the operator, provided that the operator demonstrates to the competent authority that the proximity to the FATO and accuracy enhancements of the wind-measuring equipment provide an equivalent level of safety;

(4) the operating techniques; and

(5) the operation of any systems that have an adverse effect on performance.

UAM.POL.VCA.115 Obstacle accountability

For operations to/from final approach and take-off areas (FATO), the operator shall, during prefight planning and for the purpose of obstacle-clearance calculations:

(a) consider an obstacle located beyond the FATO, in the take-off flight path or the missed approach flight path, if its lateral distance to the nearest point on the surface below the intended flight path is not further than the following:

(1) for operations under VFR:

(i) '0,75 × D', where D is the diameter of the smallest circle enclosing the VTOL-capable aircraft projection on a horizontal plane, while the aircraft is in the take-off or landing configuration, with rotor(s) turning, if applicable;

(ii) plus, the greater of '0,25 × D' or '3 m';

(iii) plus:

(A) 0,10 × distance DR for operations under VFR by day; or

(B) 0,15 × distance DR for operations under VFR at night;

(2) for operations under IFR:

(i) '1,5 × D' or 30 m, whichever is greater, plus:

(A) 0,10 × distance DR, for operations under IFR with accurate course guidance;

(B) 0,15 × distance DR, for operations under IFR with standard course guidance;

or

(C) 0,30 × distance DR for operations under IFR without course guidance;

(ii) when considering the missed approach flight path, the divergence of the obstacle accountability area only applies after the end of the take-off distance available;

(3) for operations with initial take-off conducted visually and converted to IFR/IMC at a transition point, the criteria in point (1) apply up to the transition point, and the criteria in point (2) apply after the transition point. The transition point cannot be located before the end of the take-off distance required for VTOL-capable aircraft (TODRV);

(4) for operations under automatic approach and landing procedures (AALP):

(i) '1,5 × D' or 30 m, whichever is greater;

(ii) plus, if applicable, 0,10 × distance DR;

(b) consider an obstacle located in the backup or lateral transition area, for take-offs using a backup or a lateral transition procedure, if its lateral distance from the nearest point on the surface below the intended flight path is not further than:

(1) '0,75 × D';

(2) plus the greater of '0,25 × D' or '3 m';

(3) plus:

(i) 0,10 × distance DR for operations under VFR by day; or

(ii) 0,15 × distance DR for operations under VFR at night;

(c) disregard obstacles situated beyond the FATO in the take-off flight path or the missed approach flight path if their lateral distance to the nearest point on the surface below the intended flight path is further than the following:

(1) 3 × D for day operations if it is assured that navigational accuracy can be achieved by reference to suitable visual cues during the climb;

(2) 5 × D for night operations if it is assured that navigational accuracy can be achieved by reference to suitable visual cues during the climb;

(3) 300 m if navigational accuracy can be achieved by appropriate navigation aids; or

(4) 900 m in all other cases.

UAM.POL.VCA.120 Take-off

(a) The take-off mass of the VTOL-capable aircraft shall not exceed the maximum take-off mass specified in the AFM/UFM for the certified take-off procedure or procedures to be used.

(b) The operator shall take into account the appropriate parameters of point UAM.POL.VCA.110(c).

(c) In addition, for operations from a FATO:

(1) the take-off mass shall be such that:

(i) it is possible to reject the take-off and land on the FATO if a CFP has been recognised at or before the take-off decision point (TDP);

(ii) the rejected take-off distance required (RTODRV) does not exceed the rejected take-off distance available (RTODAV); and

(iii) the TODRV does not exceed the TODAV, unless the VTOL-capable aircraft with a CFP recognised at or before the TDP can, when continuing the take-off, clear all obstacles to the end of the TODRV by a vertical margin of not less than 10.7 m (35 ft).

(2) That part of the take-off up to and including TDP shall be conducted in sight of the surface such that a rejected take-off can be carried out safely.

(3) For take-off using a backup or lateral transition procedure, with a CFP recognised at or before the TDP, all obstacles in the backup or lateral transition area shall be cleared by an adequate margin.

Rationale:

VTOL-capable aircraft may be certified to perform conventional take-offs and/or vertical take-offs, as described in point MOC VTOL.2115 'Take-off performance' of SC VTOL-01[56].

The type of profile for take-off, i.e. vertical segment — transition — climb segment, allows the pilot to descent vertically back into the surface area if the VTOL-capable aircraft does not have the performance to clear the surrounding obstacles. The point at which the VTOL-capable aircraft must be allowed to accelerate forward is the transition point at which all surrounding obstacles are cleared.

UAM.POL.VCA.125 Take-off flight path

(a) From the end of the take-off distance required for VTOL-capable aircraft (TODRV), following a critical failure for performance (CFP) being recognised at or after the take-off decision point (TDP):

(1) the take-off mass shall be such that the take-off flight path provides a vertical clearance, above all obstacles located in the climb path, of not less than 10,7 m (35 ft) for operations under VFR and 10,7 m (35 ft) + 0,01 × DR for operations under IFR or under automatic take-off procedures;

(2) where a change of direction of more than 15° is made, adequate allowance shall be made for the effect of bank angle on the ability to comply with the obstacle clearance requirements; this change of direction is not to be initiated before reaching a height of 61 m (200 ft) above the take-off surface unless it is part of an approved take-off procedure in the AFM.

(b) When showing compliance with point (a), the appropriate parameters of point UAM.POL.VCA.110(c) shall be taken into account at the aerodrome or operating site of departure.

56 https://www.easa.europa.eu/downloads/128938/en

UAM.POL.VCA.130 En route

(a) The mass of the VTOL-capable aircraft and flight path at all points along the route following a critical failure for performance (CFP) and taking into account the meteorological conditions expected for the flight shall permit compliance with point (1), (2) or (3):

(1) When a flight is to be conducted out of sight of the surface, the mass of the aircraft shall permit a rate of climb of at least 50 feet/minute at an altitude that clears vertically all terrain and obstacles along the route by at least the minimum level established in accordance with point SERA.5015(b) of the Annex to Regulation (EU) No 923/2012, and by a distance on either side of the intended track equal to or greater than the required PBN accuracy.

(2) When a flight is to be conducted out of sight of the surface, the mass of the aircraft shall permit a descent from the cruising altitude to a height of 300 m (1 000 ft) above the aerodrome or operating site where the landing can be made in accordance with point UAM.POL.VCA.135. The flight path shall clear vertically all terrain and obstacles by at least the minimum level established in accordance with point SERA.5015(b) of the Annex to Regulation (EU) No 923/2012 and by a distance on either side of the intended track equal to or greater than the required PBN accuracy. Drift-down techniques may be used.

(3) When a flight is to be conducted in VMC with the surface in sight, the mass of the aircraft shall permit a descent from the cruising altitude to a height of 300 m (1 000 ft) above the aerodrome or operating site where the landing can be made in accordance with point UAM.POL.VCA.135. Obstacles shall be considered within a distance on either side of the route as specified for the purpose of the determination of the minimum flight altitude in VFR in accordance with point SERA.5005 of the Annex to Regulation (EU) No 923/2012.

(b) When showing compliance with point (a)(2) or (a)(3), all the following shall apply:

(1) the CFP is assumed to occur at the most critical point along the route;

(2) the effects of winds on the flight path are taken into account;

(3) fuel jettisoning is planned to take place only to an extent consistent with reaching the aerodrome or operating site with the required fuel/energy reserves and using a safe procedure; and

(4) fuel jettisoning is not planned below 300 m (1 000 ft) above terrain.

UAM.POL.VCA.135 Landing

(a) The landing mass of the VTOL-capable aircraft at the estimated time of landing shall not exceed the maximum mass specified in the AFM/UFM for the certified landing procedure to be used.

(b) The operator shall take into account the appropriate parameters of point UAM.POL.VCA.110(c).

(c) If the critical failure for performance (CFP) has been recognised at any point at or before the landing decision point (LDP), it is possible either to land and stop within the runway or FATO, or perform a balked landing clearing all obstacles in the flight path by a vertical margin of 10,7 m (35 ft).

(d) If the CFP has been recognised at any point at or after the LDP, it is possible to land and stop within the runway or FATO clearing all obstacles in the approach path.

(e) That part of the landing from the LDP to touchdown shall be conducted in sight of the surface.

UAM.POL.VCA.140 Mass and balance, loading

(a) During any phase of operation, the loading, mass and centre of gravity (CG) of the VTOL-capable aircraft shall comply with the limitations specified in the AFM, or the operations manual if more restrictive.

(b) The operator shall establish the mass and the CG of any aircraft by actual weighing prior to initial entry into service and thereafter at intervals of 4 years, if individual VTOL-capable aircraft masses are used, or 9 years, if fleet masses are used. The accumulated effects of modifications and repairs on the mass and balance of the aircraft shall be taken into account and properly documented. The VTOL-capable aircraft shall be reweighed if the effect of modifications on its mass and balance is not accurately known.

(c) The weighing shall be accomplished by the manufacturer of the aircraft or by an approved maintenance organisation.

(d) The operator shall determine the mass of all operating items and crew members (pilots and, if applicable, technical crew), included in the VTOL-capable aircraft dry operating mass, by actual weighing or by using standard masses. The influence of their position on the aircraft's CG shall be determined.

(e) The operator shall establish the mass of the traffic load, including any ballast, by actual weighing or by determining the mass of the traffic load in accordance with standard passenger and, if applicable, baggage masses.

(f) The operator can use standard masses for other load items if it demonstrates to the competent authority that these items have the same mass or that their masses are within specified tolerances.

(g) The operator shall determine the mass of the fuel load and/or the energy storage unit by:

(1) fuel load: using the actual density or, if not known, the density calculated in accordance with a method specified in the operations manual;

(2) energy storage unit: weighing or by using standard masses specified in the operations manual.

(h) The operator shall ensure that the loading of:

(1) its aircraft is performed under the supervision of qualified personnel; and

(2) traffic load is consistent with the data used for the calculation of the aircraft mass and balance.

(i) The operator shall comply with additional structural limits such as the floor strength limitations, the maximum load per running metre, the maximum mass per cargo compartment, and the maximum seating limit.

(j) The operator shall specify, in the operations manual, the principles and methods involved in the loading and in the mass and balance system that meet the requirements of points (a) to (i). That system shall cover all types of the operator's intended operations.

UAM.POL.VCA.145 Mass and balance data, documentation

(a) The operator shall establish mass and balance data and shall produce mass and balance documentation prior to each flight specifying the load and its distribution. The mass and balance documentation shall enable the pilot-in-command to determine that the load and its

distribution is such that the mass and balance limits of the aircraft are not exceeded. The mass and balance documentation shall contain the following information:

(1) aircraft registration and type;

(2) flight identification, number and date;

(3) name of the pilot-in-command;

(4) name of the person who has prepared the document;

(5) dry operating mass and the corresponding CG of the aircraft:

(6) mass of the fuel or energy storage unit at take-off and the mass of trip fuel;

(7) mass of consumables other than fuel, if applicable;

(8) traffic load components including passengers, baggage, freight and ballast;

(9) take-off mass, landing mass, and zero fuel/energy mass;

(10) applicable aircraft CG positions; and

(11) the limiting mass and CG values.

The information above shall be available in flight-planning documents or mass and balance systems.

(b) Where mass and balance data and documentation are generated by a computerised mass and balance system, the operator shall:

(1) verify the integrity of the output data to ensure that the data is within the AFM limitations; and

(2) specify the instructions and procedures for its use in its operations manual.

(c) The person that supervises the loading of the aircraft shall confirm by handwritten signature or equivalent that the load and its distribution are in accordance with the mass and balance documentation given to the pilot-in-command. The pilot-in-command shall indicate their acceptance by handwritten signature or equivalent.

(d) The operator shall specify procedures for last-minute changes to the load to ensure that:

(1) any last-minute change after the completion of the mass and balance documentation is brought to the attention of the pilot-in-command and entered in the flight-planning documents containing the mass and balance documentation;

(2) the maximum last-minute change allowed in passenger numbers or hold load is specified; and

(3) new mass and balance documentation is prepared if that maximum passenger number is exceeded.

MODULE NAM-POL

NAM.POL.VCA.050 Scope

(a) Module NAM-POL establishes only the specific requirements for the operation of VTOL-capable aircraft in any configuration, where all the segments of the flight take place outside a congested area.

(b) Where no specific requirement exists, the relevant requirements of Module UAM-POL apply.

NAM.POL.VCA.100 Certification basis

(a) VTOL-capable aircraft shall be certified in the appropriate certification category for the intended type of operation to be conducted.

(b) VTOL-capable aircraft that are not certified for the commercial air transport of passengers shall not operate in hostile environment.

Rationale:

Point (a): The draft implementing act is operation-centric and considers the various certification standards. Some certification standards, such as SC VTOL, have already been developed and will be included in the related AMC.

Aircraft certified according to the following standards are considered to satisfy the performance criteria of Module NAM-POL as relevant for the intended type of operation:

- *SC VTOL category 'Basic' or SC VTOL category 'Enhanced': for the commercial and non-commercial air transport of cargo taking place fully outside congested areas or non-commercial air transport of passengers;*
- *SC VTOL category 'Enhanced': for the commercial air transport of passengers, including VEMS operations, or for the commercial and non-commercial air transport of cargo taking place outside congested areas;*
- *a certification basis equivalent to (1), (2) or higher, as determined by EASA.*

Point (b): The assumption is that the performance of VTOL-capable aircraft category 'Basic' is comparable to helicopters category B and only able to operate in PC3 conditions.

NAM.POL.VCA.120 Take-off

(a) VTOL-capable aircraft certified for the commercial air transport of passengers shall comply with point UAM.POL.VCA.120.

(b) For VTOL-capable aircraft not certified for the commercial air transport of passengers:

(1) the take-off mass shall not exceed the maximum take-off mass specified in the AFM for the certified take-off procedure or procedures to be used;

(2) the operator shall take into account the appropriate parameters of point UAM.POL.VCA.110(c);

(3) in addition, for operations from a FATO, the take-off mass shall be such that:

(i) with all lift or thrust units operating within the appropriate power setting, the VTOL-capable aircraft will clear all obstacles in the take-off phase by a vertical margin of 35 ft for operations under VFR and 10,7 m (35 ft) + 0,01 × DR for operations under IFR or under automatic take-off procedures;

(ii) in the event of critical failure for performance (CFP) in the take-off phase, the VTOL-capable aircraft shall be able to reject the take-off and land on the FATO or perform a controlled emergency landing (CEL).

(4) That part of the take-off up to and including take-off decision point (TDP) shall be conducted in sight of the surface such that a rejected take-off can be carried out safely.

NAM.POL.VCA.125 Take-off flight path / take-off phase

(a) VTOL-capable aircraft certified for the commercial air transport of passengers shall comply with point UAM.POL.VCA.125.

(b) VTOL-capable aircraft not certified for the commercial air transport of passengers shall, in the event of critical failure for performance (CFP) in the take-off phase, be able to reject the take-off and land on the FATO or perform a controlled emergency landing (CEL).

NAM.POL.VCA.130 En route

(a) VTOL-capable aircraft certified for the commercial air transport of passengers shall comply with point UAM.POL.VCA.130.

(b) VTOL-capable aircraft not certified for the commercial air transport of passengers shall be able:

(1) with all lift or thrust units operating within the appropriate power setting, to continue along their intended route or to a planned diversion without flying at any point below the minimum level established in accordance with point SERA.5015(b) of the Annex to Regulation (EU) No 923/2012.

(2) to perform a controlled emergency landing (CEL) in the event of critical failure for performance (CFP).

NAM.POL.VCA.135 Landing

(a) VTOL-capable aircraft certified for the commercial air transport of passengers shall comply with point UAM.POL.VCA.135.

(b) For VTOL-capable aircraft not certified for the commercial air transport of passengers:

(1) the landing mass of the VTOL-capable aircraft at the estimated time of landing shall not exceed the maximum mass specified in the AFM for the certified landing procedure to be used;

(2) in the event of critical failure for performance (CFP) in the landing phase, the VTOL-capable aircraft shall be able to perform a controlled emergency landing (CEL);

(3) when showing compliance with points (1) and (2), the operator shall take into account the appropriate parameters of point UAM.POL.VCA.110(c) for the estimated time of landing at the destination aerodrome or operating site, or any alternate aerodrome;

(4) that part of the landing from the landing decision point (LDP) to touchdown shall be conducted in sight of the surface.

SUBPART D — INSTRUMENTS, DATA, AND EQUIPMENT

MODULE UAM-IDE

SECTION 1

VTOL-CAPABLE AIRCRAFT (VCA)

UAM.IDE.VCA.050 Applicability

Section 1 of Module UAM-IDE establishes the requirements for the operation of VTOL-capable aircraft in any configuration, where at least one segment of the flight takes place in a congested area.

UAM.IDE.VCA.100 Instruments and equipment

(a) The instruments, data and equipment required by this Subpart shall be installed on or carried in the VTOL-capable aircraft according to the conditions under which the operation is to be conducted.

Instruments and equipment required by this Subpart shall be approved in accordance with the applicable airworthiness requirements, except for the following items:

(1) independent portable lights;

(2) an accurate time piece;

(3) chart holder;

(4) first-aid kit;

(5) survival and signalling equipment;

(6) sea anchors and equipment for mooring; and

(7) child restraint devices.

(b) Instruments and equipment not required by this Annex, as well as any other equipment which is not required pursuant to this Regulation, but carried on a flight, shall comply with the following:

(1) the information provided by these instruments, equipment or accessories shall not be used by the pilot to comply with Annex II and point 2.1 of Annex IX to Regulation (EU) 2018/1139 or points UAM.IDE.MVCA.330, UAM.IDE.UVCA.330, UAM.IDE.MVCA.335, UAM.IDE.UVCA.335, UAM.IDE.MVCA.345, and UAM.IDE.UVCA.345 of this Annex; and

(2) the instruments and equipment shall not affect the airworthiness of the aircraft, even in the case of failures or malfunction.

(c) If equipment is to be used by the pilot at their station during flight, it shall be installed so as to be readily operable from that station. When a single item of equipment is to be used by more than one person at their station, it shall be installed so as to be readily operable from any station.

(d) Those instruments that are used by the pilot shall be so arranged as to permit the pilot to see the indications readily from their station with the minimum practicable deviation from the

position and line of vision that the pilot normally assumes when looking forward along the flight path.

(e) All required emergency equipment shall be easily accessible for immediate use.

UAM.IDE.VCA.105 Minimum equipment for flight

A flight shall not be commenced when any of the aircraft instruments, items of equipment or functions required for the intended flight are inoperative or missing, unless:

(a) the aircraft is operated in accordance with the operator's MEL; or

(b) the operator is approved by the competent authority to operate the aircraft within the constraints of the master minimum equipment list (MMEL) in accordance with point ORO.MLR.105(j) of Annex III.

SECTION 2

VTOL-CAPABLE AIRCRAFT IN MANNED CONFIGURATION (MVCA)

UAM.IDE.MVCA.050 Applicability

Section 2 of Module UAM-IDE establishes the requirements for the operation of VTOL-capable aircraft in manned configuration and shall apply in addition to Section 1 of Module UAM-IDE.

UAM.IDE.MVCA.115 Operating lights

(a) Aircraft operated under VFR by day shall be equipped with anti-collision lights.

(b) Aircraft operated at night or under IFR shall, in addition to point (a), be equipped with:

(1) lighting supplied from the aircraft's electrical system to provide adequate illumination for all instruments and equipment essential for the safe operation of the aircraft;

(2) lighting supplied from the aircraft's electrical system to provide illumination in the passenger compartments;

(3) an independent, readily accessible portable light for the pilot(s);

(4) navigation/position lights;

(5) two landing lights to illuminate the ground to provide sufficient visibility for take-off and landing of the aircraft.

UAM.IDE.MVCA.125 Flight instruments and associated equipment

(a) A VTOL-capable aircraft shall be equipped with the flight instruments and equipment specified in its type-certification approval for operations under VFR by day or under IFR or at night.

(b) Additional flight instruments and equipment shall be installed or carried as necessary according to the expected operating conditions.

UAM.IDE.MVCA.140 Fuel/energy measuring and displaying equipment

VTOL-capable aircraft shall be equipped with means of measuring and displaying to the pilot during the flight the remaining usable amount of fuel/energy. In addition, a conservative estimate of the amount of fuel/energy necessary to complete the remaining part of the flight shall be provided to the pilot during the flight.

UAM.IDE.MVCA.145 Height-determination equipment

VTOL-capable aircraft shall, for flights over water, be equipped with a means to determine the height of the aircraft in relation to the ground, capable of emitting an audio warning below a pre-set value and a visual warning at a height selectable by the the pilot, when operating:

(a) out of sight of the land;

(b) in a visibility lower than 1 500 m;

(c) at night; or

(d) at a distance from land corresponding to more than 3 minutes at normal cruising speed.

UAM.IDE.MVCA.160 Airborne weather-detecting equipment

When VTOL-capable aircraft are operated in IMC or at night in areas where thunderstorms or other potentially hazardous weather conditions, which are regarded as detectable by airborne weather-detecting equipment, may be expected to prevail along the route according to current weather reports, shall be equipped with airborne weather-detecting equipment.

UAM.IDE.MVCA.165 Additional equipment for operations in icing conditions at night

(a) VTOL-capable aircraft operated in expected or actual icing conditions at night shall be equipped with a means to illuminate or detect the formation of ice on the aircraft.

(b) The means to illuminate the formation of ice shall not cause glare or reflection that would prevent the pilot from performing their duties.

UAM.IDE.MVCA.170 Flight crew interphone system

VTOL-capable aircraft operated by more than one pilot shall be equipped with an interphone system, including headsets and microphones, for use by all the pilots.

UAM.IDE.MVCA.180 Public address system (PAS)

VTOL-capable aircraft shall be equipped with a PAS, unless:

(a) the aircraft is designed without a bulkhead between the pilot and the passengers; and

(b) the operator is able to demonstrate that when in flight, the pilot's voice is audible and intelligible at all passengers' seats.

UAM.IDE.MVCA.185 Cockpit voice recorder (CVR)

(a) VTOL-capable aircraft with an MCTOM of more than 3 175 kg shall be equipped with a (CVR).

(b) The CVR shall be capable of retaining the data recorded during at least the preceding 2 hours.

(c) The CVR shall record with reference to a timescale:

(1) voice communications transmitted from or received in the flight crew compartment by radio;

(2) flight crew members' voice communications using the interphone system and the public address system (PAS), if installed;

(3) the aural environment of the flight crew compartment, including the audio signals received from the flight crew microphone;

(4) voice or audio signals identifying navigation or approach aids introduced into a headset or speaker.

(d) The CVR shall, depending on the availability of electrical power, start to record as early as possible during the cockpit checks prior to engine start at the beginning of the flight until the cockpit checks immediately following engine shutdown at the end of the flight. In any case, the CVR shall automatically start to record prior to the aircraft moving under its own power and shall continue to record until the termination of the flight.

(e) A function to modify CVR recordings shall be at the disposal of the flight crew/pilot so that recordings made prior to the operation of that function cannot be retrieved using normal replay or copying techniques.

(f) If the CVR is not deployable, it shall have a device to assist in locating it under water with a minimum underwater transmission time of 90 days. If the CVR is deployable, it shall have an automatic emergency locator transmitter (ELT).

UAM.IDE.MVCA.190 Flight data recorder (FDR)

(a) VTOL-capable aircraft with an MCTOM of more than 3 175 kg shall be equipped with an FDR that uses a digital method of recording and storing data, and for which a method of readily retrieving that data from the storage medium is available.

(b) The FDR shall record the parameters required to determine accurately the flight path, speed, attitude, engine(s) power, operation and configuration and be capable of retaining the data recorded during at least the preceding [10 or 25] hours.

(c) Data shall be obtained from the VTOL-capable aircraft sources that enable accurate correlation with information displayed to the pilot(s).

(d) The FDR shall automatically start to record the data prior to the VTOL-capable aircraft being capable of moving under its own power and shall stop automatically following engine shutdown at the end of the flight.

(e) If the FDR is not deployable, it shall have a device to assist in locating it under water with a minimum underwater transmission time of 90 days. If the FDR is deployable, it shall have an automatic emergency locator transmitter (ELT).

Rationale:

With regard to point (b), FDR data makes a small data volume of about 100 MB for a 25-hour recording duration. For aeroplanes, the 25-hour duration has been the requirement for more than a decade, and there is no technological challenge or additional cost relating to it.

Stakeholders are kindly asked about their opinion on the recording duration: 10 or 25 hours?

UAM.IDE.MVCA.191 Flight recorder

(a) VTOL-capable aircraft with an MCTOM of 3 175 kg or less shall be equipped with a flight recorder.

(b) The flight recorder shall record, by means of flight data or images, information that is sufficient to determine the flight path and aircraft speed as well as audio and data link communication messages with air traffic service (ATS) units, where applicable.

(c) The flight recorder shall be capable of retaining the flight data and the images recorded during at least the preceding 5 hours.

(d) The flight recorder shall automatically start to record prior to the VTOL-capable aircraft being capable of moving under its own power and shall stop automatically following engine shutdown at the end of the flight.

(e) If the flight recorder records images or audio of the flight crew compartment, a function to modify image and audio recordings shall be at the disposal of the pilot-in-command, so that the recordings made prior to the operation of that function cannot be retrieved using normal replay or copying techniques.

Rationale:

With regard to helicopters, the AIR OPS Regulation requires the fitment of a lightweight flight recorder when the aircraft has an MCTOM ≥ 2 250 kg ≤ 3 175 kg: please refer to point CAT.IDE.H.191 of Annex IV.

This minimum MCTOM of 2 250 kg was defined based in the impact assessment NPA 2017-03 'In-flight recording for light aircraft'[57], including the decision to not require lightweight flight recorders for aircraft with less than 2 250 kg MCTOM, in order to consider the economic cost and proportionality impact of requiring such equipment. In addition, point CAT.IDE.H.191 only applies to aircraft manufactured on or after 5 September 2022.

Unlike point CAT.IDE.H.191, SC VTOL, VTOL.2555 and point UAM.IDE.MVCA.191 do not set a minimum MCTOM condition or condition on the date of manufacture, with the reasons being as follows:

Twelve (12) safety recommendations have been addressed to EASA (by 7 accident investigation authorities) recommending that an in-flight recording capability is provided for light aircraft models which are currently outside the scope of the Air OPS Regulation. In addition, new standards (recently introduced in ICAO Annex 6) require the carriage of lightweight flight recorders for light aeroplanes and light helicopters. In addition, one of the NTSB recommendations on the Most Wanted List is 'Expand Use of Recorders to Enhance Transportation Safety'.

VTOL-capable aircraft are expected to introduce novel technologies and conduct new types of operations. It is, therefore, deemed to be essential for this new category of aircraft to have a requirement for the installation of recorders included in the airworthiness requirements to support

57 https://www.easa.europa.eu/document-library/notices-of-proposed-amendment/npa-2017-03

occurrence/accident investigation and to maintain an appropriate level of safety by enabling continuing airworthiness action. As most foreseen configurations are anticipated to have advanced flight controls, this data should already be available and, therefore, the burden on initial aircraft designs is minimised. Additionally, EASA has introduced the possibility to transmit and record some data remotely.

UAM.IDE.MVCA.195 Data link recording

(a) VTOL-capable aircraft with an MCTOM of more than 3 175 kg that have the capability to operate data link communications shall record such communications on a crash-protected recorder.

(b) The following shall be recorded, where applicable:

(1) data link communication messages related to ATS communications to and from the aircraft, including messages that apply to the following applications:

(i) data link initiation;

(ii) controller–pilot communication;

(iii) addressed surveillance;

(iv) flight information;

(v) as far as practicable, given the architecture of the system, aircraft broadcast surveillance;

(vi) as far as practicable, given the architecture of the system, aircraft operational control data;

(vii) as far as practicable, given the architecture of the system, graphics;

(2) information that enables correlation to any associated records related to data link communications and stored separately from the aircraft; and

(3) information on the time and priority of data link communications messages, taking into account the system's architecture.

(c) The recorder shall use a digital method of recording and storing data and information and a method of readily retrieving that data shall be available. The recording method shall allow the data to match the data recorded on the ground.

(d) The recorder shall be capable of retaining the data recorded during at least the preceding 2 hours.

(e) If the recorder is not deployable, it shall have a device to assist in locating it under water with a minimum underwater transmission time of 90 days. If the data link recorder (DLR) is deployable, it shall have an automatic emergency locator transmitter (ELT).

(f) The requirements applicable to the start and stop logic of the recorder are the same as the requirements applicable to the start and stop logic of the CVR contained in point UAM.IDE.MVCA.185.

UAM.IDE.MVCA.205 Seats, seat safety belts, restraint systems and child restraint devices

(a) VTOL-capable aircraft shall be equipped with:

(1) a seat or berth for each person on board that is aged 24 months or older;

(2) an upper torso restraint system that includes a seat belt with a diagonal shoulder strap for use on each passenger seat and restraining belts on each berth.

(3) a child restraint device (CRD) for each person on board that is younger than 24 months; and

(4) a four-point upper torso restraint system that includes a seat belt with two shoulder straps, on each pilot seat.

(b) A seat belt with upper-torso restraint system shall:

(1) have a single-point release; and

(2) on pilot seat, incorporate a device that will automatically restrain the occupant's torso in the event of rapid deceleration.

UAM.IDE.MVCA.210 'FASTEN SEAT BELT' and 'NO SMOKING' signs

VTOL-capable aircraft shall be equipped with a means of indicating to all persons on board when seat belts shall be fastened and that smoking is not allowed at any time.

UAM.IDE.MVCA.220 First-aid kits

(a) VTOL-capable aircraft shall be equipped with at least one first-aid kit.

(b) First-aid kits shall be:

(1) readily accessible for use;

(2) kept up to date.

UAM.IDE.MVCA.240 Supplemental oxygen — non-pressurised aircraft

Non-pressurised aircraft operated at pressure altitudes above 10 000 ft shall be equipped with supplemental oxygen equipment capable of storing and dispensing oxygen in accordance with the following table:

Minimum requirements regarding supplemental oxygen in non-pressurised aircraft

Supply for	Flight duration and cabin pressure altitude
Person(s) piloting the aircraft	For the entire flying time at pressure altitudes above 13 000 ft and for any period that exceeds 30 minutes at pressure altitudes above 10 000 ft but not exceeding 13 000 ft.
100 % of passengers ([1])	For the entire flying time at pressure altitudes above 13 000 ft.
10 % of passengers ([1])	For the entire flying time beyond 30 minutes at pressure altitudes above 10 000 ft but not exceeding 13 000 ft.
([1]) Passenger numbers in the table refer to passengers carried on board, including persons aged younger than 24 months.	

UAM.IDE.MVCA.250 Handheld fire extinguishers

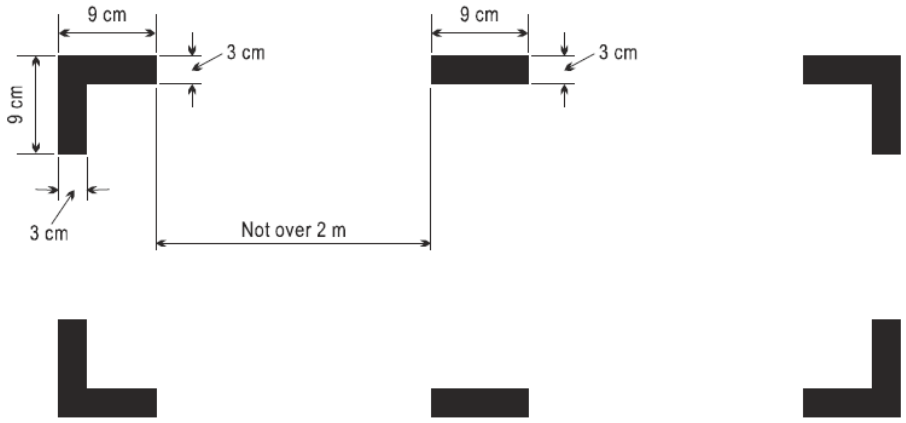
(a) VTOL-capable aircraft shall be equipped with at least one handheld fire extinguisher that is readily accessible for use.

(b) The type and quantity of the fire-extinguishing agent for the required handheld fire extinguishers shall be suitable for the type of fire likely to occur in the compartment where the handheld fire extinguisher is intended to be used and to minimise the hazard of toxic gas concentration in compartments occupied by persons.

UAM.IDE.MVCA.260 Marking of break-in points

If areas on the aircraft's fuselage are marked that are suitable for break-in by rescue crews in an emergency, such areas shall be marked as shown in Figure 1.

Figure 1



UAM.IDE.MVCA.275 Emergency lighting and marking

VTOL-capable aircraft shall be equipped with:

(a) an emergency lighting system to provide a source of general cabin illumination to facilitate passenger evacuation from the aircraft; and

(b) emergency-exit marking and locating signs visible in daylight or in the dark.

UAM.IDE.MVCA.280 Emergency locator transmitter (ELT)

VTOL-capable aircraft shall be equipped (fitted) with at least one approved automatic ELT or, alternatively, with such other approved automatic aircraft tracking device in combination with a locator beacon that shall enable rescue services to be alerted, to reach the accident site and to accurately locate survivors.

UAM.IDE.MVCA.300 Flights over water

(a) Unless otherwise determined by the competent authority, based on the operator's risk assessment and effective mitigation measures, a VTOL-capable aircraft that carries passengers shall be certified:

(1) for ditching, when operated over water in a hostile sea at a distance from land corresponding to more than 10 minutes flying time at normal cruise speed;

(2) for emergency flotation, when operated over water in a non-hostile sea at a distance from land corresponding to more than 10 minutes flying time at normal cruise speed;

(3) for limited overwater operations, when operated in conditions other than those referred to in point (a) or (b), and when one or more of the following conditions apply:

(i) the total flying time over water is longer than 3 minutes;

(ii) the flying time over water is longer than the performance time following a critical failure for performance (CFP), considering:

— the proximity to adequate aerodromes or to a landing area that minimises the risks to people or property on the ground; and

— the accessibility for rescuing occupants;

(iii) landing or taking off over water.

(b) VTOL-capable aircraft shall carry a survival ELT (ELT(S)) that is buoyant and can be automatically activated for flights over water, except for limited overwater operations.

UAM.IDE.MVCA.305 Life jackets and other equipment

(a) Except as provided for in (c), (d) and (e), for flights over water, VTOL-capable aircraft shall be equipped as a minimum with a life jacket for each person on board, stowed in a position that is readily accessible from the seat or berth of the person for whose use it is provided, with the restrain system fastened. If it is not possible to have the life jackets readily accessible with the restrain system fastened, each person shall wear a life jacket on or, if that person is younger than 24 months, an equivalent flotation device.

(b) Each life jacket or equivalent individual flotation device shall be equipped with a means of electric illumination for the purpose of facilitating the location of persons in the water.

(c) For flights over water in a hostile sea area at a distance from land corresponding to more than 10 minutes flying time at normal cruise speed, each person on board shall wear a life jacket during the entire operation unless integrated survival suits that meet the combined requirement of the survival suit and life jacket are worn.

(d) For flights over water in a hostile sea area at a distance from land corresponding to more than 10 minutes flying time at normal cruise speed, each person on board shall wear a survival suit as appropriate with regard to the water temperature and estimated rescue time. The level of insulation provided shall be sufficient for the prevailing conditions and not excessive.

(e) For flights over water in a hostile sea area at a distance from land corresponding to more than 10 minutes flying time at normal cruise speed, each person on board shall carry and be instructed in the use of emergency breathing systems (EBSs).

UAM.IDE.MVCA.310 Life rafts

(a) VTOL-capable aircraft shall have one or more life rafts installed on board for flights over water in a hostile sea area at a distance from land corresponding to more than 10 minutes flying time at normal cruise speed, or at least one life raft stowed so as to facilitate its ready use in an

emergency for flights over water in a non-hostile sea at a distance from land corresponding to more than 10 minutes flying time at normal cruise speed. These life rafts shall have sufficient capacity, separately or together, to accommodate all persons carried on board.

(b) All life rafts installed or carried on board shall allow for their ready use in an emergency.

(c) Each life raft shall contain at least one survival ELT (ELT(S)).

(d) Each life rafts installed or carried on board shall be usable in the sea conditions in which the VTOL-capable aircraft's ditching, flotation, and trim characteristics have been evaluated for the purpose of certification.

(e) Each life raft shall contain life-saving equipment, including means of sustaining life, as appropriate to the flight to be undertaken.

UAM.IDE.MVCA.311 Survival equipment

VTOL-capable aircraft operated over areas where search and rescue would be particularly difficult shall be equipped with:

(a) signalling equipment to make distress signals;

(b) at least one survival emergency locator transmitter (ELT(S)); and

(c) additional survival equipment for the route to be flown taking into account the number of persons on board.

UAM.IDE.MVCA.315 Equipment for on-water operations

VTOL-capable aircraft certified for operating on water shall be equipped with:

(a) a sea anchor and other equipment necessary to facilitate mooring, anchoring or manoeuvring the VTOL-capable aircraft on water, appropriate to its size, weight and handling characteristics; and

(b) equipment for making the sound signals prescribed in the *International Regulations for Preventing Collisions at Sea*, where applicable.

UAM.IDE.MVCA.325 Headset

VTOL-capable aircraft shall be equipped with a headset with boom microphone or equivalent and a transmit button on the flight controls for each person that pilots the aircraft at the assigned station.

UAM.IDE.MVCA.330 Radio communication equipment

(a) VTOL-capable aircraft shall be equipped with at least one radio communication system connected to the aircraft's primary power supply and as many more as necessary for the type of operation to be conducted and the class of airspace in which the operation shall take place.

(b) The radio communication equipment shall allow flight crews under normal operating conditions to:

(1) communicate with an appropriate ground station from any point on the route, including diversions;

(2) communicate with appropriate ATC stations from any point in controlled airspace within which flights are intended to be operated; and

(3) receive meteorological information.

(c) The radio communication equipment shall provide for communication on the 121,5 MHz aeronautical emergency frequency.

Rationale:

The necessity for at least two independent radio communication systems is currently based on airspace requirements. However, for VFR flights with VTOL-capable aircraft over visually navigated routes, it makes sense to mandate the carriage of at least one radio communication system.

UAM.IDE.MVCA.335 Audio selector panel

VTOL-capable aircraft operated under IFR shall be equipped with an audio selector panel that is operable from each flight crew member piloting station.

UAM.IDE.MVCA.345 Navigation equipment

(a) VTOL-capable aircraft shall be equipped with navigation equipment in accordance with the requirements for IFR or VFR flights and the applicable airspace requirements.

(b) VTOL-capable aircraft shall have sufficient navigation equipment to ensure that, in the event of the failure of one item of equipment at any phase of the flight, the remaining equipment shall allow safe navigation in accordance with the flight plan.

(c) VTOL-capable aircraft operated on flights in which it is intended to land in IMC shall be equipped with suitable equipment capable of providing guidance to a point from which a visual landing can be performed for each aerodrome at which it is intended to land in IMC and for any designated alternate aerodrome.

(d) For PBN operations, VTOL-capable aircraft shall meet the airworthiness certification requirements for the appropriate navigation specification.

UAM.IDE.MVCA.350 Transponder

The VTOL-capable aircraft shall be equipped with a pressure altitude reporting secondary surveillance radar (SSR) transponder and with any other SSR transponder capability required for the route to be flown.

UAM.IDE.MVCA.355 Management of aeronautical databases

The operator shall:

(a) ensure that aeronautical databases to be used on certified aircraft system applications meet the data quality requirements that are adequate for the intended use of the data;

(b) ensure the timely distribution and update of current and unaltered aeronautical databases to all aircraft that require them;

(c) report to the database provider instances of erroneous, inconsistent or missing data that might be reasonably expected to constitute a hazard to flight, notwithstanding any other occurrence-reporting requirements as defined in Regulation (EU) No 376/2014. In such cases, the operator shall inform all personnel concerned, and shall ensure that the affected data is not used.

SECTION 3

VTOL-CAPABLE AIRCRAFT IN UNMANNED CONFIGURATION THAT CARRY PASSENGERS (UVCA)

(Reserved)

SECTION 4

VTOL-CAPABLE AIRCRAFT IN UNMANNED CONFIGURATION THAT CARRY CARGO (DVCA)

(Reserved)

MODULE NAM-IDE

SECTION 1

VTOL-CAPABLE AIRCRAFT (VCA)

NAM.IDE.VCA.050 Applicability

(a) Module NAM-IDE establishes the requirements for the operation of VTOL-capable aircraft in any configuration, where all the segments of the flight take place outside congested areas.

(b) Where no specific requirement exists, the relevant requirements of Module UAM-IDE shall apply.

SECTION 2

VTOL-CAPABLE AIRCRAFT IN MANNED CONFIGURATION (MVCA)

NAM.IDE.MVCA.300 Flights over water

VTOL-capable aircraft not certified for the commercial air transport of passengers shall not operate over water when carrying passengers.

SECTION 3

VTOL-CAPABLE AIRCRAFT IN UNMANNED CONFIGURATION THAT CARRY PASSENGERS (UVCA)

(Reserved)

SECTION 4

VTOL-CAPABLE AIRCRAFT IN UNMANNED CONFIGURATION THAT CARRY CARGO (DVCA)

(Reserved)

3.7. Proposed amendments to Commission Regulation (EU) No 1178/2011

Article 2 – Definitions

[…]

(8a) 'rotorcraft' means a power-driven, heavier-than-air aircraft that depends principally for its support in flight on the lift generated by up to two rotors.

(8b) 'VTOL-capable aircraft' means a power-driven, heavier-than-air aircraft, other than aeroplane or rotorcraft, capable of performing vertical take-off and landing by means of lift or thrust units used to provide lift during take-off and landing;

[…]

Rationale

In the context of new Article 4f (see below) and the future comprehensive licensing framework for pilots of innovative VTOL-capable aircraft, the term 'VTOL-capable aircraft' is introduced, addressing innovative aircraft with vertical take-off and landing capability.

Article 4f – Type ratings for VTOL-capable aircraft

1. Applicants that hold a commercial pilot licence for aeroplanes (CPL(A)) or helicopters (CPL(H)) in accordance with Annex 1 (Part-FCL) shall be entitled to be issued with a type rating for a VTOL-capable aircraft and shall exercise the privileges of such a type rating, provided they comply with all the following:

   (a) the prerequisites determined in the operational suitability data established in accordance with Annex I (Part 21) to Commission Regulation (EU) No 748/2012;

   (b) Section 1 of Subpart H of Annex I (Part-FCL).

2. Type rating training, skill tests and proficiency checks for aircraft specified in paragraph 1 shall:

   (a) comply with the following requirements of Appendix 9 to Annex I (Part-FCL):

      (i) Section A;

      (ii) Sections B, C or D, as determined and unless specified otherwise in the operational suitability data established in accordance with Annex I (Part 21) to Commission Regulation (EU) No 748/2012; and

   (b) under the conditions and to the extent determined in the operational suitability data established in accordance with Annex I (Part 21) to Commission Regulation (EU) No 748/2012, include additional training and testing to allow applicants to obtain the competence to operate the relevant VTOL-capable aircraft.

3. The validity period of type ratings issued in accordance with this Article shall be 1 year. Holders shall, in the relevant aircraft or an FSTD representing that aircraft, do all the following:

(a) in order to revalidate the type rating:

(1) within the validity period of the rating, complete at least 2 hours of flight time as pilot;

(2) within the 3 months immediately preceding the expiry date of the rating, pass a proficiency check in accordance with paragraph 2 the duration of which may be counted towards the flight time specified in paragraph (1). If applicants choose to pass the proficiency check earlier than within these 3 months, the new validity period shall commence from the date of the proficiency check.

(b) in order to renew the type rating, comply with point FCL.740(b) of Annex I (Part-FCL).

4. Holders of licences and a type rating as specified in paragraph 1 shall be entitled to operate the relevant VTOL-capable aircraft under instrument flight rules, provided that they comply with all of the following:

(a) they hold a valid IR(A) or IR(H), as applicable;

(b) they have, in the relevant type of VTOL-capable aircraft, completed the skill test or the proficiency check, as applicable, in accordance with paragraph 2 including the content relevant for instrument flight.

5. Notwithstanding point FCL.900(b) of Annex I (Part-FCL), applicants who hold an instructor certificate in accordance with Annex I (Part-FCL) with privileges to provide training for aeroplane or helicopter type ratings shall be issued with privileges to provide training for type ratings specified in paragraph 1, provided that they:

(a) hold a type rating as per point 1 for the relevant aircraft;

(b) unless otherwise specified in the operational suitability data established in accordance with Annex I (Part 21) to Commission Regulation (EU) No 748/2012, have, within the 12 months preceding the application, completed at least 30 route sectors, including take-offs and landings, as pilot-in-command in the relevant aircraft type, of which 15 route sectors may be completed in an FSTD representing that type; and

(c) have completed, at an ATO, theoretical and practical training for extending instructor privileges to that aircraft, including mandatory training elements as specified in the operational suitability data established in accordance with Annex I (Part 21) to Commission Regulation (EU) No 748/2012;

(d) pass the relevant sections of the assessment of competence in accordance with point FCL.935 of Annex I (Part-FCL).

6. Holders of instructor privileges as per paragraph 4 shall receive revalidation or renewal, as applicable, of these privileges when they comply with the relevant revalidation or renewal requirements of Subpart J of Annex I (Part-FCL), as applicable for the instructor certificate held, and additionally do either of the following:

(a) complete instructor refresher training that focuses on the privileges as per paragraph 4;

(b) pass the relevant sections of the assessment of competence in accordance with point FCL.935 of Annex I (Part-FCL) in the relevant aircraft specified in paragraph 1 or an FSTD representing that aircraft.

7. Notwithstanding point FCL.1000(b) of Annex I (Part-FCL), applicants who hold an examiner certificate in accordance with Annex I (Part-FCL) with privileges to act as an examiner for aeroplane or helicopter type ratings shall be issued with privileges to conduct skill tests and proficiency checks for an aircraft specified in paragraph 1, provided that they hold instructor privileges as per paragraph 4 for the relevant aircraft and comply with all of the following in the relevant aircraft or an FSTD representing that aircraft:

(a) examiner standardisation in accordance with point FCL.1015 of Annex I (Part-FCL), including the conduct of at least a skill test or a proficiency check;

(b) an assessment of competence in accordance with point FCL.1020 of Annex I (Part-FCL).

8. Holders of examiner privileges as per paragraph 6 shall receive revalidation or renewal, as applicable, of these privileges when they comply with the relevant parts of point FCL.1025 of Annex I (Part-FCL) and additionally do either of the following:

(a) complete an examiner refresher course that focuses on the privileges as per point 6;

(b) pass the relevant sections of the assessment of competence in accordance with point FCL.1020 of Annex I (Part-FCL) in the relevant aircraft specified in point 1 or an FSTD representing that aircraft.

Rationale

General:	*This Article includes essential regulatory elements for type ratings (training content, revalidation, renewal, instructor and examiner requirements). While these requirements often contain references to specific requirements in Part-FCL, a general applicability of the entire Part-FCL Subpart H would not work, in the context of new VTOL-capable aircraft that do not fall into one of the existing aircraft categories which are currently reflected in Part-FCL.*
Point (2):	*Next to the general applicability of Section A of Appendix 9 to Part-FCL, OSD will further determine whether the Sections for aeroplanes, helicopters or powered-lift aircraft will be used as a basis. This will depend on the characteristics and needs of the particular aircraft.*
Point (2)(b)	*Additional training may be necessary for bridging gaps, for example if applicants for such a type rating holding an aeroplane pilot licence and need to receive additional training in hovering manoeuvres. OSD will set out the specific arrangements, with regard to previous experience of the applicants.*
Point (3):	*Revalidation arrangements are inspired by point FCL.740.H(a)(1) and (2) of Part-FCL.*
Point (4):	*CPL(A)/CPL(H) holders will be entitled to exercise their IR(A)/IR(H) privileges in the VTOL-capable aircraft, subject to skill tests / proficiency checks to cover instrument flight. The IR(A)/(H) itself needs*

	to be kept valid by complying with revalidation requirements in aeroplanes / helicopters, without credits for IR training / checking in VTOL-capable aircraft.
Point 5(b):	*The minimum flight time experience on VTOL-capable aircraft for obtaining instructional privileges are inspired by point FCL.905.TRI(e)(2).*
Point (5)(c):	*A simple reference to point FCL.910.TRI (for extending TRI privileges to a new VTOL-capable aircraft) would be problematic: Point FCL.910.TRI(c)(1)(i) requires, for TRI type extension, to have completed the relevant parts of TRI training course on that type. However, there will be no ab initio TRI training course for VTOL-capable aircraft during the initial phase. Hence, this paragraph requires in general theoretical and practical training for the extension of TRI privileges to a particular VTOL-capable aircraft, with the possibility for OSD to establish minimum requirements.*
Point (6) and (8):	*When instructors/examiners will revalidate their (conventional) instructor/examiner certificate for aeroplanes or helicopters, they will need to do some additional elements, in order to also revalidate the VTOL-capable aircraft – related privileges. Allowing a full combination (credit) of conventional and innovative aircraft at this early stage does not seem to be appropriate.*

3.7.1. Annex I (Part-FCL)

FCL.010 Definitions

[…]

'Helicopter' means a heavier-than-air aircraft supported in flight chiefly by the reactions of the air on ~~one or more~~ up to two power-driven rotors on substantially vertical axes.

[…]

Rationale:

The proposed definition of 'VTOL-capable aircraft' also requires a change in the existing definition of 'helicopter' in Regulation (EU) No 965/2012, in Implementing Regulation (EU) No 923/2012 and in Regulation (EU) No 1178/2011 in order to ensure a clear distinction between those two aircraft definitions. In particular, it is proposed to limit the scope of the definition of helicopter to 'heavier-than-air aircraft supported in flight chiefly by the reactions of the air on up to two power-driven rotors on substantially vertical axes'. This would imply that aircraft configurations with more than two power-driven rotors should be initially classified as VTOL-capable aircraft for the purposes of the above-mentioned Regulations.

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' which encompasses helicopters and gyroplanes as subcategories of rotorcraft.

3.8. Proposed amendments to Commission Regulation (EU) No 923/2012

3.8.1. Draft cover regulation

Article 2 Definitions

[…]

85. 'rotorcraft' means a power-driven, heavier-than-air aircraft that depends principally for its support in flight on the lift generated by up to two rotors;

85a. 'helicopter' means a heavier-than-air aircraft supported in flight chiefly by the reactions of the air on ~~one or more~~ up to two power-driven rotors on substantially vertical axes;

[…]

94a. 'minimum fuel' means a term used to describe a situation in which an aircraft's fuel/energy supply has reached a state where the flight is committed to land at a specific aerodrome and no additional delay can be accepted;

[…]

Rationale:

The proposed definition of 'VTOL- capable aircraft' also requires a change in the existing definition of 'helicopter' in Commission Regulation (EU) No 965/2012, Implementing Regulation (EU) No 923/2012 and Commission Regulation (EU) No 1178/2011 in order to ensure a clear distinction between those two aircraft definitions. In particular, it is proposed to limit the helicopter to 'heavier-than-air aircraft supported in flight chiefly by the reactions of the air on up to two power-driven rotors on substantially vertical axes'. This would imply that aircraft configurations with more than two power-driven rotors should be initially classified as VTOL-capable aircraft for the purpose of the above regulations.

Consequently, to ensure a coherent organisation of the categories of aircraft, it is necessary also to introduce in the above-mentioned regulations, the definition of rotorcraft to make sure that helicopters and gyrocopters are considered a subcategory of rotorcraft.

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

[…]

3.8.2. Annex — Rules of the air

[…]

SECTION 2

APPLICABILITY AND COMPLIANCE

SERA.2010 Responsibilities

[…]

(b) Pre-flight action

Before beginning a flight, the pilot-in-command of an aircraft shall become familiar with all available information appropriate to the intended operation. Pre-flight action for flights away from the vicinity of an aerodrome, and for all IFR flights, shall include a careful study of available current weather reports and forecasts, taking into consideration fuel/energy requirements and an alternative course of action if the flight cannot be completed as planned.

[…]

SECTION 4
FLIGHT PLANS

[…]

SERA.4005 Contents of a flight plan

(a) A flight plan shall comprise information regarding such of the following items as are considered relevant by the competent authority:

[…]

(12) Fuel/energy endurance

[…]

SERA.4015 Changes to a flight plan

[…]

(b) Information submitted prior to departure regarding fuel/energy endurance or total number of persons carried on board, if incorrect at time of departure, constitutes a significant change to the flight plan and as such shall be reported.

[…]

SECTION 8
AIR TRAFFIC CONTROL SERVICE

[…]

SERA.8015 Air traffic control clearances

[…]

(b) Operation subject to clearance

[…]

(4) *Potential reclearance in flight.* If, prior to departure, it is anticipated that, depending on fuel/energy endurance and subject to reclearance in flight, ~~a~~ decision may be taken to proceed to a revised destination aerodrome, the appropriate air traffic control units shall be so notified by the insertion in the flight plan of information concerning the revised route (where known) and the revised destination.

[…]

SERA.8020 Adherence to flight plan

[…]

(d) *Weather deterioration below the VMC.* When it becomes evident that flight in VMC in accordance with its current flight plan will not be practicable, a VFR flight operated as a controlled flight shall:

(1) request an amended clearance enabling the aircraft to continue in VMC to destination or to an alternative aerodrome or operating site, or to leave the airspace within which an ATC clearance is required; or

(2) if no clearance in accordance with ~~a)~~ point (1) can be obtained, continue to operate in VMC and notify the appropriate ATC unit of the action being taken either to leave the airspace concerned or to land at the nearest suitable aerodrome or operating site; or

[…]

SECTION 9
FLIGHT INFORMATION SERVICE

[…]

SERA.9005 Scope of flight information service

(a) Flight information service shall include the provision of pertinent:

[…]

(8) ~~any other information likely to affect safety.~~ information on unmanned aircraft;

(9) any other information likely to affect safety.

[…]

SECTION 11
INTERFERENCE, EMERGENCY CONTINGENCIES AND INTERCEPTION

SERA.11005 Unlawful interference

[…]

(ab) If an aircraft is subjected to unlawful interference, the pilot-in-command shall attempt to land as soon as practicable at the nearest suitable aerodrome or operating site or at a dedicated aerodrome or operating site assigned by the competent authority, unless considerations aboard the aircraft dictate otherwise.

SERA.11012 Minimum ~~F~~fuel/energy and ~~F~~fuel/energy ~~E~~emergency

(a) When a pilot reports a state of minimum fuel/energy, the controller shall inform the pilot as soon as practicable of any anticipated delays or that no delays are expected.

(b) When the level of fuel/energy renders declaring a situation of distress necessary, the pilot, in accordance with SERA.14095, shall indicate that by using the radiotelephony distress signal (MAYDAY), preferably spoken three times, followed by the nature of the distress condition (FUEL).

[…]

SERA.11015 Interception

[…]

(b) The pilot-in-command of a civil aircraft, when intercepted, shall:

(1) immediately follow the instructions given by the intercepting aircraft, interpreting and responding to visual signals in accordance with the specifications in Tables S11-1 and S11-2;

[…]

Table S11-1

Signals initiated by intercepting aircraft and responses by intercepted aircraft

Series	INTERCEPTING Aircraft Signals	Meaning	INTERCEPTED Aircraft Responds	Meaning
[…]				
3	DAY or NIGHT — Lowering landing gear (if fitted), showing steady landing lights and overflying runway in use or, if the intercepted aircraft is a helicopter / VTOL-capable aircraft, overflying the helicopter / VTOL-capable aircraft landing area. In the case of helicopters / VTOL-capable aircraft, the intercepting helicopter / VTOL-capable aircraft makes a landing approach, coming to hover near to the landing area.	Land at this aerodrome.	DAY or NIGHT — Lowering landing gear, (if fitted), showing steady landing lights and following the intercepting aircraft and, if, after overflying the runway in use or helicopter / VTOL-capable aircraft landing area, landing is considered safe, proceeding to land.	Understood, will comply.

[…]

Table S11-2

Signals initiated by intercepted aircraft and responses by intercepting aircraft

Series	INTERCEPTED Aircraft Signals	Meaning	INTERCEPTING Aircraft Responds	Meaning
4	DAY or NIGHT — Raising landing gear (if fitted) and flashing landing lights while passing over runway in use or helicopter / VTOL-capable aircraft landing area at a height exceeding 300 m (1 000 ft) but not exceeding 600 m (2 000 ft) (in the case of a helicopter, at a height exceeding 50 m (170 ft) but not exceeding 100 m (330 ft)) above the aerodrome level, and continuing	Aerodrome you have designated is inadequate.	DAY or NIGHT — If it is desired that the intercepted aircraft follow the intercepting aircraft to an alternate aerodrome, the intercepting aircraft raises its landing gear (if fitted) and uses the Series 1 signals prescribed for intercepting aircraft.	Understood, follow me. Understood, you may proceed.

Table S11-2				
	to circle runway in use or helicopter / VTOL-capable aircraft landing area. If unable to flash landing lights, flash any other lights available.		If it is decided to release the intercepted aircraft, the intercepting aircraft uses the Series 2 signals prescribed for intercepting aircraft.	
[…]				

[…]

APPENDIX 1 — SIGNALS

[…]

4. MARSHALLING SIGNALS

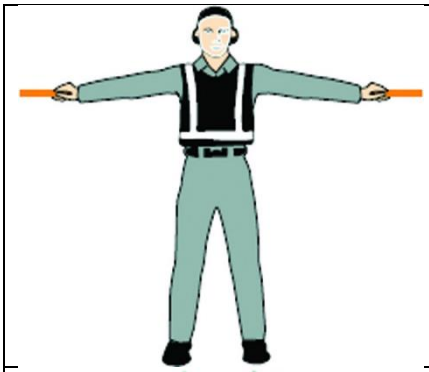
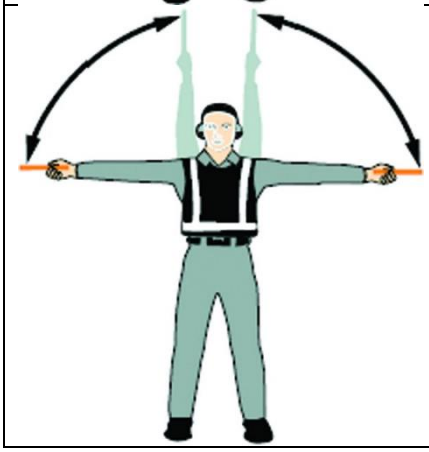
4.1. From a signalman/marshaller to an aircraft

4.1.1. The signals for use by the signalman/marshaller, with hands illuminated as necessary to facilitate observation by the pilot, and facing the aircraft in a position shall be:

[…]

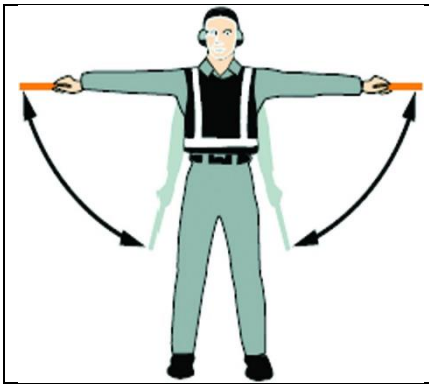
(b) for helicopters / VTOL-capable aircraft, where the signalman/marshaller can best be seen by the pilot.

[…]

	**16. Hover**[58] Fully extend arms and wands at a 90-degree angle to sides.
	**17. Move upwards**[59] Fully extend arms and wands at a 90-degree angle to sides and, with palms turned up, move hands upwards. Speed of movement indicates rate of ascent.

58 For use to hovering helicopters / VTOL-capable aircraft.

59 For use to hovering helicopters / VTOL-capable aircraft.

	**18. Move downwards**[60] Fully extend arms and wands at a 90-degree angle to sides and, with palms turned down, move hands downwards. Speed of movement indicates rate of descent.
	**19(a) Move horizontally left (from pilot's point of view)**[61] Extend arm horizontally at a 90-degree angle to right side of body. Move other arm in same direction in a sweeping motion.
	**19(b) Move horizontally right (from pilot's point of view)**[62] Extend arm horizontally at a 90-degree angle to left side of body. Move other arm in same direction in a sweeping motion.

60 For use to hovering helicopters / VTOL-capable aircraft.

61 For use to hovering helicopters / VTOL-capable aircraft.

62 For use to hovering helicopters / VTOL-capable aircraft.

	**20. Land**[63] Cross arms with wands downwards and in front of body.

[…]

APPENDIX 5 — TECHNICAL SPECIFICATIONS RELATED TO AIRCRAFT OBSERVATIONS AND REPORTS BY VOICE COMMUNICATIONS

A. REPORTING INSTRUCTIONS

[…]

2. DETAILED REPORTING INSTRUCTIONS

[…]

Section 2

[…]

Item 8 — ENDURANCE. Report ‘ENDURANCE’ followed by fuel/energy endurance in hours and minutes (4 numerics).

[…]

63 For use to hovering helicopters / VTOL-capable aircraft.

4. Impact assessment (IA)

4.1. Innovative air mobility — introduction to the issue

Compared to existing manned aircraft and ground vehicle operations, operations with UAS and aircraft with vertical take-off and landing (VTOL) capability (other than helicopters) create new opportunities as they open the field of 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 different geographical scales ranging from urban environments to intercontinental routes.

The estimated market size of innovative air mobility (IAM)[64] in Europe, including research and development (R&D), vehicle manufacturing, operations and infrastructure construction, will be approximately EUR 4.2 billion by 2030, which represents almost one third of the global market and hints at the opportunity that this industry may offer for Europe. The estimated market size may create or sustain approximately 90 000 jobs by 2030, based on labour spending for constructing related infrastructure and operating UAM65.

Although the IAM market is still at an early stage, it shows increasing momentum. Many start-ups and companies are emerging across the entire value chain. In particular, the drones and VTOL-capable aircraft manufacturing sector, together with infrastructure providers, is rapidly evolving, especially in Europe, where numerous designs and concepts are currently being investigated and developed, with some already reaching the certification stage. Different types of aircraft architectures will be employed to support several use cases ranging from passenger and cargo transport to emergency use. Amongst many different use cases, air taxis will be the type of innovative operations more largely deployed in Europe in the near future. These operations will be the core of IAM. Initially, air taxi operations are expected to be performed with manned VTOL-capable aircraft at an early stage, while in the future such operations will be performed on the same platforms but remotely piloted; therefore, it is necessary to support the transitioning phase and to ensure a smooth integration of these new operational concepts in the current civil aviation domains.

Given the constraints of the requirements applicable to aircraft operations in an urban environment, today manned aircraft operations in such environment are rare: mainly police helicopters, HEMS, in some cases general aviation (GA) aircraft, and occasionally some specially authorised balloon operations.

More complex operations involving the transport of passengers and cargo or package deliveries are being foreseen with the use of electrical and hybrid aviation technology. At the same time these operations aim to change the urban mobility scenario by pushing for the development of zero/limited emissions airborne urban public transportation.

Applications for the type certification of electrical aircraft with vertical take-off and landing capability have been received by EASA since 2017. They intend to offer high-density deployment of on-demand operations of passenger commercial air transport (CAT), in urban and inter-urban areas, for intermodal connections.

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64 Refer to the definition of 'IAM' provided in Section 2.

65 *Source:* EASA Study on the societal acceptance of Urban Air Mobility in Europe (https://www.easa.europa.eu/sites/default/files/dfu/uam-full-report.pdf).

Obviously, the safety of IAM vehicle occupants needs to be ensured, along with the safety of potentially affected third parties on the ground and other air users. While EASA is not able to quantify the level of safety that the public would accept when and if IAM would be deployed, the widespread perception of the risk involved cannot be disregarded. Results of the recent EASA study on the societal acceptance of UAM in Europe[66] indicates that the expected safety level is similar to that for other CAT operations.

Recent accidents with large aircraft are clear evidence that the sector remains subject to close scrutiny by the media and the public, despite the proven high level of safety achieved over the past decades. A fatal accident in the early stage of IAM development may lead the public opinion to consider these operations unsafe. This would prevent the economic viability and the emergence of this revolutionary mode of urban transportation.

Therefore, EASA has initiated discussions on this novel operational context as regards the framework to enable IAM.

In order to better understand the complexity of the argument, this section introduces the logical elements contributing to its definition. It details the factors that trigger the need for regulatory activity, the drivers and the matter of concern, and the issues.

4.1.1. Drivers

— New operational concepts enabled by UAS and innovative, manned VTOL-capable aircraft typically powered by electrical engines.

— The need to enable IAM as one element of the future 'smart, green and digital' cities.

— The lack of a comprehensive regulatory framework addressing safety, security and environmental aspects to build EU citizens' trust in the use cases of IAM operations, conducted with UAS and passenger-carrying innovative, manned VTOL-capable aircraft.

— Support to EU's industry competitiveness at global level.

4.1.2. Issues

— Inadequate protection against ground safety risks (accidents/incidents involving persons on the ground or in sensitive areas)

  — The ground risk involves the probability of a UAS or a VTOL-capable aircraft crashing on persons or property on the ground causing injuries/fatalities or damage (including critical infrastructures). The risk is highly dependent on the area overflown, in terms of population density, or presence of properties and sensitive areas. The risk is normally higher in urban environments not only due to the higher population density but also the presence of obstacles during navigation (e.g. buildings, barriers, etc.).

  — The risk of damage to critical infrastructures[67] is considered a complex condition for which countries may have differing sensitivities. Therefore, the analysis and quantification of the associated risks is deemed difficult and subject to national

[66] Source: EASA Study on the societal acceptance of Urban Air Mobility in Europe (https://www.easa.europa.eu/sites/default/files/dfu/uam-full-report.pdf).

[67] A similar approach has been proposed by JARUS in its SORA 2.5 document under development and to be published at http://jarus-rpas.org/publications.

specificities, it is thus not addressed within this NPA and should be subject to a separate risk assessment. This should be done in cooperation with organisations responsible for infrastructure, as they are most knowledgeable of the infrastructure weaknesses and failure modes and effects, together with the potential threats affecting the infrastructure.

- The ground risk also involves the risk associated to ground operations (taxiing, servicing of the aircraft, refuelling/recharging the aircraft, and the risk related to parts departing from the UAS or the VTOL-capable aircraft and hitting persons on the ground).

- Inadequate protection against air safety risks (mid-air collision risk, aircraft proximity (AIRPROX), accidents and incidents with manned and unmanned aircraft)
  - The increase in the number of UAS and VTOL-capable aircraft in airspace raises concerns about the increased risk of mid-air collisions with manned and unmanned aircraft, and occurrences resulting in collision-avoidance manoeuvres seriously affecting traffic management.
  - Loss of control of light UAS due to wake turbulence caused from operations with rotorcraft, aeroplanes, manned VTOL-capable aircraft, or larger UAS.
- Inadequate protection against aviation security risks (incidents due to harmful actions)
  - While UAS will be operated in quite a flexible way from different locations, VTOL-capable aircraft will typically operate from vertiports located outside aerodromes, and for such new structures there is a need to identify appropriate and proportionate measures, like security checks of the passengers or scanning of luggage, such to mitigate the risk associated to the malicious use of VTOL-capable aircraft.
  - Similarly to other aircraft products, operations with VTOL-capable aircraft may also be subject to electronic or physical disruption of the flight that could result in a risk to occupants or third parties.
- Lack of a harmonised regulatory framework in Europe
  - Non-harmonised and/or rigid and too prescriptive regulations might create barriers to the market. This might imply high costs for manufacturers to adapt their products to the various regulatory systems of the Member States, additional burden to comply with different technical requirements, a possible reduction in financial investments on research and development of solutions that would improve the level of safety. This could also lead to drawbacks for the competitiveness of EU's industry due to market barriers.
- Poor adoption of the use cases by EU citizens in the domain of IAM (lack of trust due to safety, security, and environmental risks)
  - Despite the initial positive attitude shown by European citizens, there is a need to foster the actual adoption of the IAM use cases by future users, and also the acceptance of IAM use cases by urban residents. Regulatory authorities shall ensure that an adequate level of safety, security and environmental protection will be ensured, and that no citizen will suffer undue and unbalanced nuisance from IAM.

4.1.3. Safety risk assessment

During the preparation of this regulatory proposal, EASA performed a review of the occurrences (accidents and incidents) that happened between 2014 and 2020, and are available in the European Common Repository database. Despite the fact that most of the reported drone occurrences come from large aircraft on approach or during take-off but not from other sources, and the fact that almost the whole set of occurrences referred to operations with small UAS classifiable in the existing 'open' and 'specific' category, the analysis revealed some generic trends pointing at aircraft design deficiencies (e.g. loss of power, loss of rotor integrity, system/component failure, loss of control/data link) or operational limitation breaches (e.g AIRPROX, mid-air collisions).

No safety recommendations pertaining to the domains covered in this NPA have been addressed to EASA so far, as the current requirements enabling operations over congested urban areas (cities, towns or settlements) or over open-air assemblies of persons are so limiting that make such operations quite rare (e.g. only limited to police helicopters, HEMS, in very rare cases GA aircraft, and some specifically authorised balloon or airship operations).

4.1.3.1 Safety risk assessment for UAS operated in the 'specific' category and which are subject to certification

The regulatory framework established with Delegated Regulation (EU) 2019/945[68] only stipulates that UAS subject to certification shall comply with the requirements set out in Commission Regulation (EU) No 748/2012[69] and Commission Regulation (EU) No 1321/2014[70]. However, there are two main reasons that require the amendment of those Regulations:

— the initial and continuing airworthiness processes established by the above-mentioned Regulations do not cater for the novel element the command unit (CU) of an UAS represents;

— in accordance with Article 58 of Regulation (EU) 2018/1139, the maintenance of UAS is to be regulated by a delegated act, hence the need to establish a new dedicated delegated regulation for the continuing airworthiness of UAS that are subject to certification.

The proposed amendments to existing regulations and the proposed new regulations will neither introduce novelties as regards the technical assumptions that impact on the airworthiness of UAS nor modify existing conditions for operations, but they will only describe the applicable processes needed to ensure the initial and continuing airworthiness of UAS operated in the 'specific' category and subject to certification in accordance with Article 40(1)(d) of Delegated Regulation (EU) 2019/945.

For this reason, a specific safety risk assessment for UAS operated in the 'specific' category and subject to certification will not be performed. Regarding the 'specific' category of UAS, the conclusions stated

[68] 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=1655060708504).

[69] Commission Regulation (EU) No 748/2012 of 3 August 2012 laying down implementing rules for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations (OJ L 224, 21.8.2012, p. 1) (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32012R0748&qid=1655060079589).

[70] Commission Regulation (EU) No 1321/2014 of 26 November 2014 on the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and on the approval of organisations and personnel involved in these tasks (OJ L 362, 17.12.2014, p. 1) (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32014R1321&qid=1655060162463).

in NPA 2017-05(B)[71] are still considered applicable. In particular, the applicable provisions that require an operational authorisation (which includes the review of certain airworthiness aspects) to perform certain operations, together with the available standard scenarios issued by EASA and the possibility for operators to apply for a LUC[72] including certain privileges, are considered sufficient elements to mitigate the safety risk associated to accidents and incidents that involve UAS.

4.1.3.2 Safety risk assessment for manned VTOL-capable aircraft

In performing the overall risk assessment linked to operations with innovative, manned (including pilots and passengers) VTOL-capable aircraft, EASA has considered the following risk categories:

— risk to occupants,

— ground risk,

— air risk.

4.1.3.2.1 Risk to occupants

4.1.3.2.1.1 Risk assessment inputs

The assessment of the risk to occupants is performed through a comparison of the risk associated to operations with VTOL-capable aircraft with the risk associated to other modes of transport. The safety level of IAM services is put in perspective with other modes of transport.

It is also assumed that IAM services are certified in accordance with the Special Condition SC VTOL in the category 'Enhanced' and, therefore, with a design safety objective of 1×10^{-9} per flight hour for each individual catastrophic failure condition, which is the same safety objective currently adopted for large transport aircraft.

The European Union Agency for Railways (ERA) publishes on a regular basis a Report on Railway Safety and Interoperability in the EU that provides intermodal comparison of the risks. The following table is based on the 2017[73] and 2018[74] reports, and shows the average fatality rates for different modes of transport in the EU.

71 NPA 2017-05(B) (https://www.easa.europa.eu/document-library/notices-of-proposed-amendment/npa-2017-05).

72 'Light UAS operator certificate' as defined by Commission Implementing Regulation (EU) 2019/947.

73 https://www.era.europa.eu/sites/default/files/library/docs/safety_interoperability_progress_reports/railway_safety_performance_2017_en.pdf

74 https://www.era.europa.eu/sites/default/files/library/docs/safety_interoperability_progress_reports/railway_safety_and_interoperability_in_eu_2018_en.pdf

Table 1: Fatality rates per transport mode

Transport mode	Fatalities per billion passenger kilometres (pkm)	Average speed (km/h)[75]	Fatalities per billion passenger travel hours (pth)
Airline passenger (on EU territory)	0.06	457.1	27.4
Railway passenger	0.10	57.1	5.7
Bus/coach occupant	0.23	28.6	6.4
Car occupant	2.67	35.7	95.4
Powered 2-wheelers	37.80	31.9	1205.2

A passenger kilometre (*pkm*) is defined as 'a unit of measurement representing the transport of one passenger by a defined mode of transport over one kilometre'; a passenger travel hour (*pth*) is defined as 'a unit of measurement representing the transport of one passenger by a defined mode of transport for one hour'.

The average number of fatalities per *pkm* and the average number of fatalities per *pth* are linearly dependent on the average speed for the given mode of transport. The rate per *pth* can be derived by multiplying the rate per *pkm* by the average speed.

The risk to aircraft passengers mainly occurs during the take-off and landing phases, while the cruise part of the flight accounts for only a small percentage of the risk. This statement also shows that the comparison of IAM services with the traditional commercial air transport comes to a limit. IAM services operations consist indeed of very short times (around 30 minutes) and very short distances flights (< 50 km) where take-off and landing phases consume a much higher portion of the total flight time than for conventional commercial flights.

In this analysis, two possible concepts of operations associated to IAM services are considered:

— IAM Service A is high-density deployment of urban, on-demand passenger commercial air transport for intermodal connections (e.g. vertiport at a train station). Flights will typically be around 20 minutes long, with cruise at 150 m (490 ft) AGL under VFR-day regime.

— IAM Service B is high-density deployment of urban and inter-urban, on-demand passenger commercial air transport for intermodal connections.

The following table summarises the assumptions associated to each IAM service:

Table 2: Design and operational assumptions

	IAM Service A	IAM Service B
Number of occupants per vehicle	2	5
Average speed	60 km/h	150 km/h
Mean flight time	0.3 hrs	0.8 hrs
Average flight distance	18 km	120 km
Fleet size per city	150	150
Number of flights per day	31	18
Usage per year	300 days	300 days

[75] Derived from '*TRANSPORT SAFETY PERFORMANCE IN THE EU / A statistical Overview published by the European Transport Safety Council in 2003*'.

Based on these assumptions, the given fleets will accumulate the following *pkm/pth* per year per city:

— IAM Service A:

  — 50 million passenger kilometres (pkm) per year per fleet per city,

  — 0.84 million passenger travel hours (pth) per year per fleet per city.

— IAM Service B:

  — 486 million passenger kilometres (pkm) per year per fleet per city,

  — 3.24 million passenger travel hours (pth) per year per fleet per city.

To establish an occupant fatality rate, it is necessary to predict the average number of fatalities per year due to these UAM services.

Note that this prediction will only consider:

— fatal occupant injuries,

— accidents resulting from random system failures.

The analysis also assumes the following major limitations:

— third-party fatalities that could be caused by an accident in populated and congested areas are not considered at this stage; these are assessed in Section 4.1.3.2.2.3;

— failures resulting from human errors, failures from structures or dynamic components, production, maintenance, security or operational issues are not considered;

— occupancy factors are not considered.

Given these major limitations, the predictions in the following section of the average number of fatalities per year due to these UAM services in urban areas may be relatively optimistic.

4.1.3.2.1.2 Results

Risk at city level

The following table provides an estimation of the annual number of accidents for a large city once the above IAM services are introduced.

Table 3: Estimated number of fatal accidents per year per city per IAM service

Aircraft type	Estimated number of fatal accidents per year for a large city
IAM Service A	0.02
IAM Service B	0.06

The assumption for the IAM service operations and the city (size of the fleet) are given in Table 2. IAM Service B that corresponds to intercity services has a higher probability of accidents. This is due to the relatively higher complexity of the products (higher number of catastrophic failure conditions — additional operational capabilities to support the use cases) and concept of operations (aircraft annual usage is higher than for IAM Service A).

Comparison of UAM occupant risks with other modes of transport

Accident estimation can also be made for an individual that uses IAM services and can be compared to other modes of transport.

Two indicators 'Average fatalities per billion pkm' and 'Average fatalities per billion pth' are commonly used to compare the safety level of modes of transport. The first indicator is, by definition, more sensitive to the distance travelled. In contrast, the second indicator is more sensitive to travel time. This is the reason why in Table 1 commercial aircraft, which are used to make longer journeys than trains and buses, appear to be the safest means of transport in terms of distance travelled (the first indicator), but perform slightly worse when it comes to the second indicator, in terms of travel time.

Knowing the number of occupants and the use of the product, we obtain the predicted number of fatal accidents per year, per fleet and per city. The performance of IAM Service A and B is then calculated based on the above two indicators:

Table 4: Estimated fatality rates

Mode of transport	Estimated average fatalities per billion pkm	Estimated average fatalities per billion pth
IAM Service A	*0.83*	*50*
IAM Service B	*0.67*	*100*

Notes:

These estimations are sensitive to two main parameters/assumptions:

— the 'average aircraft speed / average distance travelled' per flight:

  the higher the speed, the lower the fatality rate per billion pkm; in this study, the average speed for both IAM Service A and UAM Service B was set at or near typical cruising speed, knowing that the final average speed in service is likely to be slightly lower due to time spent in the vertical take-off and landing phases with zero forward speed;

— the number of catastrophic failure conditions per type design; the higher the number of catastrophic failure conditions, the higher the fatality rate per billion pkm and pth respectively; for this analysis, typical designs under certification by EASA have been considered.

The estimated fatality rates in Table 4 can then be compared to the observed fatality rates in Table 1 for existing means of transport: IAM services, certified according to SC VTOL category 'Enhanced', that is to say with a safety objective of 1×10^{-9} per flight hour for each individual catastrophic failure condition (same objectives as for large transport aircraft), may achieve a level of safety comparable to, or for some indicators by an order of magnitude, lower than bus, railway or airline services.

It is reasonable to assume that the public will not accept a significantly lower level of safety than bus/coach occupants when travelling using UAM services.

It is, however, important to highlight the following:

— The estimations in Table 4 are solely based on the system safety objective of 1×10^{-9} per flight hour for each individual catastrophic failure condition, assuming that VTOL manufacturers will propose designs that strictly meet the system safety quantitative objective.

— In practice, experience shows that for various reasons (technical choices, design margin, company policy) the proposed designs often achieve better in-service reliability than the certification objectives.

— To address other risks than random system failures, dedicated requirements were introduced in SC VTOL (continued safe flight and landing concept, no single failure requirement for structural parts, etc.). Due to their qualitative nature, the effect of these requirements has not been taken into account in the numerical analysis above.

4.1.3.2.2 Ground safety risk

4.1.3.2.2.1 Ground safety risk — ground operation

The VTOL certification process will cover some risks associated to the ground operation, especially thanks to:

— SC VTOL.2510 that requires to assess system safety for the entire duration of the flight; this includes the conditions associated with embarkation and disembarkation, taxi phase, etc.;

— SC VTOL 2320(a)(2) Occupant physical environment;

— SC VTOL 2400(c)(3) Lift/thrust system installation.

Risks associated to charging (e.g. fire following a battery thermal runaway) will be managed via the certification of the charging station (SC VTOL 2430(c)) and the provisions that will be defined in future regulations applicable to aerodromes and vertiports.

4.1.3.2.2.2 Ground safety risk – Parts departing from VTOL-capable aircraft

On fixed-wing and rotary-wing products, departing parts from the aircraft is a known risk during operations: departing parts can pose safety risks to the aircraft itself, to other air users, and mainly to people on the ground.

Dedicated certification memoranda have been developed to assess and control the risks:

— for fixed-wing aircraft: EASA CM No.: CM–21.A-A-001 Issue 01, dated 29 November 2018[76];

— for rotorcraft: EASA CM No.: Proposed CM–21.A-A-002 Issue 01, dated 3 September 2021[77].

A similar approach is expected to be developed and followed for VTOL products to mitigate such risk to an acceptable level.

4.1.3.2.2.3 Ground safety risk — third parties

The purpose of this analysis is to develop a ground risk profile for operations with manned VTOL-capable aircraft over congested (urban) areas. Compared to IAM Service B, IAM Service A performs its mission entirely in urban environment and, therefore, is considered more relevant for the scope of the analysis. For this purpose, IAM Service A from Section 4.1.3.2.1.1 (urban, on-demand passenger commercial air transport service for intermodal connections) is considered and the consequences of the crash of such a vehicle investigated in terms of number of ground fatalities per year using parameters such as:

— the IAM Service A intended concept of operations;

[76] https://www.easa.europa.eu/document-library/product-certification-consultations/easa-cm-21a-001

[77] https://www.easa.europa.eu/document-library/product-certification-consultations/proposed-certification-memorandum-cm-21a-002

— the vehicle area of impact in case of crash;

— the population density;

— the required occurrence probability per flight hour of a catastrophic failure condition.

Note: The risk of occupant fatalities is assessed in Section 4.1.3.2.1.

Like in the previous analysis, the IAM Service A risk profile only considers random system failures. Therefore, the values obtained hereafter shall be considered optimistic since all other possible causes leading to a crash are not considered. So far, experience with the commercial aviation (aeroplanes and rotorcraft) suggests that these other causes can be a considerable part and they are not quantified for the purpose of this analysis.

Therefore, the number of fatal accidents, derived hereafter, is subject to uncertainty. The purpose of the analysis is rather to provide a rough estimation of the number of fatal accidents, and affected people, per year per city.

Table 5: Design and operational assumptions for IAM Service A

	IAM Service A
Maximum take-off weight (MTOW)	1 000 kg
Mean flight time	0.3 hrs
Fleet size per city	150
Number of flights per day	31
Usage per year	300 days
Number of flights per year per city	1 395 000 flights

The following formula is used in order to obtain the number of design-related fatal accidents per year per city.

$$\begin{aligned} &Number\ of\ design\ related\ Fatal\ Accidents\ per\ Year\ per\ City \\ &= Number\ of\ Catastrophic\ Failure\ Conditions\ at\ Product\ level \\ &\times Occurrence\ Probability\ of\ a\ Catastrophic\ Failure\ Condition\ at\ Aircraft\ level\ per\ flight\ hour \\ &\times Mean\ Flight\ Time \times Number\ of\ Flights\ per\ Year\ per\ City \end{aligned}$$

Table 6: Number of design-related fatal accidents per year per city

∑ Fatal Accidents per Year per City
0.02

A catastrophic failure condition is described in terms of fatalities/serious injuries — however, usually related to the occupants only. Considering only the occupants of the IAM Service A could result in underestimating the number of people affected by a catastrophic failure condition. The new concept of an aircraft being used for large-scale urban mobility (i.e. into congested areas) is indeed leading to additionally consider in the equation the risk to third parties on the ground.

In order to quantify the risk of endangering persons on the ground, two parameters have been identified:

— the density of population; and

— the vehicle area of impact in case of crash.

Population density varies significantly among European cities. This analysis is limited to the impact assessment of three cities, with different levels of population densities (low, medium and high) in order to get an order of magnitude of the data variation when computing the number of people affected by a crash.

Average population densities from various European cities across the continent have been considered to establish the three categories of city densities. Sources and age of data (INSEE 2018, *Bevölkerung im Land Brandenburg nach amtsfreien Gemeinden, Ämtern und Gemeinden*, 31. Dezember 2020. Amt für Statistik Berlin (NUTS - 2013); Anual - INE, *Estimativas anuais da população residente*) are considered adequate for the purpose of this analysis, i.e. investigating orders of magnitude rather than the exact number of people affected by a crash.

Table 7: Average population density per city

City population density	Average population density (number of people per km^2)
Low	1 000
Medium	5 000
High	20 000

Density population is subject to great variation depending on the district within the same city and also on the time of the day (e.g. less populated city centre during night). Therefore, the average population density does not represent well the number of people exposed to the risk during a typical mission of IAM Service A.

Considering that IAM Service A will take off from / land at highly congested areas, in order to fulfil its business model, a density amplification factor is applied to the take-off and landing phases as areas of interest such as hotels and railway stations are considered.

The next step is to define the damage area, being the area where people on the ground are affected by the IAM Service A crash. Multiple models to estimate this have been proposed by industry and military and civil authorities, and all models have underlying assumptions and limitations. Until in-service experience is gained, there is limited statistical evidence that a particular model would provide better estimations than others. For consistency with the EASA model used to established VTOL product safety objectives, the simplified methodology is inspired from Attachment G to the AER.P-2TR *Italy's Ministry of Defence – Military Aircraft Type Qualification and Suitability for Installation*[78], and is based on the geometric area of the aircraft corrected with a specific factor.

For this second step, the mission profile of IAM Service A is further simplified and two main scenarios are considered:

(a) crash related to a catastrophic failure condition occurring in cruise;

(b) crash related to a catastrophic failure condition occurring at take-off or landing.

Since the method is based on the total mechanical energy, the two parameters considered are speed and altitude.

78 https://www.difesa.it/SGD-DNA/Staff/DT/ARMAEREO/Biblioteca/5Categoria/Documents/AER_P_2TR.pdf

For scenario (a), the total energy is computed as follows:

$$Etot_a(J) = \frac{1}{2} \times MTOW(kg) \times Vcr^2(m.s^{-1}) + 0.9 \times MTOW(kg) \times H(m) \times 9.81(m.s^{-2})$$

using the following values: MTOW = 1 000 kg, Vcr = 60 km/h, and H = 150 m

giving *Etot_a* around 3 100 kJ.

For scenario (b), the total energy is computed as follows:

$$Etot_b(J) = 0.9 \times MTOW(kg) \times H(m) \times 9.81(m.s^{-2})$$

using the following values: MTOW = 1 000 kg, and H = 150 m

giving *Etot_b* around 1 324 kJ.

Based on the AER.P-2TR model, a correction factor is determined for the area of damage. The IAM Service A corrected area of damage on the ground is estimated to around 2 450 m^2 for the take-off and landing phases. People that are in the corrected area of damage may suffer different level of injuries. For the purpose of this analysis, these specific aspects of the wounded people involved in a crash are not further assessed. Therefore, any person in the corrected area of damage is considered fatally injured.

The total number of affected people in case of a crash of the IAM Service A is calculated as follows:

$$Total\ number\ of\ Fatalities\ per\ Crash = Corrected\ Average\ Population\ Density \times Corrected\ Area\ of\ Damage$$

Applying the number of fatal accidents per year per city, and considering the population density of the three reference cities, the following figures are obtained:

Table 8: Estimated number of ground fatalities per year depending on city population density

City population density	Average ground fatalities per year per city per fleet
Low	0.2
Medium	1
High	5

With the assumptions considered, this second analysis shows that:

— the estimated number of annual accidents is very low for a given city (Table 6); for this reason, the estimated number of average fatalities is relatively low (Table 8). However, in the few occasions where a crash occurs in a city, it may involve around 5–10 third parties on the ground and possibly much more if it occurs in a high-density area;

— operations into congested areas require to minimise as much as possible the risk of endangering people on the ground; this risk may be controlled by implementing similar mitigating measures as the ones foreseen for UAS operations:

  — define routes that avoid as much as practically possible flying over densely populated urban areas (e.g. maximise flight over rivers or highways)

— identify alternate vertiports or appropriate operating sites along the planned routes.

In order to address the above consequences and to provide for an acceptable level of safety for European citizens, EASA will adopt:

— via SC VTOL, the highest certification standards, aligned with those for large aeroplanes performing commercial air transport;

— stringent operational requirements, including those on airspace management.

4.1.3.2.3 Air safety risk

The key elements to consider for conducting the air risk safety assessment are the following:

— operations are performed with manned VTOL-capable aircraft;

— the aircraft is certified;

— the pilot holds a commercial pilot licence (CPL);

— the aircraft operator holds an air operator certificate (AOC);

— operations are performed in day VFR or SVFR (Special VFR) conditions;

— the cruise levels are defined locally considering airspace constraints and/or operator constraints: for this analysis, it is assumed that the cruise phase will be at low level, but it is not excluded that flights may be conducted in Class E airspace;

— the focus is on heavy-traffic, high-complexity intracity operations; for intercity operations, it is assumed that they will be subject to the same air risk mitigating measures, although these operations may take place in scenario with low traffic density or with reduced complexity.

The main novelties introduced by these operations are the following:

— new electric aircraft with novel design;

— operations in urban environments / congested areas with a greater traffic density;

— take-off from and landing at vertiports or other operating sites.

4.1.3.2.3.1 Safety strategy for the air risk

4.1.3.2.3.1.1 The proposed strategy

This impact assessment will address only the air risk. However, ground risk and air risk should normally not be considered in isolation but looked at as complementary components of the final safety level achieved. Indeed, a mitigation measure for ground risk might be detrimental to the air risk and vice versa (e.g. flying low to avoid other aircraft increases the ground risk).

This impact assessment is conducted by analysing the introduction of operations with manned VTOL-capable aircraft in a representative operational environment which relies on existing helicopter operations in congested (urban) areas and non-congested areas.

There are a few examples in Europe (e.g. Paris Issy les Moulineaux heliport, Monaco or Nice Cote d'Azur) where helicopter operations are conducted in VFR close to cities not only for HEMS or police operations. These reference scenarios will be the basis for this impact assessment and could be used

as a good reference for other urban areas in Europe with possibly other specific constraints for certain cities.

Furthermore, at the time of the analysis, this assessment has considered current, applicable regulations on manned aircraft, air traffic services, UAS and U-space airspace.

This impact analysis does not address specifically intercity, regional/interregional operations as the air risk of VFR operations with manned VTOL-capable is considered equivalent to that of any other VFR operation carried under an AOC, assuming that they apply strictly the VFR/VMC rules. This assumption also relies on the fact that these operations will not be always conducted in congested areas with a high concentration of traffic and might use aerodromes complementarily to vertiports.

Considering that future operations are intended to be conducted with manned VTOL-capable aircraft for the carriage of passengers, operated in VFR conditions, the objective would be to achieve a safety level comparable to that for helicopter VFR operations carried under an AOC (CAT).

An alternate solution, which will be less demanding in terms of safety, would be to require a level of safety equivalent to that for private helicopter VFR operations. This option was finally not retained.

Strategic elements to reach the safety level objective for the air risk are the following:

— a pilot is on board aircraft and appropriately trained and qualified for the intended operation;

— CPL (and not private pilot licence (PPL)) requiring greater accuracy in flying, considerable experience to maintain the licence and higher airmanship standards;

— AOC authorising an operator to carry out specific commercial air transport operations;

— the ‘see and avoid’ principle in VFR conditions should not be compromised by these new operations;

— the risk of collision with other UAS should not be greater with manned VTOL-capable aircraft when compared to helicopter VFR operations performed under an AOC.

The challenges of meeting this air risk safety strategy are as follows:

— urban environment leading to fly over more congested areas compared to current helicopter operations;

— traffic density which would probably be higher leading to a mathematical increase in the air risk;

— concentration of the traffic at vertiports or at specific areas of the operational environment (hotspots);

— traffic mix in this operational environment (manned VTOL-capable aircraft, helicopters, fixed-wing aircraft, UAS, etc.); for separation to be maintained among all users of a particular airspace class, it is essential that the flight levels of all these aircraft be known unambiguously, meaning that a common altitude reference system (CARS) is established;

— current limits of the ‘see and avoid’ principle will be fully applicable to these new operations.

The proposed strategy to address the air risk is limited to the analysis of the risk of in-flight collision. It means that the risk of accident due to wake-turbulence encounter is not addressed in this analysis. The main reason is that flight is conducted in VFR and the pilot is responsible for maintaining an appropriate longitudinal spacing between aircraft. However, when taking off/landing at vertiports, a dedicated wake-turbulence analysis to evaluate the risk might be needed considering the different

types of manned VTOL-capable aircraft operating at vertiports. Furthermore, a wake-turbulence analysis will be needed to evaluate the risk of flying close/near to aerodromes with 'conventional' manned aircraft (light, medium, heavy and super-heavy aircraft categories).

4.1.3.2.3.1.2 Air risk components associated to the strategy

The two components of the air risk, namely the severity and the probability of in-flight collision when considering this safety strategy should be analysed:

— the severity of the harmful effects associated to a collision where one of the aircraft involved in the collision is a manned VTOL-capable aircraft carrying passengers is very similar to a collision where one of the aircraft involved in the collision is a helicopter carrying passengers. It is assumed that the number of passengers transported is similar between manned VTOL-capable aircraft and helicopters. A reduction in the severity might be considered if fewer passengers are carried in a manned VTOL-capable aircraft compared to a helicopter, but it is assumed that the manned VTOL-capable aircraft will be certified for 2 to 6 seats, which is comparable to helicopters;

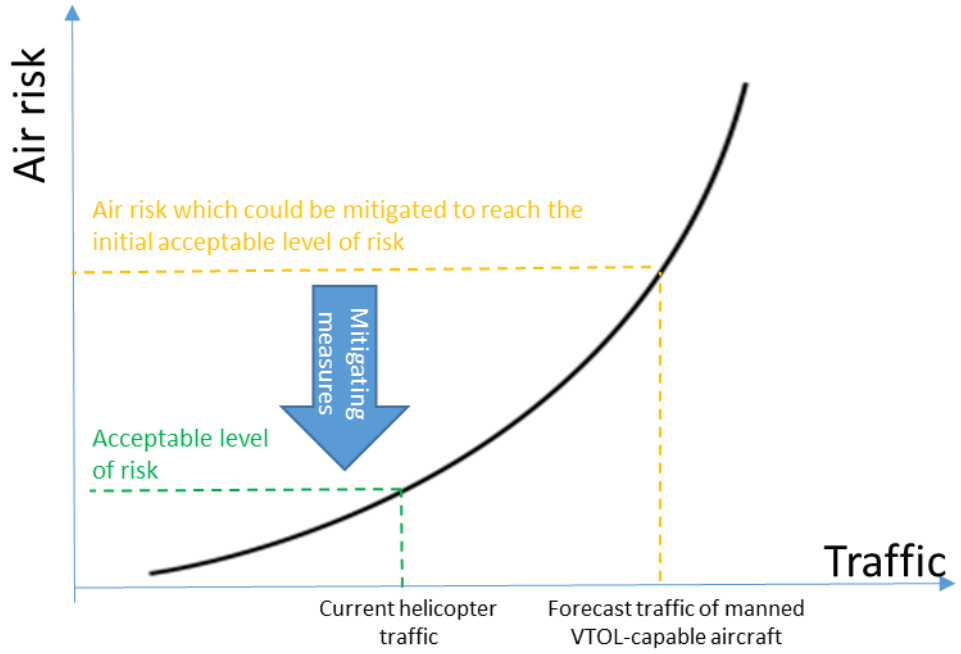
— the probability of in-flight collision is directly linked to traffic density; therefore, this risk component will increase if no specific mitigating measures are implemented. This air risk component will be the main driver of this impact assessment to identify the appropriate mitigating measures to achieve an acceptable level of safety.

4.1.3.2.3.1.3 Acceptable level of safety for the air risk

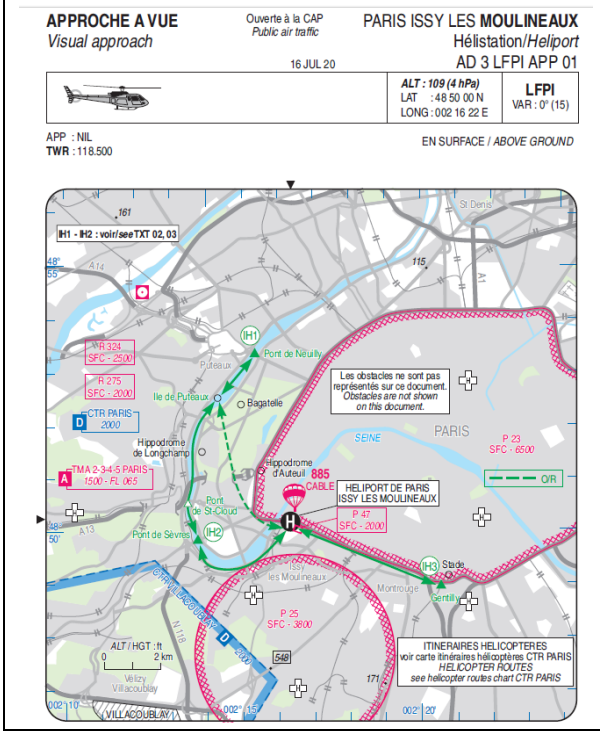
The acceptable level of safety should be defined by considering the increase in traffic due to operations with manned VTOL-capable aircraft to the reference scenario (current VFR helicopter traffic in the target operational environment).

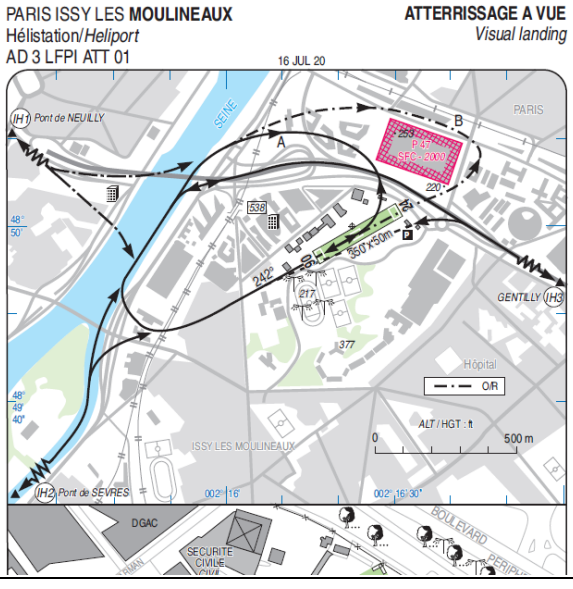
The air risk is very sensitive to the traffic density as it is shown in Figure 6. Considering that the reference scenario is acceptably safe (green dotted line), then this safety level shall be maintained despite the increase in traffic. In such case, mitigating measures (blue arrow) shall be put in place to reduce the new air risk (amber dotted line) in order to achieve the acceptable level of risk (green dotted line) despite the increase in traffic.

Figure 6 — The air risk curve and the impact of the increase in traffic



The Paris Issy Les Moulineaux commune is a good example where VFR helicopter operations are conducted in congested area. The heliport in the example is located within class D CTR PARIS and several limitations are published (operating instructions, VFR departure and arrival routes, training and skills of the pilot, etc.). When considering this example, the current safety level achieved for VFR helicopter operations in such environment should not be reduced when additional operations with manned VTOL-capable aircraft will be conducted in this operational environment.

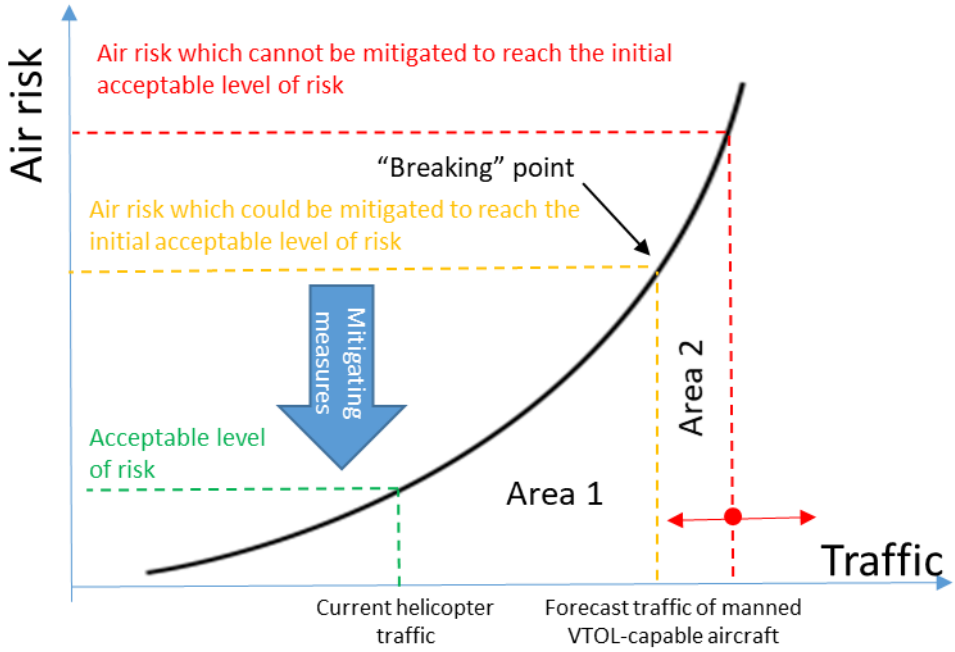




The determination of additional mitigating measures should be commensurate to the increase of air risk and, therefore, directly linked to the increase in traffic and the novelty of the operation.

It is important to note that the identification of mitigating measures and their efficiency to achieve an acceptable level of air risk will be possible only up to a certain limit as it is shown in Figure 7. Indeed, when traffic density goes beyond a certain point, there will be no possibility any more to mitigate the risk to achieve the initial acceptable level (green dotted line). The determination of this 'breaking point' is not easy and is specific to each operational environment. The present impact assessment will focus on 'Area 1' where mitigating measures will be identified to achieve an acceptable level of air risk. For 'Area 2' (beyond the breaking point), the risk will be greater than the initial risk, which means that the targeted safety level will not be achieved.

Figure 7 — Mitigating the air risk up to a certain point



4.1.3.2.3.1.4 Manned VTOL-capable aircraft traffic density scenario

It is very difficult to define what the actual traffic density will be for operations with manned VTOL-capable aircraft.

Despite this difficulty, several manned VTOL-capable aircraft traffic density scenarios need to be selected for this impact assessment to be put in contrast with the current helicopter traffic density of the reference scenario (as defined in Section 4.1.3.2.3.1.1).

The reference scenarios are defined as follows:

Table 9 — Traffic density in reference scenario

Reference landing site	Number of helicopter movements per year
Paris — Issy les Moulineaux	10 000
Monaco	35 000
Nice — Cote d'Azur	45 000

For each of the above reference scenarios, VFR helicopter operations are conducted in controlled airspace with predetermined VFR routes. It has not been possible to identify a reference scenario in uncontrolled airspace with such traffic density.

Traffic density corresponds to the number of manned VTOL-capable aircraft in a given airspace volume. It is difficult to compare one operational environment with another if the airspace volume/geometry is not identical. Furthermore, when assessing the air risk, the airspace complexity criteria are as important as the traffic density because they are characterised by the number of possible aircraft interactions in a particular airspace volume. Based on this difficulty, it is not the intent of this impact analysis to define traffic density/complexity scenarios in a quantitative way, and a qualitative approach is proposed instead.

For that purpose, three traffic density scenarios have been defined: a low, a high, and an excessive one.

The low and high traffic density scenarios correspond to 'Area 1' of Figure 7 where mitigating measures could be put in place to achieve the acceptable level of risk whereas the excessive-traffic scenario corresponds to 'Area 2' (beyond the breaking point) and no appropriate mitigation is possible.

The 'VTOL low traffic density scenario' will correspond to a scenario where potential conflicts with other airspace users will be limited (increase in traffic due to VTOL-capable aircraft is limited compared to the current traffic density in this airspace) and potential conflicts between VTOL-capable aircraft will be very limited considering this traffic density.

The 'VTOL high traffic density scenario' will correspond to a scenario where potential conflicts with other airspace users will increase significantly (increase in traffic due to VTOL-capable aircraft is important compared to the current traffic density in this airspace) and potential conflicts between VTOL-capable aircraft will have to be mitigated considering their traffic density.

The 'VTOL excessive traffic density scenario' will correspond to a scenario where potential conflicts with other airspace users and between VTOL-capable aircraft will considerably increase and will become unmanageable without airspace reclassification or redesign.

4.1.3.2.3.1.5 Safety criteria determination

By considering all the elements discussed so far, it is proposed to set the safety criteria based on:

— the probability of in-flight collision (or near-collision[79]) involving at least one manned VTOL-capable aircraft;

[79] Collision prevented just by chance (providence).

— an equivalent level of safety to existing VFR helicopter operations carried under an AOC (CAT) in a similar operational environment;

— a level of safety which should be maintained irrespective of the increase in traffic.

The next section assesses the air risk in different operational environments, and the safety criteria will be defined per operational environment.

4.1.3.2.3.2 Analysis of the air risk in different operational environments

The following different operational environments have been considered:

— uncontrolled airspace without U-space (OPE#1);

— uncontrolled airspace with U-space (OPE#2);

— controlled airspace without U-space (OPE#3);

— controlled airspace with U-space (OPE#4).

4.1.3.2.3.2.1 Air risk analysis in uncontrolled airspace without U-space (OPE#1)

The safety criterion in uncontrolled airspace without U-space (OPE#1) is proposed to be the following:

SAC-OPE#1: The probability of in-flight collision or near-collision between a VFR manned VTOL-capable aircraft with other airspace users in uncontrolled airspace without U-space shall not be greater than a collision between a VFR helicopter (carried under an AOC) with other airspace users in uncontrolled airspace.

'Other airspace users' are all other manned aircraft (helicopters, fixed-wing aircraft, State aircraft, general aviation, balloons, commercial air traffic, gliders, paramotors, sailplanes, etc.) and UAS.

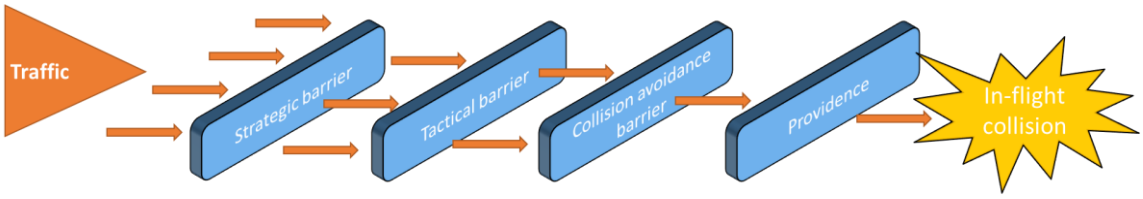
There are several reports[80] detailing the current level of safety in terms of air risk in such operational environment. These reports show that the safety level in such operational environment is not optimum, and the limits of the 'see and avoid' safety barrier are highlighted. Most collisions or near-collisions occur at low level, near aerodromes, and in good visual conditions. The use of novel technologies for manned aircraft like electronic conspicuity is recommended in these reports to enhance pilot situational awareness.

The barrier model considered for the analysis is depicted in

[80] — UK airprox board annual report 2019 (https://www.airproxboard.org.uk/reports-and-analysis/annual-summary-reports/);
— Study Concerning Airproxes and Collisions of Aircraft in German Air Space 2010 – 2015- BFU (https://www.bfu-web.de/EN/Publications/Safety%20Study/Studies/Study_AIRPROX_2017.html?nn=817288);
— EASA SM1.1 Safety Intelligence and Performance - Safety Issue Assessment- Deconfliction with IFR/VFR traffic;
— BEA Mid-air collision safety study (https://www.bea.aero/etudes/abordageseng/midair.htm).

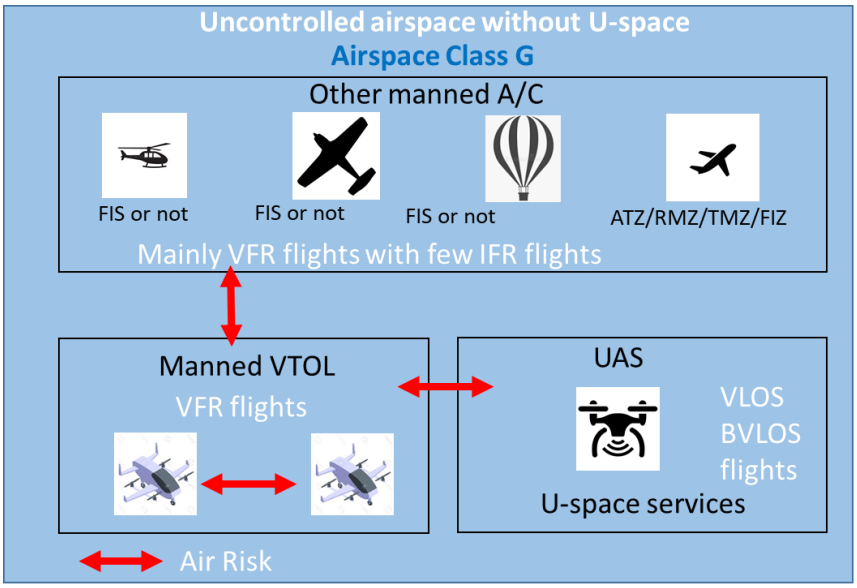
Figure 8 and it includes the generic safety barriers ('strategic', 'tactical' and 'collision avoidance', and 'providence' is also represented for completeness).

Figure 8 — Barriers of air risk mitigation



The elements of the air risk in this operational environment are presented in Figure 9. The analysis will identify whether a barrier needs to be implemented in a given operational environment or reinforced, in case it already exists.

Figure 9 — Air risk in OPE#1



The first outcome of this analysis is an increase in the risk in this uncontrolled airspace because operations with innovative, manned VTOL-capable aircraft are conducted and, therefore, there is a need to mitigate the risk in order to meet the safety criteria.

The three types of air risks illustrated in Figure 9 (manned VTOL-capable aircraft versus other manned aircraft; manned VTOL-capable aircraft versus UAS and manned VTOL-capable aircraft versus manned VTOL-capable aircraft) are analysed in the following sections:

(i) Risk of in-flight collision between manned VTOL-capable aircraft and other manned aircraft operated in OPE#1

The reference scenario is important for assessing the new risk. Indeed, the current traffic density of 'other manned aircraft' at such low level is key to assess the impact of these new operations in terms of risk. In such environment there is little probability of manned traffic at low level over big cities, except helicopters (on specified routes).

— If the number of operations with manned VTOL-capable aircraft in this operational environment is small (low traffic density scenario as defined in Section 4.1.3.2.3.1.4), the risk will not increase significantly and will be capped by ensuring that the 'see and avoid' safety barrier is as efficient as for other manned aircraft operations.

— If the number of operations with manned VTOL-capable aircraft is considerable (high traffic density scenario), the risk will increase significantly and relying solely on the 'see and avoid' safety barrier will most likely not be sufficient. In such case, mitigating measures should be put in place to achieve the initial acceptable air risk level ('Area 1' of Figure 7), and the use of predetermined VFR routes for manned VTOL-capable aircraft might allow to deconflict strategically manned VTOL-capable aircraft from 'other manned aircraft'. Clear information/publication of these predetermined VFR routes for manned VTOL-capable aircraft should be provided to other airspace users that operate in this operational environment.

— If the number of operations with manned VTOL-capable aircraft becomes excessive in a relatively small volume of airspace / dense operation environment (excessive traffic density scenario), the risk cannot be mitigated to achieve the initial risk level ('Area 2' of Figure 7), despite the mitigating measures put in place (e.g. predetermined VFR routes, information to other airspace users). In such case, the reclassification or redesign of the airspace should be decided locally as it is done for typical manned aircraft operations in case of new operations / higher-density traffic.

Regarding the severity of the harmful effects associated to in-flight collision, it will be very similar to a collision where one of the aircraft involved is a helicopter carrying passengers. The essential aspect to control from a safety point of view is the collision with a large commercial aircraft landing/taking off at an aerodrome in the vicinity of vertiports or VTOL-capable aircraft routes which might lead to a higher severity (e.g. more than 50 passengers involved). In terms of mitigating measures, the strategic deconfliction based on predetermined VFR routes for operations with VTOL-capable aircraft is an important element but is not sufficient, and the main mitigating measure is with the tools associated to protect the aerodrome traffic (ATZ, RMZ, TMZ, FIZ) where such large commercial aircraft may sometimes operate at an aerodrome located in Class G.

When considering the above mitigating measures / elements in urban and in non-urban environment, which are relative to the strategic barrier (predetermined routes) and collision-avoidance barrier ('see and avoid'), and considering that the increased level of manned VTOL-capable aircraft traffic is managed (not reaching the 'breaking point' of Figure 7), the safety criteria SAC-OPE#1 should be met. In addition, other manned aircraft shall be informed about the VTOL-capable aircraft traffic through information / publication / VFR charting.

(ii) Risk of in-flight collision between manned VTOL-capable aircraft and UAS in OPE#1

The reference scenario is important for assessing the new air risk. Indeed, the current traffic density of UAS at such low level is essential to determine the level of air risk, and is likely to increase if manned VTOL-capable aircraft traffic increases. In a similar way to the risk of collision between manned VTOL-capable aircraft and other manned aircraft, three cases apply:

— If the number of operations with manned VTOL-capable operations in this environment is low (low traffic density scenario), the 'see and avoid' principle for the UAS 'specific' category operations through the appropriate application of Article 11 of Implementing Regulation (EU) 2019/947 (specific operational risk assessment — SORA — process) should be sufficient. Furthermore, it is assumed that the 'see and avoid' principle to be

applied by the 'open' category operators should also be sufficient. It should be noted that the 'see and avoid' performance of manned VTOL-capable aircraft will be very limited considering the size of UAS.

— If the number of operations with manned VTOL-capable aircraft in this environment is considerable (high traffic density scenario), additional mitigating measures are needed like the strategic mitigation based on predetermined VFR routes for operations with VTOL-capable aircraft. Furthermore, clear information/publication of these predetermined VFR routes for operations with VTOL-capable aircraft should be provided to UAS operators/pilots that conduct flights in this operational environment and considered in their operational risk assessment.

— If the number of operations with manned VTOL-capable aircraft becomes excessive, the risk cannot be mitigated to achieve the initial acceptable air risk level ('Area 2' of Figure 7) despite the mitigating measures put in place (excessive traffic density scenario). In such case, the reclassification or redesign of the airspace or 'no-drone zones' should be decided locally.

In this impact assessment, it is assumed that UAS operations will be conducted in a manner intending to avoid any collision with manned aircraft — either 'other manned aircraft' or 'manned VTOL-capable aircraft'; therefore, the probability of a collision will be similar regardless of the type of manned aircraft. This is also supported by the appropriate application of the SORA process and its associated 'Standard Scenario' and 'Predefined Risk Assessment' for the 'specific' category and the 'see and avoid' principle to be applied by operators in the 'open' category.

Regarding the severity of the harmful effects associated to a collision, it will be very similar to a collision where one of the aircraft involved is a helicopter carrying passengers.

The limitation of the SORA effectiveness, when assessing the air risk in a given operational environment, is relative to the operator-centric view that does not provide comprehensive knowledge of other traffic (existing and forecast). This aspect should be considered for the determination of the overall safety level.

When considering the above mitigation, which is relative to the appropriate application of the UAS SORA process, the safety criteria SAC-OPE#1 should be met if the traffic density of UAS operations remains low. In addition, the UAS operator/remote pilot shall be informed about the VTOL-capable aircraft traffic through aeronautical information/publication.

(iii) Risk of in-flight collision between manned VTOL-capable aircraft in OPE#1

There is no reference scenario because operations with manned VTOL-capable aircraft are new. However, the higher risk of encounter between manned VTOL-capable aircraft due to higher concentration of aircraft in some areas (of economic interest) should be considered.

The foreseeable cases are as follows:

— If the number of operations with manned VTOL-capable aircraft in this environment is sufficiently small (low traffic density scenario), the current 'see and avoid' mitigation is considered sufficient.

— If the number of operations with manned VTOL-capable aircraft in this environment is considerable (high traffic density scenario), additional mitigating measures would be needed if the 'one at a time' principle is not retained like the strategic mitigation based on predetermined VFR routes for VTOL-capable aircraft which are conflict free (no crossing, no head on, no overtaking) and tactical mitigation supporting a safe traffic flow on these predetermined routes (organisation of the traffic). Obviously, the 'see and avoid' collision-avoidance barrier will remain the last safety barrier.

— If the number of operations with manned VTOL-capable aircraft becomes excessive, the risk cannot be mitigated to achieve the initial acceptable air risk level ('Area 2' of Figure 7) despite the mitigating measures put in place (excessive traffic density scenario). In such case, the reclassification or redesign of the airspace and procedures should be decided locally.

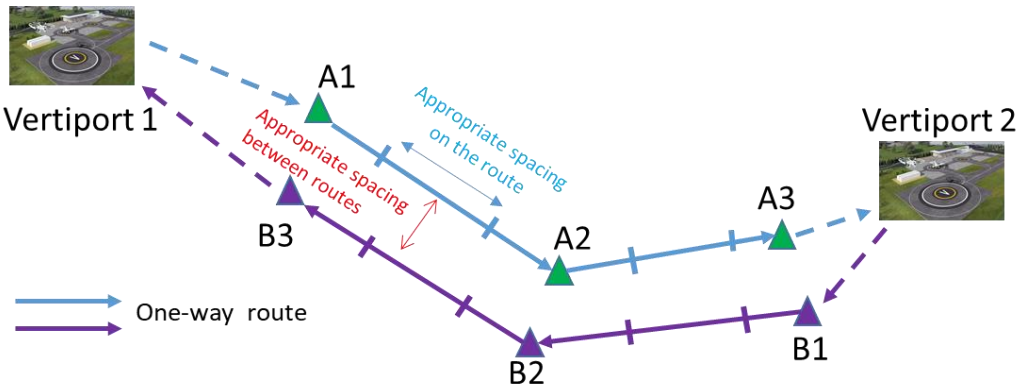
In addition to the above high-level analysis, the air risk should be analysed for the different phases of flight (en route, take-off, and landing) and, therefore, should be based on the traffic density on predetermined routes and at vertiports.

One of the safety barriers at strategic level which might be used is the 'one at a time' principle which will eliminate/limit the risk of in-flight collision between manned VTOL-capable aircraft. However, it is recognised that such limitation might significantly impact on the business model of such operations.

If the 'one at a time' principle is not implemented, then strategic and tactical barriers should be put in place to mitigate the risk of in-flight collision:

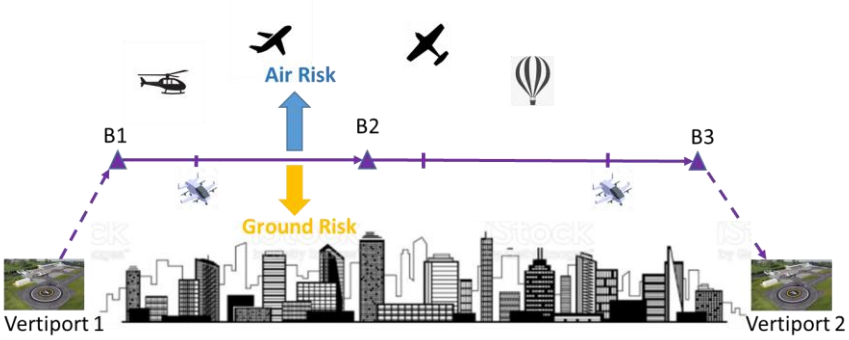
— for the strategic barrier: predetermined VFR VTOL routes should be established to prevent conflicting situations (e.g. crossing, head-on or overtaking situation) as shown in Figure 10. For that proposal, an efficient strategy would be to establish longitudinal spacing rules between VTOL-capable aircraft on one-way routes (e.g. 3-km spacing or 2-min spacing and subject to landing pad availability at the vertiport). In addition, lateral spacing between one-way routes to prevent two-way route structure should be considered. The need for a supporting navigation system on board VTOL-capable aircraft (e.g. GNSS) to adhere more accurately to the predetermined route in addition to the pilot VFR navigation in sight of the ground should be analysed. However, this is not the purpose of this impact assessment to assess in more detail the best strategic mitigation in terms of predetermined route structure.

Figure 10 — Predetermined VFR routes for operations with VTOL-capable aircraft



The level of these routes should be assessed carefully in such environment because if the routes are defined at very low level, the air risk will be lower (less manned aircraft), but the ground risk will be higher (obstacles), and if the route is defined at higher level, the air risk increases (more aircraft) but the ground risk is reduced. This is the air–ground risk interaction principle illustrated in Figure 11, which should allow to agree on a compromise on the best choice in terms of level definition for such operations with manned VTOL-capable aircraft in this operational environment.

Figure 11 — Interaction between air risk and ground risk in VFR routes for operations with VTOL-capable aircraft



— for the tactical barrier: early detection of any potential conflicting traffic by the pilot of the VTOL-capable aircraft is important when traffic density increases, in particular when the strategic mitigating measures are not sufficiently efficient. For that purpose, it is recommended that all manned VTOL-capable aircraft be equipped with a validated electronic conspicuity device (ECD) allowing each aircraft to identify any potential conflict in advance and facilitate the visual acquisition of the conflicting aircraft (‘enhanced see and avoid’ principle). The interoperability of the ECDs used would be key, as well as the existence of procedures to make sure that ECDs are properly set and the information they provide is properly used by pilots. This tactical barrier could be managed by the pilot (assisted by a system or not) or fully automated but under the monitoring of the pilot.

— for the collision-avoidance barrier: it is assumed that the ‘see and avoid’ barrier performance will be the same compared to other manned aircraft considering a similar aircraft manoeuvrability to avoid collisions. A requirement for a collision-avoidance

system (ACAS, DAA) to reinforce this barrier is not proposed in this impact assessment considering the type of operation (VFR and low level).

The risk of collision at/near vertiports also needs to be assessed carefully. At vertiports, there will be a 'concentration' of manned VTOL-capable aircraft and, therefore, the risk of collision will increase as it is the case for current VFR operations in the aerodrome circuit. There is a need for a traffic management function at the vertiport to identify, e.g., whether the landing site is available for landing, whether there are no two or more VTOL-capable aircraft intending to land at the same time, or whether there is no conflict between VTOL-capable aircraft taking off and landing.

A kind of vertiport information zone (VIZ) similar to the FIZ managed by a third party (ANSP or other entity) might be implemented or at least, due to the fact that these operations are conducted in VFR, a procedure and air-to-air communication between manned VTOL-capable aircraft should be available to coordinate their flights to/from vertiports. An effective time slot allocation system for managing the traffic and landing pad might be needed. It seems necessary to have more information on the way a vertiport traffic will be managed before determining whether the risk is sufficiently mitigated. There is a clear link between availability of landing pads at vertiports and the management of the circuit/approach, and even the frequency of flights allowed on predetermined routes.

When considering the above mitigating measures / elements which are relative to the strategic barrier ('one at a time' principle or a more capacity-oriented solution with a predetermined route structure with proper organisation of the traffic), tactical barrier (traffic management if the 'one at a time' principle does not apply) and collision-avoidance barrier ('see and avoid', assisted when needed), the safety criteria SAC-OPE#1 should be met. However, traffic management at vertiports is still unknown and will necessitate a more in-depth analysis once the concept is described in more detail.

4.1.3.2.3.2.2 Air risk analysis in uncontrolled airspace with U-space (OPE#2)

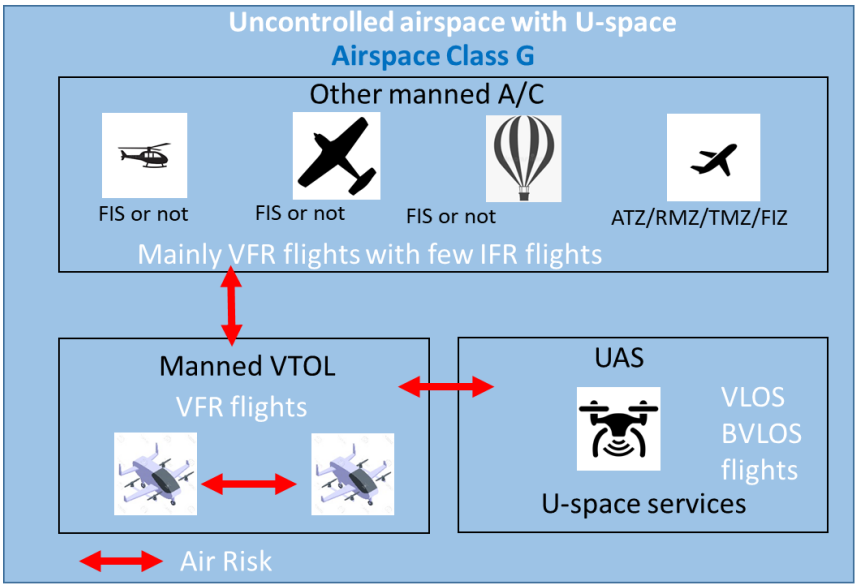
The safety criterion as regards uncontrolled airspace with U-space (OPE#2) is proposed to be the following (identical to that for SAC-OPE#1):

SAC-OPE#2: The probability of in-flight collision or near-collision between a VFR manned VTOL-capable aircraft with other airspace users in uncontrolled airspace without U-space shall not be greater than a collision between a VFR helicopter (carried under an AOC) with other airspace users in uncontrolled airspace.

The air risk in this operational environment is illustrated in Figure 12, and the barrier model remains the generic model in

Figure 8.

Figure 12 — Air risk in OPE#2



The first outcome of this analysis is an increase in the risk in this uncontrolled airspace because operations with innovative, manned VTOL-capable aircraft are conducted along with a higher number of UAS that operate in it (associated to U-space implementation); therefore, there is a need to mitigate the risk in order to meet the safety criteria of SAC-OPE#2.

The three types of air risk are as follows:

(i) Risk of in-flight collision between manned VTOL-capable aircraft and other manned aircraft operated in OPE#2

Same as for OPE#1 since in U-space environment, manned VTOL-capable aircraft are treated as manned aircraft. In addition, once U-space is implemented, manned VTOL-capable aircraft and other manned aircraft that operate in this environment are supposed to be equipped with electronic conspicuity devices (ECDs) but nothing indicates that it would be efficient/sufficient to help avoid collisions (due to, e.g., lack of procedures, interoperability issues, etc.).

(ii) Risk of in-flight collision between manned VTOL-capable aircraft and UAS in OPE#2

There is no reference scenario for a comparison with current manned aircraft because U-space is not yet deployed and the concept not yet described in detail, but three cases should be considered:

— If the number of operations with manned VTOL-capable aircraft in this environment is small (low traffic density scenario), the 'see and avoid' principle from U-space airspace through the appropriate application of Delegated Regulation (EU) 2021/664 should be sufficient. It should be noted that the 'see and avoid' performance of manned VTOL-capable aircraft will be very limited considering the size of the UAS.

— If the number of operations with manned VTOL-capable aircraft in this environment is considerable (high traffic density scenario), additional mitigating measures would be needed like the strategic mitigation based on predetermined VFR routes for VTOL-capable aircraft. Furthermore, clear information /publication of these predetermined

VFR routes for operations with manned VTOL-capable aircraft should be provided to U-space service providers.

— If the number of operations with manned VTOL-capable aircraft becomes excessive (excessive traffic density scenario), the risk cannot be mitigated by U-space and/or by other mitigating measures to achieve the initial acceptable air risk level ('Area 2' of Figure 7). In such case, the reclassification/redesign of the airspace should be decided locally.

It is assumed that, in accordance with Article 11 of Delegated Regulation (EU) 2021/664[81], manned VTOL-capable aircraft which will enter a U-space airspace will be deconflicted from UAS. For that purpose, manned VTOL-capable aircraft will have to be equipped with an electronic conspicuity device (ECD) as required by point SERA.6005[82] of Implementing Regulation (EU) 2021/666[83].

UAS operations in U-space airspace supported by U-space services will be conducted to prevent any collision with manned aircraft, either 'other manned aircraft' or 'manned VTOL-capable aircraft', provided they are electronically conspicuous; therefore, the probability of a collision will be similar regardless of the type of manned aircraft.

In this uncontrolled airspace it is highly recommended to implement the predetermined VFR VTOL route structure (see Figure 10) in U-space with a possibility to protect the VTOL route and associated traffic by geo-awareness services. Indeed, if the density of manned VTOL-capable aircraft traffic and UAS traffic is high, the residual risk associated to one or more UAS which do not deconflict efficiently from manned VTOL-capable aircraft will not be negligible.

Regarding the severity of the harmful effects associated to a collision, it will be very similar to a collision where one of the aircraft involved is a helicopter carrying passengers.

When considering the above mitigation, which is relative to the appropriate application of the U-space Regulation, and if U-space services support such mitigation in a performant way, the safety criteria SAC-OPS#2 should be met. This conclusion holds true only if the deconfliction mechanism established by the U-space Regulation proves to work highly reliably and efficiently — which is still to be demonstrated.

(iii) Risk of in-flight collision between manned VTOL-capable aircraft in OPE#2

Same as for OPE#1.

4.1.3.2.3.2.3 Air risk analysis in controlled airspace without U-space (OPE#3)

The safety criterion as regards controlled airspace without U-space (OPE#3) is proposed to be the following:

[81] 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).

[82] Manned aircraft operating in airspace designated by the competent authority as U-space airspace, and not provided with an air traffic control service by the ANSP, shall continuously make themselves electronically conspicuous to the U-space service providers.

[83] Commission Implementing Regulation (EU) 2021/666 of 22 April 2021 amending Regulation (EU) No 923/2012 as regards requirements for manned aviation operating in U-space airspace (OJ L 139, 23.4.2021, p. 187).

SAC-OPE#3: The probability of in-flight collision or near-collision between a VFR manned VTOL-capable aircraft with other airspace users in controlled airspace without U-space shall not be greater than a collision between a VFR helicopter operation (conducted under an AOC) with other airspace users in controlled airspace.

'Other airspace users' are all other manned aircraft (helicopters, fixed-wing aircraft, State aircraft, general aviation, balloons, commercial air traffic, gliders, paramotors, sailplanes, etc.) and UAS.

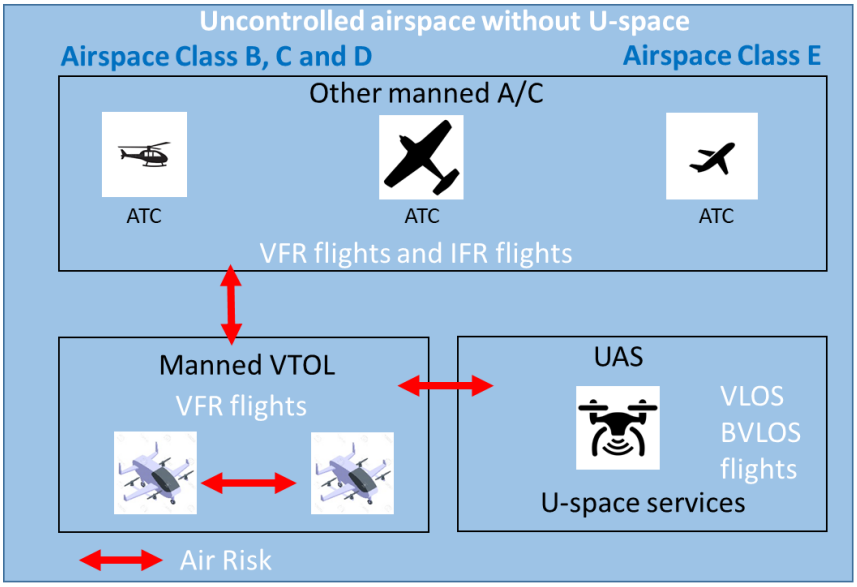
In this operational environment, air traffic control (ATC) service is provided in accordance with point SERA.6001 (classification of airspaces) for airspace classes B, C, D or E. It should be noted that all VFR flights must be in radio contact with ATC except for Class E where continuous air–ground voice communication is only required for IFR flights (except if RMZ with Class E).

The current level of safety in terms of air risk in such operational environment can be found in the reports mentioned in the footnote 80, and the safety level in such operational environment is acceptable thanks to the provision of ATS in such airspace, except for Class E. Indeed, in Class E, IFR–VFR deconfliction is still an issue with a significant number of IFR–VFR collisions or near-collisions in this environment. Some proposals relative to the implementation of radio mandatory zones (RMZ) and transponder mandatory zones (TMZ) in such airspace have been put forward to reduce the risk associated to unknown VFR traffic.

The air risk in this operational environment is illustrated in Figure 13 while the barrier model remains the one with the generic safety barriers presented in

Figure 8.

Figure 13 — Air risk in OPE#3



The most relevant airspace classes for operations with manned VTOL-capable aircraft in controlled airspace are Class D (control traffic region (CTR) and possibly terminal manoeuvring area (TMA)) and Class C (TMA).

Despite the fact that Class E is used for airspace between usually 2 500 ft AGL and FL 100, it is considered in this impact assessment that operations with manned VTOL-capable aircraft might be conducted in this airspace class.

The analysis of the three types of air risk yields the following considerations:

(i) Risk of in-flight collision between manned VTOL-capable aircraft and other manned aircraft operated in OPE#3

— Airspace Class C and D

The reference scenario is important for assessing the new risk. Indeed, the current traffic density in this controlled environment at such low level is key to assess the impact of these new operations in terms of risk.

— If the number of operations with manned VTOL-capable aircraft in this operational environment is small (low traffic density scenario), the risk will not increase significantly and will be capped by ensuring that ATC handles properly the additional manned VTOL-capable aircraft traffic.

— If the number of operations with manned VTOL-capable aircraft is considerable (high traffic density scenario), the risk will increase significantly, and ATC might start having difficulties in handling safely the additional traffic. In such case, mitigating measures should be put in place to achieve the initial acceptable air risk level (‘Area 1’ of Figure 7). One possibility is the use of predetermined VFR routes for VTOL-capable aircraft for uncontrolled airspace which will deconflict strategically manned VTOL-capable aircraft from ‘other manned aircraft’.

— If the number of operations with manned VTOL-capable aircraft becomes excessive (excessive traffic density scenario), the risk cannot be mitigated to achieve the initial acceptable risk level ('Area 2' of Figure 7). In such case, the reclassification or redesign of the airspace should be decided locally, e.g. by creating a Class G corridor specific to operations with manned VTOL-capable aircraft.

In this controlled airspace, it is assumed that ATC does not manage the vertiport traffic and a dedicated vertiport traffic management system is put in place by a third party.

The same level of ATC service will be provided to manned VTOL-capable aircraft compared to other VFR operations (helicopter, general aviation, etc.); therefore, the risk of in-flight collision will be equivalent to the reference scenario provided that ATC is able to handle safely the increase in traffic.

Air traffic controllers (ATCOs) should be aware of any limitations associated to manned VTOL-capable aircraft, in particular in terms of performance limitations, if any.

The non-interference of operations between existing runways/helipads and new vertiports is not specifically addressed in this impact assessment. It is assumed that there is no interference between current operations with manned aircraft and operations with manned VTOL-capable aircraft (proper design and location of landing sites, sufficient distance between vertiport(s) and existing runways/helipads even if they are all located within the same controlled traffic region (CTR)). Specific VFR VTOL route corridors might be the best solution with smart segregation/strategic deconfliction from other traffic.

Regarding the severity of the harmful effects associated to a collision in such airspace, it will be very similar to a collision where one of the aircraft involved is a helicopter carrying passengers.

To summarise, in airspace Class D (and C), and when considering the ATC and pilot mitigating measures which are relative to the strategic barrier (predetermined VFR routes for VTOL-capable aircraft), tactical barrier (ATC clearance needed), and collision-avoidance barrier ('see and avoid'), the safety criteria SAC-OPE#3 should be met.

An equivalent level of safety could be achieved for airspace Class D (and C) if ATC is able to provide the same level of service despite the fact that operations with innovative, manned VTOL-capable aircraft are conducted in such airspace. However, there is a limit in terms of additional traffic which could be allowed in a CTR or in a TMA/sector to satisfy this safety criterion (notion of 'breaking point' in Figure 7).

— Airspace Class E

This point is only applicable provided that operations with manned VTOL-capable aircraft would be conducted in airspace Class E.

In airspace Class E, and considering the well-known issue of the VFR–IFR deconfliction in such airspace, the increase in VFR flights associated to operations with manned VTOL-capable aircraft will increase mathematically the risk of in-flight collision.

— If the number of operations with manned VTOL-capable aircraft in this environment is small (low traffic density scenario), the risk will not increase significantly and will be capped by ensuring that the 'see and avoid' safety barrier is as efficient as for 'other manned aircraft' operations.

— If the number of operations with manned VTOL-capable aircraft is considerable (high traffic density scenario), the risk will increase significantly and relying solely on the 'see and avoid' safety barrier and the traffic information provided by ATC to all airspace users (as far as practicably possible) will most likely not be sufficient. In such case, and because operations with manned VTOL-capable aircraft will be regular with a high traffic density, then RMZ/TMZ might be needed with the use of predetermined VFR VTOL route networks to deconflict traffic more easily. The mandatory radio contact (RMZ) and the surveillance requirement[84] (TMZ) for manned VTOL-capable aircraft will prevent from having high density 'unknown VFR traffic' operating in airspace Class E.

— If the number of operations with manned VTOL-capable aircraft becomes excessive in a relatively small volume of airspace / dense operational environment (excessive traffic density scenario), the risk cannot be mitigated to achieve the initial acceptable air risk level ('Area 2' of Figure 7). In such case, the reclassification or redesign of the airspace should be decided locally as it is done for conventional manned aircraft operations when new operations are introduced and traffic becomes heavier.

Regarding the severity of the harmful effects associated to a collision in this airspace, it will be very similar to a collision where one of the aircraft involved is a helicopter carrying passengers.

In airspace Class E, and when considering the existing ATC services provided (provision of air traffic information, as far as practicable) and pilot ('see and avoid') mitigating measures and with a high number of operations with manned VTOL-capable aircraft, the risk of in-flight collision will increase and reinforcing barrier(s) will be most likely needed. One possibility is to reinforce the strategic barrier (predetermined VFR routes for VTOL-capable aircraft) and tactical barrier by mandating radio contact (RMZ) and surveillance equipment (TMZ) for manned VTOL-capable aircraft in order to meet the safety criteria of SAC-OPE#3.

(ii) Risk of in-flight collision between manned VTOL-capable aircraft and UAS in OPE#3

This reference scenario is important to assess the new risk. The current UAS traffic density in CTR Class D is very low and it is assumed that it will remain low in the future (without U-space), and it is expected that competent authorities will implement a system to approve UAS operations in controlled airspace. It is likely that UAS operations in controlled airspace may be limited (close to aerodromes, ATC authorisation required, forbidden to the 'open' category, geographical zones, etc.).

It is also assumed that airspace Class C/D (CTR-TMA) and E (> 2 500 ft AGL) are not considered appropriate for UAS operations in the absence of a 'detect and avoid' system.

The risk will, therefore, remain the same when manned VTOL-capable aircraft are operated. It is assumed that through the SORA process, UAS operations will be conducted to prevent any collision with manned aircraft regardless of the type of manned aircraft ('other manned aircraft' or 'manned VTOL-capable aircraft'); therefore, the probability of a collision will be similar irrespective of the type of manned aircraft.

[84] This requirement refers to an interoperable E-conspicuity device supported with procedures fully acceptable by the air traffic service provider.

The limitation of the SORA effectiveness when assessing the air risk in a given environment is relative to the operator-centric view that does not provide a comprehensive knowledge of the other traffic (existing and forecast).

Regarding the severity of the harmful effects associated to a collision, it will be very similar to a collision where one of the aircraft involved is a helicopter carrying passengers.

When considering the above mitigation, which is relative to the appropriate application of the UAS SORA process and the ATC unit authorisation of UAS operations in controlled airspace, the safety criteria SAC-OPS#3 should be met. In addition, UAS operators should be informed about VTOL operations on predetermined routes by the aeronautical information service (AIS) (publication to airspace users).

(iii) Risk of in-flight collision between manned VTOL-capable aircraft in OPE#3

There is no reference scenario because operations with manned VTOL-capable aircraft are new in this class of airspace. However, the higher risk of encounter between manned VTOL-capable aircraft due to higher concentration of aircraft in some areas (of economic interest) needs to be considered.

The following three cases are to be considered:

— If the number of operations with manned VTOL-capable aircraft in this environment is sufficiently small (low traffic density scenario), ATC could handle easily this additional manned VTOL-capable aircraft traffic in Class C/D. In Class E, a possible increase of 'unknown' VFR traffic due to these additional operations might degrade the situation but it is assumed that the 'see and avoid' safety barrier would still be sufficient.

— If the number of operations with manned VTOL-capable aircraft in this environment is important (high traffic density scenario), ATC might start to have difficulty to handle safely the additional traffic. In such case, mitigating measures should be put in place to reach the initial acceptable air risk level ('Area 1' of Figure 7). Such mitigating measures should be relative to strategic and tactical mitigating measures. For strategic mitigating measures, predetermined VFR routes for VTOL-capable aircraft should be designed to prevent the conflict between manned VTOL-capable aircraft based on routes which are conflict free (no crossing, no head on, no overtaking) and tactical mitigation supporting a safe traffic flow on these predetermined routes with appropriate organisation of the traffic (either associated with procedure at strategic level or by ATC action at tactical level). Obviously, the collision avoidance barrier ('see and avoid') will remain the last safety barrier. In addition, for airspace Class E to prevent having additional 'unknown VFR' traffic on these routes, RMZ/TMZ should be implemented.

— If the number of operations with manned VTOL-capable aircraft would become excessive (excessive traffic density scenario), the risk cannot be mitigated to reach the initial acceptable air risk level ('Area 1' of Figure 7). In such case, the reclassification or redesign of the airspace should be decided locally.

The air risk should be analysed during the different phases of flight (en route, take-off, and landing) and, therefore, should be based on the traffic density of manned VTOL-capable aircraft en route and during landing/take-off at vertiports.

The strategic mitigation applicable to uncontrolled airspace in terms of predetermined VFR routes for VTOL-capable aircraft is fully applicable to controlled airspace (Class C/D/E) when the traffic density of manned VTOL-capable aircraft becomes high.

It is assumed that most of the operations with manned VTOL-capable aircraft will be conducted in CTR Class D, and vertiports may be also part of this airspace class. It means that the ATC (if controlling the flight) will manage the VTOL flights like any other VFR flights in CTR Class D including landing/take-off phases. The ATC will decide whether dedicated mitigating measures should be implemented for an acceptable level of safety, in particular for the management of traffic at vertiports.

The air traffic management at/near the vertiport should be analysed in more depth but information is missing. Appropriate considerations should be made on the need for a control tower, even a remote one, the responsible actors in the control of departure/landing of manned VTOL-capable aircraft, and the use of procedures and phraseology.

When considering ATC and pilot mitigating measures which are relative to the strategic barrier (predetermined VFR routes for VTOL-capable aircraft with appropriate organisation of the traffic), tactical barrier (ATC clearance needed) and collision avoidance barrier ('see and avoid'), the safety criteria of SAC-OPS#3 should be met.

However, the management of traffic at vertiports is still an unknown case and will necessitate a more in-depth analysis when the concept of operations will be known in more detail. In addition, if manned VTOL-capable aircraft are allowed to operate at vertiports, RMZ/TMZ should be implemented in airspace Class E to prevent having additional 'unknown VFR' traffic in this airspace class.

4.1.3.2.3.2.4 Air risk analysis in controlled airspace with U-space (OPE#4)

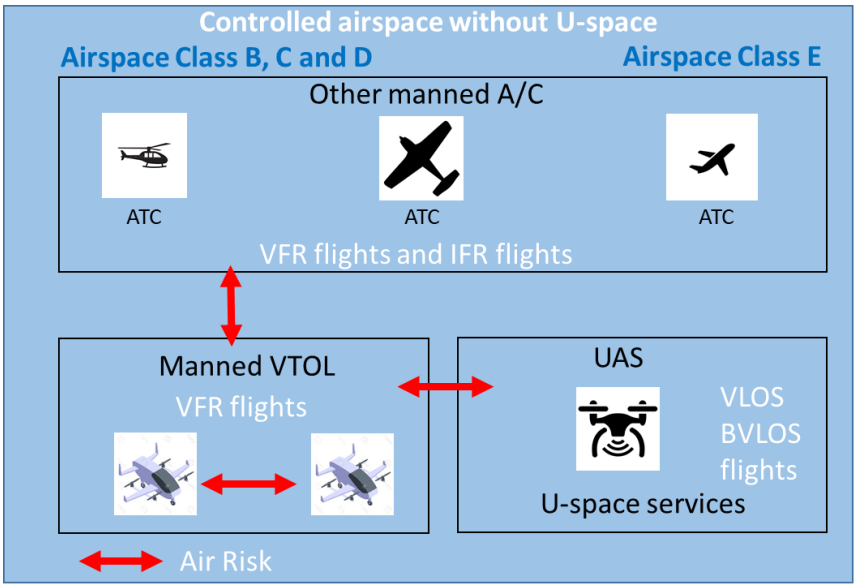
The safety criterion as regards controlled airspace with U-space (OPE#4) is proposed to be the following (identical to that for SAC-OPE#3):

SAC-OPE#4: 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 without 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.

The air risk in this operational environment is illustrated in Figure 14 and the barrier model remains the generic model in

Figure 8.

Figure 14 — Air risk in OPE#4



The analysis of the three types of air risk yields the following considerations:

(i) *Risk of in-flight collision between manned VTOL-capable aircraft and other manned aircraft operated in OPE#4*

Same as for OPE#3.

(ii) *Risk of in-flight collision between manned VTOL-capable aircraft and UAS in OPE#4*

There is no reference scenario for a comparison with current manned aircraft because U-space is not yet deployed, and the concept is not yet described in detail.

The main mitigating measure to prevent in-flight collision between manned aircraft (including VTOL-capable aircraft) and UAS is the dynamic airspace reconfiguration. Dynamic airspace reconfiguration means the temporary modification of U-space airspace in order to accommodate short-term changes in manned traffic demand by adjusting the geographical limits of that U-space airspace. The objective of this strategic mitigation is to make sure that manned aircraft which are provided with ATC services and UAS remain segregated.

Dynamic airspace reconfiguration is defined in Article 4 of Delegated Regulation (EU) 2021/664, and for the ATC part in point ATS.TR.237 of Implementing Regulation (EU) 2021/666.

Regarding the severity of the harmful effects associated to a collision, it will be very similar to a collision where one of the aircraft involved is a helicopter carrying passengers.

When considering the dynamic airspace reconfiguration mitigation and the appropriate and efficient application of the U-space and ATS Regulations, the safety criteria SAC-OPS#4 should be met. However, dynamic airspace reconfiguration is a brand new concept and there is a high level of uncertainty around it at this stage about its detailed implementation.

(iii) *Risk of in-flight collision between manned VTOL-capable aircraft in OPE#4*

Same as for OPE#3.

4.1.3.2.3.3 Impact analysis associated to the novelty of the operation

The purpose of this section is to analyse the potential impact of the main novelties of operations with manned VTOL-capable aircraft on the nature of the mitigating measures.

When compared to the reference scenario including VFR helicopter operations, the main novelties are:

— new types of aircraft with novel technologies and novel performance;

— operations in urban areas / congested areas with high traffic density;

— operations to/from vertiports with high traffic density.

4.1.3.2.3.3.1 New types of aircraft with novel technologies and novel performance

This analysis should determine whether the risk of in-flight collision could be impacted by this change when comparing it with VFR helicopter operations.

(i) Safe operations in normal conditions

The following assumptions are considered:

— the aircraft is certified and maintained in accordance with the initial and continued airworthiness regulations applicable to this new type of aircraft;

— the pilot is qualified and trained for this type of aircraft, and respects any operational limitations as defined during the air operation approval;

— the VMC minima should be adequate for manned VTOL-capable aircraft; contrary to helicopters, all certified manned VTOL-capable aircraft may not always be able to fly at low speed or to hover long enough to fly safely with reduced visibility down to 800 m, and additionally the traffic density is likely to be much higher than what was the general case with helicopter operations in the past; subsequently, it has been decided to recommend that flight visibilities for manned VTOL-capable aircraft could be reduced to not less than 1 500 m;

— there is no limitation associated to the type of aircraft which might lead to the inappropriate application of the rules of the air;

— the type of aircraft and the pilot are able to adhere to predetermined VFR routes (if any) with an acceptable level of accuracy;

— the manned VTOL-capable aircraft uses at least pressure altitude obtained from barometric readings;

— the aircraft is equipped with the appropriate communications, navigation and surveillance (CNS) system as specified by the State and/or aeronautical information publication (AIP) (in controlled airspace and in U-space);

— the manned VTOL-capable aircraft could be handled by ATC in a similar way like a VFR helicopter operation, and that the performance of the VTOL-capable aircraft is not detrimental to the ATC deconfliction strategy.

Based on the above assumptions, the risk of collision due to new types of aircraft with novel technology/performance is considered acceptable.

(ii) Safe operations in abnormal conditions

The possible abnormal conditions which might increase the risk of in-flight collision and which have been identified so far are as follows (non-exhaustive list):

— weather conditions (strong wind) leading to impact on the strategic mitigation (head wind impacting speed/endurance) or segregation from other traffic flow (crosswind leading to lateral drift from the predetermined route);

— interference/jamming/hacking (if C2 link is still used, even if this is a manned VTOL-capable aircraft) leading to aircraft deviation from the route;

— loss of C2 link and its potential impact on navigation (loss of C2 link user data (nice-to-have) and loss of C2 link control data (must-have) to be evaluated on a case-by-case basis (e.g. availability information on vertiport for landing or meteorological information);

— others like turbulence, icing, effect of low temperature on batteries, heavy rain, lightning.

The main mitigating measure when encountering such abnormal conditions is under the pilot's responsibility. The pilot will first detect the problem (e.g. deviation from the predetermined VTOL route should be possible because in day VFR and, therefore, in sight of the ground) and then the pilot will apply a contingency procedure in order to prevent conflict with another aircraft (manual take-over with disengagement of automation if impacted by the abnormal condition). A landing as soon as possible to an alternate destination aerodrome is generally a good mitigating measure also to reduce the exposure to the air risk — but also to reduce the risk of *pressure* on the pilot to reach the destination aerodrome on time should not be ignored (well-known risk in certain types of operations).

Considering these abnormal conditions (which are not exhaustive), the operator of manned VTOL-capable aircraft should define appropriate contingency procedures and the pilot should be trained to apply these procedures when encountering such abnormal conditions.

(iii) Safe operations with faulted conditions

The main operational hazard, which may be caused by system failure or pilot error, is a conflict with other manned aircraft or with UAS. It is assumed that the design of predetermined VFR routes is validated before the start of operations in order to check that operations with VTOL-capable aircraft on these routes do not lead to systematic conflicts (route design errors are corrected before operation).

For that purpose, the following assumptions are considered:

— any failure of the aircraft which could increase the risk of in-flight collision is addressed by the airworthiness approval;

— any pilot error which could increase the risk of in-flight collision is reduced by the appropriate flight crew licensing and training;

— the reliability of ATS and U-space services is commensurate to the risk of in-flight collision; with regard to this, operations with manned VTOL-capable aircraft are not different from operations with manned aircraft; however, the level of certification/approval of U-space services and their associated systems may not be a priori the same as for ATS services (e.g. poor reliability, integrity, etc.).

4.1.3.2.3.3.2 Operations in urban areas / congested areas with high traffic density

This analysis should determine whether the risk of in-flight collision could be impacted by this change when comparing it with VFR helicopter operations.

The use of VFR VTOL predetermined routes for deconflicting traffic more efficiently in urban areas and the support of navigation systems like GNSS to adhere to these routes might have a detrimental effect (side effect) on safety. In such case, the pilot would be tempted to conduct pseudo-IFR operations with the risk of inadvertent entry into instrument meteorological conditions (IMC) which constitutes an important cause of accident for current VFR operations. Appropriate flight crew training will be essential to mitigate this possible side effect.

Several mitigating measures which will be necessary for satisfying the applicable safety criteria (predetermined VFR routes with appropriate organisation of the traffic, spacing between routes, spacing on the route, availability of landing pads at vertiports, etc.) have already been identified in Section 4.1.3.2.3.2.

It is necessary that appropriate VFR VTOL-capable aircraft charts (route, visual landing, visual departure) be specifically developed for pilots to facilitate the navigation in such 'hostile' environment. It is also necessary to request radio navigation assistance for pilots in such congested urban environments to adhere more easily to predetermined VFR routes for VTOL-capable aircraft (e.g. RNP xx).

4.1.3.2.3.3.3 Operations to/from a vertiport with high traffic density

This analysis should determine whether the risk of in-flight collision could be impacted by this change when comparing it with VFR helicopter operations. However, vertiport operations cannot be compared with aerodrome/heliport operations because both the vertiport design and the operational concept are not considered sufficiently mature/known at this stage.

Several mitigating measures which may be necessary to satisfy the applicable safety criteria have been identified in Section 4.1.3.2.3.2:

— for uncontrolled airspace, an ATZ/RMZ/TMZ/FIZ-equivalent service might be necessary;

— for controlled airspace, a service equivalent to that of a control tower (or at least AFIS type) should be provided to the vertiport.

No specific points are considered for normal and faulted conditions.

For abnormal conditions (like unplanned closure of a vertiport), the main mitigating measure will be for the pilot to land at an alternate destination aerodrome within the range of the operation with manned VTOL-capable aircraft. This is an essential aspect to be considered when conducting such operations.

4.1.3.2.3.4 Conclusions of the air safety risk analysis

This safety impact assessment, focusing on air safety risks and considering operations with manned VTOL-capable aircraft in urban areas, has shown that such operations could be conducted safely if several mitigating measures are put in place and the traffic density is not excessive.

Four operational scenarios have been assessed and a safety criterion has been defined for each scenario based on the probability of in-flight collision (or near-collision) involving at least one manned VTOL-capable aircraft, based on a level of safety equivalent to that of current VFR helicopter operations performed under an AOC (CAT) in a similar operational environment, and based on an initial level of safety which should be maintained irrespective of the increase in traffic.

For each of these scenarios, a risk assessment has been conducted considering a reference scenario based on VFR helicopter operations in urban areas. Three densities (low, high, and excessive) for operations with manned VTOL-capable aircraft have been considered, and mitigating measures (strategic, tactical, or collision avoidance) have been identified to meet the safety criteria, whenever practicable.

The mitigating measures are not exhaustive nor comprehensive; they are only indicative and may be complemented by other measures.

Furthermore, due to a lack of information about vertiport operations and traffic management in the vicinity of vertiports, the increased risk of collision in such environments is obviously relevant and constitutes an area that must be carefully monitored in any of the analysed operational scenarios.

4.1.4. Who is affected

This regulatory activity will have an impact on the following stakeholders:

— Manufactures of UAS and VTOL-capable aircraft

  — Manufacturers (especially small to medium-sized enterprises) might be impacted by the additional technical requirements introduced into the regulatory framework, associated with excessive costs for their implementation.

— Operators of UAS and innovative VTOL-capable aircraft

  — Aircraft operators may be put at a disadvantage due to the technical limitations imposed not only at design level, but also at operational level, as well as on the training requirements for flight crews.

— Competent authorities

  — Competent authorities would need to deal with the demands and expectations that come along with the growing UAS and VTOL-capable aircraft sector: develop regulations, organise licensing and oversight, check declarations and authorisations, issue certificates, address registration issues, set up training for operators and continuing airworthiness organisations, and train their staff. In addition, competent authorities would need to enforce public policies with regard to safety, privacy, and security matters. The competent authorities concerned are at local, national, and EU level (EASA).

— Pilots and pilot training organisations

  - New pilot licences and training requirements, also based on previous pilot experience, will have to be developed to cater for the specificities of the innovative design of VTOL-capable aircraft, including their level of automation.

- Maintenance organisations and continuing airworthiness management organisations
  - Organisations and personnel involved in the continuing airworthiness of UAS may need to deal with additional or different requirements due to the novel architecture of such products and operations different than conventional aviation.
- Other airspace users (manned and unmanned aircraft)
  - There is a need to establish the conditions for manned and unmanned aircraft to safely operate in controlled and uncontrolled airspace where also U-space services may be provided, and to complement the existing ATM environment of conventional manned aviation to keep all aircraft that operate in airspace safe.
- Providers of air traffic management/air navigation services (ATM/ANS) and other ATM network functions
  - With the establishment of the U-space airspace, the associated U-space services will have to ensure that both manned and unmanned traffic is managed safely to enable operations with UAS and VTOL-capable aircraft in complex environments.
- Aerodrome operators
  - It is likely that VTOL-capable aircraft will operate not only at aerodromes, by possibly reusing existing helicopter infrastructures, but also at vertiports that may or may not be located at or near existing aerodromes.
- The general public
  - All EU citizens impacted by the risks posed by operations with UAS and manned VTOL-capable aircraft, either as clients of the services or as people on ground. Operations with UAS and manned VTOL-capable aircraft support innovative services with a high potential for welfare and new jobs; however, they may pose risks to safety, security, and privacy.

4.1.5. How could the issue evolve

Legacy and newly established manufacturing companies are in the phase of developing UAS and manned VTOL-capable aircraft to be used in new operational concepts in order to enable the deployment of IAM in its full potential. The lack of regulatory initiative in the domains of:

- initial airworthiness,
- continuing airworthiness,
- air operations,
- flight crew licencing, and
- air traffic management

may severely compromise the achievement of the necessary level of safety of operations with UAS and manned VTOL-capable aircraft. Technical and operational requirements established on the level of Member States may cause market fragmentation and force European manufacturers and operators

to bear the increased costs for the implementation of those requirements by subtracting resources to research and development, hence losing in global competitiveness.

Operations would be performed with different levels of safety in different Member States, and this may give an economic edge to those Member States where requirements would be less restrictive. At the same time, operators may also have to bear the additional administrative burden to manage authorisations in different Member States.

Flight crews may not be able to develop and acquire an adequate set of skills and competences for the piloting of innovative, manned VTOL-capable aircraft, which would prevent the onset of specific occurrences.

The growing number of UAS and of innovative, manned VTOL-capable aircraft will create a hazard to air traffic if not addressed through appropriate mitigating measures to ensure the integration of both manned and unmanned aviation in controlled and uncontrolled airspace.

European citizens may also be exposed to unregulated excessive noise and emissions levels with an impact on their health and well-being. An impact on wildlife and the potential landscape pollution is also foreseeable in case no regulatory action is taken in the environmental domain.

As operations with manned VTOL-capable aircraft will be enabled by the digitalisation of the associated services (customer experience, e.g. booking and check-in, maintenance status, flight plan management, airspace usage, etc.), the regulatory framework should provide for the protection against cybersecurity risks.

The EASA mandate established by Regulation (EU) 2018/1139 includes the responsibility to regulate the airworthiness and to establish the operational requirements for UAS and manned VTOL-capable aircraft, while allowing Member States, under very few circumstances, to grant specific derogations to the design, production, maintenance and operations of such aircraft. Such provisions shall enable the establishment of a single, harmonised regulatory framework across Europe, while avoiding regulatory fragmentation.

4.2. Introduction to the options

The proposed amendments included in Chapter 3 tackle the key issues described in Section 4.1 and contribute to achieving the objectives described in Section 2.2.

The following table summarises with examples the link between issues and solutions.

The draft regulatory proposals introduce additional elements that will help addresses the issues identified in Section 4.1. The specific proposed amendments shall be considered as additional contributors towards the mitigation of the identified risks in connection with existing requirements contained in other regulatory material, technical specifications, and guidance material already issued by EASA.

Issue	How it is tackled in this proposal	Additional risk-mitigation contributors established through other EASA initiatives
Inadequate protection against ground safety risk (accidents/incidents involving persons on the ground or sensitive areas)	- Definition of the initial airworthiness processes leading to the certification of the unmanned aircraft system or the command unit (refer to Sections 2.3.1.3 and 2.3.3) - Definition of the continuing airworthiness standards applicable to the maintenance of UAS and to maintenance organisations (refer to Section 2.3.2) - Definition of the requirements applicable to operations with and operators of manned VTOL-capable aircraft (refer to Sections 2.3.4.2 and 2.3.4.4) - Definition of the criteria for the availability of appropriately qualified and licensed flight crews for manned VTOL-capable aircraft (refer to Section 2.3.5) - Definition of the criteria for the establishment of predefined routes or areas/corridors for operations with manned VTOL-capable aircraft (refer to Section 2.3.6)	- RMT.0727 *Alignment of Part 21 with Regulation (EU) 2018/1139* - RMT.0731 *New air mobility* - RMT.0729 *Regular update of Regulations (EU) 2019/945 & 2019/947* - RMT.0730 *Regular update of the AMC & GM to Regulations (EU) 2019/945 & 2019/947* - RMT.0230 Subtask B *U-space* - RMT.0573 *Fuel/energy planning and management* - RMT.0255 *Review of Part-66* - RMT.0544 *Review of Part-147* - EASA *Special Condition VTOL* - EASA *Special Condition Light UAS* - EASA DOA Review Item 2021-01 - Prototype Technical Specifications for Vertiports

Issue	How it is tackled in this proposal	Additional risk-mitigation contributors established through other EASA initiatives
Inadequate protection against air safety risk (in-flight collision risk, air proximity, accidents and incidents with manned and unmanned aircraft)	- Definition of the requirements applicable to operations with and operators of manned VTOL-capable aircraft (refer to Sections 2.3.4.2 and 2.3.4.4) - Definition of the criteria for the establishment of predefined routes or areas/corridors for operations with manned VTOL-capable aircraft (refer to Section 2.3.6)	- RMT.0230 Subtask B *U-space* - RMT.0573 *Fuel/energy planning and management* - Guidelines for the management of drone incidents at airports
Inadequate protection against aviation security risk (incidents due to harmful actions)	- Definition of the requirements applicable to operations with and operators of manned VTOL-capable aircraft (refer to Sections 2.3.4.2 and 2.3.4.4)	- RMT.0720 *Management of information security risks* - Guidelines for the management of drone incidents at airports - RMT.0648 *Update of the existing CSs to include cybersecurity requirements for products* - Prototype Technical Specifications for Vertiports
Lack of a harmonised regulatory framework in Europe	- Definition of a harmonised set of rules at European level addressing safety and security risks	—
Poor adoption of the use cases by EU citizens in the domain of UAM	- Definition of a harmonised set of rules at European level addressing safety and security risks	—

For the proposals mentioned above, there is no need to define options and their respective analyses have been identified: indeed, these proposals refer to elements where the potential solution is commonly accepted and no alternative feasible options could be identified.

Nevertheless for the elements listed below, this document includes an analysis of the potential options and the respective impacts in two different regulatory domains:

— continuing airworthiness: importance of definition of the level of requirement proportionality (e.g. considering the lighter and simpler principles of Part-ML and Part-CAO), including the responsibility for managing the airworthiness and maintaining the UAS, and whether or not a maintenance licence would apply in this case;

— air operations: importance of definition of a regulatory framework for the use of VTOL-capable aircraft in emergency medical services (VEMS); importance of the definition of operations with VTOL-capable aircraft in the 'certified' category to make (or not) a distinction between the commercial and non-commercial purpose of the flight.

For the two domains analysed above, the standard 'No policy change' 'Option 0' is discarded as rulemaking is the only way forward to address the issues.

4.3. Analysis of the proposed solutions and their impacts

4.3.1. Options for the continuing airworthiness of UAS subject to certification and operated in the 'specific' category

4.3.1.1 Description of the options

The options identified for this specific domain are listed in the below table. A more detailed description is provided right after the table.

Table 10 — Selected policy options

Option No	*Short title*	*Description*
1		New delegated act for the CAW of UAS: Develop specific annexes for the CAW of UAS subject to certification which are operated in the 'specific' category on the principles of Part-ML and Part-CAO of Regulation (EU) No 1321/2014 (future, specific annexes will then be developed for UAS operated in the 'certified' category)
2		New delegated act for the CAW of UAS: Develop the same set of requirements for both the 'specific' category (high risk) and the 'certified' category

Option 1: This option offers a set of requirements that are proportionate to that particular type of operations using the lighter and simpler principles of Part-ML and Part-CAO (initially developed for manned GA aircraft) as a starting basis. In this respect, the responsibility for managing the airworthiness and maintaining the UAS may be given to a single organisation, not requiring an SMS. This option is also characterised by the absence of maintenance licensing, whereby certifying staff would be subject to organisation requirements on qualification and competency assessment.

Option 2: This option offers a unique CAW framework for both UAS operated in the 'certified' category and UAS subject to certification which are operated in the 'specific' category. This includes various organisation approvals (continuing airworthiness management, maintenance), with higher technical and organisational standards established on the basis of Part-M, Part-CAMO and Part-145 (of Regulation (EU) No 1321/2014), and with SMS requirements. This option also establishes a maintenance licensing system as well as maintenance training organisation (on the basis of Part-66 and Part-147).

Discarded option: 'No policy change' (rules remain unchanged and risks as outlined in the issue analysis). This option is not retained because Article 40 of Delegated Regulation (EU) 2019/945 stipulates that certified UAS operated in high risk of the 'specific' category shall apply the CAW provisions of Commission Regulation (EU) No 1321/2014, which is not adapted to UAS. Besides, Regulation (EU) 2018/1139 requires the establishment of a delegated act on UAS maintenance. Therefore, this option is not further analysed in the next paragraph.

4.3.1.2 Analysis of the impacts of the options

4.3.1.2.1 Safety impacts

Option 1 allows the UAS 'specific' category to benefit from alleviations similar to those used in manned general aviation with Part-ML and Part-CAO (e.g. no maintenance programme approval by the competent authority). Besides, Option 1 actually contains also certain safety benefits, such as clarity for the stakeholders of the 'specific' category (which may not be familiar with traditional CAW provisions), hence facilitating the understanding and implementation of the respective regulations and rules and, as a consequence, enabling to achieve an adequate level of safety.

Option 2 represents the highest possible safety standard in CAW developed in manned aviation for complex motor-powered aircraft and aircraft used by licensed air carriers. This option implies that the operator is approved or contracts a continuing airworthiness management organisation (CAMO) and an approved maintenance organisation, two types of organisations with stringent and rigorous organisational requirements (including management of safety risks with SMS), and subject to high technical standards (Part-M). This option also establishes a maintenance licensing system as well as approved maintenance training organisations to ensure a high level of qualification for certifying staff that release maintenance.

The absence of maintenance licence in Option 1 (contrary to Option 2) is mitigated by the fact that maintenance will always be performed and released by an organisation that will be required to implement a company authorisation scheme, a system which is used already for component maintenance and approved production organisations. Provisions for independent certifying staff or pilot-owners are not proposed with Option 1.

Therefore, overall, both options ensure similar positive safety impacts.

4.3.1.2.2 Social impacts

Option 1: This option does not include a licensing system, but the maintenance organisation must establish a robust qualification system, ensuring that the affected personnel receive adequate and appropriate training. The absence of mutual recognition of licensing systems is mitigated by requiring the organisation to provide personnel that leave the organisation with a copy of their personnel records. This would help personnel collect evidence of their background and experience upon leaving

the maintenance organisation to work at another maintenance organisation. Besides, in manned aviation, maintenance licence holders may offer their services as independent certifying staff to perform maintenance on aircraft used in non-commercial operations. However, operations with UAS subject to certification which are operated in the 'specific' category are mainly foreseen to be conducted in commercial operations; therefore, the absence of a maintenance licence would have a limited negative effect in this regard.

In general, Option 1 also provides for a facilitated understanding and implementation of the provision.

Option 2: This option includes a licensing system for the maintenance of UAS, which provides for simpler authorisation processes and the free movement of persons between organisations within the EU since it is mutually recognised by all Member States. This licensing system also allows private individuals that hold such licence to act as independent certifying staff for non-commercial operations. However, it can also be argued that in the context of maintenance of UAS for which there is currently no regulatory framework, establishing a new licensing system could represent a barrier to personnel that have already the necessary background and experience in this field but do not hold a licence.

Overall, Option 1 is considered to have social impacts similar to those of Option 2.

4.3.1.2.3 Economic impacts

Option 1: This option is proportionate for SMEs, allowing a single and less complex organisation to manage all CAW aspects of the UAS, including the performance of airworthiness reviews and the issue of the ARC, with reduced competent autority involvement (e.g. UAS maintenance programme approved by the Part-CAO.UAS organisation, and not by the competent authority). This should reduce the cost of owning an UAS in this category.

Option 2: This option will incur additional costs for obtaining a maintenance licence. The ownership cost of an UAS will increase with the contracting of two approved organisations with higher technical and organisational standards (Part-CAMO and Part-145), and closer involvement of the competent authority (e.g. approval of the maintenance programme). Besides, the implementation of SMS by organisations involved in the CAW of UAS would incur additional costs related to, for instance, implementing and maintaining a safety risk management process.

Overall, compared to Option 2 which is considered disproportionate for this category of UAS, Option 1 is considered to have a much higher positive economic impact.

4.3.1.3 Comparison of the options

Option 1 is the preferred option. It does not include the potential costs for a maintenance licence, thus avoiding potential limitations for personnel that already have the appropriate background and experience in this field but do not hold a maintenance licence. It also offers an organisation approval with all necessary CAW privileges (Part-CAO.UAS organisations). From a safety point of view, Option 1 is considered to have overall similar impacts as Option 2. All in all, Option 1 is considered to contribute to the establishment of safe and proportionate CAW provisions for UAS subject to certification and are operated in the 'specific' category.

4.3.2. Options for manned VTOL-capable aircraft

4.3.2.1 Development of a regulatory framework for the operation of manned VTOL-capable aircraft

For the Air Operations domain, it has been concluded that manned VTOL-capable aircraft shall be regulated on the basis of specifically developed implementing acts. This solution provides for the development of a dedicated annex (i.e. Annex IX (Part-IAM)) to Commission Regulation (EU) No 965/2012 to address flight operations with manned VTOL-capable aircraft and adaptations to some of its annexes (i.e. Annex I (Definitions), Annex II (Part-ARO), Annex III (Part-ORO) and Annex V (Part-SPA).

4.3.2.1.1 VTOL-capable aircraft employed in emergency medical services (VEMS)

Due to the operational flexibility of VTOL-capable aircraft, EASA had to tackle the issue of how to address emergency medical services operations and how to handle those operations compared to existing HEMS operations.

Before illustrating the preferred options, the following options were discarded:

— Option 'In case of emergency medical services use the flexibility provisions of Article 71 of Regulation (EU) 2018/1139 to deviate from the existing Implementing Regulations for flight operations with aeroplanes and helicopters, depending on whether the VTOL design is closer to an aeroplane or a helicopter'.

  This option has been discarded due to the following reasons:

  — each VTOL design may be unique and may combine features from aeroplanes and helicopters: considering the increase in production and use of VTOL-capable aircraft, dealing with each particular design to establish specific areas where deviation is needed would be unjustifiable in terms of effort and time;

  — regulating piece by piece would require the screening of all relevant, domain-specific requirements (such as AIR OPS, IAW/CAW, SERA, FCL) every time an individual exemption is considered; this is also unjustifiable in terms of effort and time;

  — the specific risks for IAM operations, mainly in congested areas, cannot be mitigated.

— Option 'Development of a stand-alone regulation on operations with VTOL-capable aircraft, including requirements for operators and authorities'.

  This option was discarded due to the following reasons:

  — the need to repeat all same requirements on operators and authorities that exist today for operations with aeroplanes and helicopters;

  — the necessity to apply two different regulations for the same VTOL-capable aircraft when certified for both manned and unmanned operations.

Therefore, the selected solution includes the development of a regulatory framework for the use of VTOL-capable aircraft in emergency medical services (VEMS). The use of VTOL-capable aircraft as emergency doctor transport is expected to have a variety of positive effects on our society. This was demonstrated by a representative study on the attitude of the population towards the use of air taxis in airspace over urban areas. In this study, more than 65 % of the respondents were in favour of the

use of air taxis for medical emergencies (Dannenberger et al., 2020 p. 15). In addition, the use of VTOL-capable multicopters[85] in EMS can serve as an incubator for further possible applications of this technology. States/regions can benefit from such novel technologies, especially when considering the reduced cost to ensure EMS operations when compared to the cost required for EMS with helicopters.

For the purpose of VEMS, EASA has decided to take into account the results of the ADAC Feasibility Study[86], which assessed the potential use of VTOL-capable multicopters for EMS to be feasible under certain conditions.

The operation of a VTOL-capable aircraft with two pilots has been excluded, as only two seats (pilot plus passenger) are available in most VTOL designs. As the long-term intention of the manufacturers of VTOL-capable aircraft is to perform autonomous flights, VTOL-capable aircraft are not designed for operation with two pilots. Therefore, only single-pilot operation (with the support of an emergency doctor trained as technical crew) is possible and should be considered. The emergency doctor must be the pilot's 'second pair of eyes' when it comes to take-off and landing at unknown sites, possibly under the most adverse weather or visibility conditions. This requires training and checking as is today the case for HEMS technical crew members. Where the training of medical doctors as technical crew in HEMS is allowed by national law in the field of emergency medical services, the cost of the training is considered relatively low because it will be provided in a systematic way. In countries where medical doctors cannot be employed as technical crew, a technical crew member, in addition to the pilot-in-command and the medical doctor, will still be needed on board. This increased payload will in turn limit the range of the flight and flight endurance because VTOL-capable aircraft have limited capacity. Also, the cost of VEMS will be higher, compared to countries where the role of the technical crew is fulfilled by the medical doctor.

VTOL-capable aircraft used in EMS operations are likely to gain full public acceptance due to expected lower levels of pollution (emissions and noise) and the improvements in emergency medical care.

These operations (i.e. VEMS) would not entirely substitute current EMS operations. Indeed, these are to be considered as complementary, e.g. the VEMS would bring quickly on the accident scene the emergency doctor to treat and stabilise the patient while the HEMS/ground-based vehicle would bring further the patient to the appropriate location.

Remark: Autonomous, unmanned VTOL-capable aircraft deployment options are not considered for the time being, as in the field of rescue services (part of EMS) these cannot be considered realistic in the medium term due to the strict requirement with regard to flying skills in unknown terrain or landing at uncharted landing sites.

4.3.2.1.2 Certification of non-commercial operators of manned VTOL-capable aircraft

Today, operators of non-commercial operations (e.g. corporate flights, private flights) with manned non-complex aeroplanes and helicopters, where passengers or cargo may be carried on board or specialised services may be provided, are not subject to operator certification (i.e. issue of an air operator certificate (AOC)).

[85] 'Multicopter' is a term not adopted by EASA, but used in the referenced study.

[86] ADAC Luftrettung *Feasibility Study on the application potential of multicopters as emergency doctor shuttles* — Result report. Munich, Germany, 14 October 2020 Project (https://luftrettung.adac.de/volocopter/).

As a consequence, operations conducted in similar conditions (e.g. in urban environment) may be subject to different operational requirements depending on their nature (commercial versus non-commercial operations).

Before taking a decision on the final proposed solution, the following options were considered yet discarded. Even though both discarded options would not include some negative economic considerations for operators and MS authorities as in the solution proposed, the safety considerations led to discard them.

— No certificate (non-commercial operators shall not be required to have an AOC): non-commercial operators of VTOL-capable aircraft in manned configuration would not have an AOC. It is expected that this could lead to a decrease in terms of safety, in particular in urban areas.

— Special authorisation (non-commercial operators shall have a special authorisation to operate instead of an AOC): the process for granting an authorisation requires fewer checks compared to an AOC, and the safety oversight performed by the competent authority is less thorough.

Instead, the preferred option for the regulation of manned VTOL-capable aircraft will make no distinction between the commercial and non-commercial purpose of the flight.

An operator that conducts non-commercial operations with manned VTOL-capable aircraft will be required to undergo a certification procedure before starting operations. This is because the novel VTOL designs that can be operated in manned (initially) as well as in unmanned configuration are being associated to 'certified' category operations with UAS[87] and that the 'certified' category requires, among others, operator certification.

As a result, similar operations (non-commercial, manned aircraft) conducted under similar conditions may happen to be treated in a different way.

Although no safety recommendations have been addressed to EASA so far, considering the potential growth of operations with VTOL-capable aircraft, including for non-commercial purposes, and the potential high safety and security risks posed by such operations to third parties on the ground, especially in urban environments, an aircraft operator certificate (AOC) also for non-commercial operations is deemed necessary.

The main reasons why no distinction is made between commercial and non-commercial operations with manned VTOL-capable aircraft, including for the purpose of air operator certification (AOC), are as follows:

— in the next 5 to 10 years, the number of commercial and non-commercial applicants altogether, which intend to operate manned VTOL-capable aircraft, is expected to be low;

— the issue of AOCs to these applicants is not likely to impose a significant burden on competent authorities in terms of working hours and human resources;

— passenger operations with VTOL-capable aircraft will be a variant of today's CAT and NCC operations; this means that current flight operations inspector training will be sufficient to cover new types of operations;

[87] The 'certified' category operation is defined in Article 6 of Commission Implementing Regulation (EU) 2019/947 and in Article 40 of Commission Delegated Regulation (EU) 2019/945.

— the AOC process for passenger operations with VTOL-capable aircraft is expected to be similar to or even less complicated than the AOC process for passenger operations with helicopters; the first operations with VTOL-capable aircraft will be manned, VFR, by day — which significantly simplifies the certification requirements.

This proposed solution is expected to offer the following:

— positive safety considerations considering the thorough checks in the AOC issue process;

— operator effort to demonstrate compliance in order to obtain the AOC;

— MS competent authorities might face costs related to additional personnel required to be hired and trained to issue AOCs to non-commercial operators and perform oversight; however, these costs are not expected to be high considering the low number of non-commercial operations with VTOL-capable aircraft expected to be conducted in the short/medium term; therefore, these activities might be performed partially by current personnel.

4.4. Conclusions

Further to the analysis in Section 4.3, an overview of the impacts of the proposed solutions is presented in the following table. It provides the highlights of the impacts of the preferred solution (or of the sole assessed solution in case where other options were discarded) for each domain analysed and assessed.

Affected regulatory domain	Assessment of the preferred option
CAW: Specific annexes for the CAW of UAS subject to certification and operated 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 the appropriate experience in this field but do not hold a licence. It also offers an organisation approval with all necessary CAW privileges (Part-CAO.UAS organisations). It provides for safe and proportionate CAW provisions for UAS subject to certification and operated in the 'specific' category.

Affected regulatory domain	Assessment of the preferred option
AIR OPS: Use of manned VTOL-capable aircraft in emergency medical services (VEMS)	VEMS would bring quickly on the accident scene the emergency doctor to treat and stabilise the patient. Manned VTOL-capable aircraft in EMS are likely to gain full public acceptance due to expected lower societal benefits and lower levels of pollution (noise and emissions).
Certification of non-commercial operators of manned VTOL-capable aircraft	Air operator certificate (AOC): 1) Positive safety considerations considering the thorough checks in the AOC issue process. 2) Administrative effort for operators to demonstrate compliance in order to obtain the AOC. 3) EU MS competent authorities might face costs related to additional personnel required to be hired and trained to issue AOCs to non-commercial operators and perform oversight. However, these costs are not expected to be high considering the low number of non-commercial operations with VTOL-capable aircraft expected to be conducted in the short/medium term; therefore, these activities might be performed partially by current personnel.
FCL: New requirements to allow existing CPL(A) and CPL(H) holders to add VTOL-capable aircraft type ratings to their licences	Only pilots that already hold a licence for conventional aircraft could be involved in manned VTOL-capable aircraft operations, with no possibility for ab initio pilot training in VTOL-capable aircraft. However, in any case, only experienced pilots shall fly VTOL-capable aircraft during the initial 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 VTOL-capable aircraft with a future NPA in the context of RMT.0230.

Affected regulatory domain	Assessment of the preferred option
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 on some types of operations.

5. Proposed actions to support implementation

— Publication of AMC and GM applicable to new/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

6. References

6.1. 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[88]

— Commission Delegated Regulation (EU) 2019/945 of 12 March 2019 on unmanned aircraft systems and on third-country operators of unmanned aircraft systems[89]

— Commission Implementing Regulation (EU) 2019/947 of 24 May 2019 on the rules and procedures for the operation of unmanned aircraft[90]

— 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[91]

— 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[92]

— 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[93]

6.2. Related EASA decisions

n/a

6.3. Other references

— EASA Study on the societal acceptance of Urban Air Mobility in Europe94

— 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 Force95

88 http://data.europa.eu/eli/reg/2012/748/oj
89 http://data.europa.eu/eli/reg_del/2019/945/2020-08-09
90 http://data.europa.eu/eli/reg_impl/2019/947/oj
91 http://data.europa.eu/eli/reg/2012/965/oj
92 http://data.europa.eu/eli/reg/2011/1178/oj
93 http://data.europa.eu/eli/reg_impl/2012/923/oj
94 https://www.easa.europa.eu/domains/urban-air-mobility-uam
95 https://www.easa.europa.eu/document-library/general-publications/drone-collision-task-force

7. Quality of the NPA

To continuously improve the quality of its documents, EASA welcomes your feedback on the quality of this NPA with regard to the following aspects:

7.1. The regulatory proposal is of technically good/high quality

[Please choose one of the options below and place it as a comment in CRT; if you disagree or strongly disagree, please provide a brief justification.]
Fully agree / Agree / Neutral / Disagree / Strongly disagree

7.2. The text is clear, readable and understandable

[Please choose one of the options below and place it as a comment in CRT; if you disagree or strongly disagree, please provide a brief justification.]
Fully agree / Agree / Neutral / Disagree / Strongly disagree

7.3. The regulatory proposal is well justified

[Please choose one of the options below and place it as a comment in CRT; if you disagree or strongly disagree, please provide a brief justification.]
Fully agree / Agree / Neutral / Disagree / Strongly disagree

7.4. The regulatory proposal is fit for purpose (capable of achieving the objectives set)

[Please choose one of the options below and place it as a comment in CRT; if you disagree or strongly disagree, please provide a brief justification.]
Fully agree / Agree / Neutral / Disagree / Strongly disagree

7.5. The impact assessment (IA), as well as its qualitative and quantitative data, is of high quality

[Please choose one of the options below and place it as a comment in CRT; if you disagree or strongly disagree, please provide a brief justification.]
Fully agree / Agree / Neutral / Disagree / Strongly disagree

7.6. The regulatory proposal applies the 'better regulation' principles[1]

[Please choose one of the options below and place it as a comment in CRT; if you disagree or strongly disagree, please provide a brief justification.]
Fully agree / Agree / Neutral / Disagree / Strongly disagree

7.7. Any other comments on the quality of this NPA (please specify)

Note: Your comments on this Section will be considered for internal quality assurance and management purposes only and will not be published in the related CRD.

[1] For information and guidance, see:

- https://ec.europa.eu/info/law/law-making-process/planning-and-proposing-law/better-regulation-why-and-how_en
- https://ec.europa.eu/info/law/law-making-process/planning-and-proposing-law/better-regulation-why-and-how/better-regulation-guidelines-and-toolbox_en
- https://ec.europa.eu/info/law/law-making-process/planning-and-proposing-law/better-regulation-why-and-how/better-regulation-guidelines-and-toolbox/better-regulation-toolbox_en