European Union Aviation Safety Agency

Explanatory Note to ED Decisions 2025/010/R, 2025/011/R & 2025/012/R

issued in accordance with Article 4(2) of MB Decision No 01-2022

Introduction of a regulatory framework for the operation of drones

Enabling innovative air mobility with manned VTOL-capable aircraft

RMT.0230 — SUBTASK C#3

WHAT THESE DECISIONS ARE ABOUT

The Decisions issue acceptable means of compliance (AMC) and guidance material (GM) to Regulation (EU) 2024/1111 which addresses new operational and mobility concepts that are based on innovative technologies, such as aircraft with a vertical take-off and landing (VTOL) capability, and fosters and promotes their acceptance and adoption by European citizens.

The Decisions issue amendments to existing AMC and GM, and issue new AMC and GM as well, to illustrate the means to show compliance with the operational requirements applicable to manned VTOL-capable aircraft (VCA).

The specific objectives of both amended and new AMC and GM are to:

- enable operators to safely implement the applicable regulations for the operation of manned VCA in the single European sky (SES);
- ensure that the applicable conditions are met as regards the safe operation of manned VCA in the ATM environment;
- support innovation and development in the field of innovative air mobility (IAM) through the implementation of an efficient, proportionate, and well-designed regulatory framework which does not unnecessarily hinder the development of the manned VCA market;
- provide guidance to the competent authorities of the EU Member States for the implementation of the applicable regulations on manned VCA;
- provide guidance to manufacturers and operators of manned VCA for the deployment of operations with manned VCA;
- support the early adoption of IAM technologies, products and services.

ED DECISIONS TO BE AMENDED

- ED Decision 2014/019/R 'GM to Regulation (EU) No 965/2012'
- ED Decision 2012/015/R 'GM to Definitions for terms used in Annexes II to VIII'
- ED Decision 2014/025/R 'AMC & GM to Part-ARO'
- ED Decision 2014/017/R 'AMC & GM to Part-ORO'
- ED Decision 2018/009/R 'AMC & GM to Regulation (EU) No 1178/2011'
- ED Decision 2013/013/R 'AMC & GM to the rules of the air'

ED DECISIONS TO BE ISSUED

- ED Decision 2025/010/R
  'AMC & GM to Regulation (EU) No 965/2012 and to Annex I (Definitions), Part-ARO, Part-ORO, Part-SPA and Part-IAM'
- ED Decision 2025/011/R
  'AMC & GM to Regulation (EU) No 1178/2011'
- ED Decision 2025/012/R
  'AMC & GM to the Annex (Rules of the air) to Regulation (EU) No 923/2012'

AFFECTED STAKEHOLDERS

VCA operators; VCA manufacturers; competent authorities (CAs); flight crews; other airspace users; general public

WORKING METHODS

Development	Impact assessment(s)	Consultation
By EASA with external support	Detailed	Public – NPA

RELATED DOCUMENTS / INFORMATION

ToR RMT.0230 Issue 4 issued on 19.12.2022; NPA 2022-06 issued on 30.6.2022; Opinion No 03/2023 issued on 31.8.2023; NPA 2024-01 issued on 6.2.2024

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

Table of contents

1. About the Decisions

1.1. How this regulatory material was developed

The European Union Aviation Safety Agency (EASA) developed Decisions 2025/010/R, 2025/011/R and 2025/012/R to establish an updated set of AMC and GM associated with Regulation (EU) 2024/1111[1] (originally proposed with Opinion No 03/2023[2]) with regard to new operational and mobility concepts based on innovative technologies, like aircraft with a VTOL capability.

This rulemaking activity is included in the 2025 edition of Volume II of the European Plan for Aviation Safety (EPAS) for 2023–2025[3] under Rulemaking Task (RMT).0230 Subtask C#3. That subtask is specific to the operational requirements applicable to manned VCA.

EASA developed the regulatory material in question in line with Regulation (EU) 2018/1139[4] (the Basic Regulation) and the Rulemaking Procedure[5], as well as in accordance with the objectives and working methods described in the Terms of Reference (ToR) for this RMT[6].

When developing the subject regulatory material, EASA received support from several dedicated working groups of experts from the Member States' national competent authorities and industry, established for each of the affected domains (AIR OPS, FCL and SERA).

The draft regulatory material was publicly consulted in accordance with the ToR for this RMT through NPA 2024-01[7].

EASA reviewed the comments received and duly considered them for the preparation of the regulatory material presented here.

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1 Commission Implementing Regulation (EU) 2024/1111 of 10 April 2024 amending Regulation (EU) No 1178/2011, Implementing Regulation (EU) No 923/2012, Regulation (EU) No 965/2012 and Implementing Regulation (EU) 2017/373, as regards the establishment of requirements for the operation of manned aircraft with a vertical take-off and landing capability (OJ L, 2024/1111, 23.5.2024 (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32024R1111&qid=1743777280591).

2 Opinion No 03/2023 'Introduction of a regulatory framework for the operation of drones — Enabling innovative air mobility with MVCA, the initial airworthiness of UAS subject to certification, and the continuing airworthiness of those UAS operated in the "specific" category' (RMT.0230 — SUBTASK C#1) (https://www.easa.europa.eu/en/document-library/opinions/opinion-no-032023).

3 https://www.easa.europa.eu/en/document-library/general-publications/european-plan-aviation-safety-epas-2025

4 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).

5 EASA is bound to follow a structured rulemaking process as required by Article 115(1) of Regulation (EU) 2018/1139. Such a process has been adopted by the EASA Management Board (MB) and is referred to as the 'Rulemaking Procedure'. See MB Decision No 01-2022 of 2 May 2022 on the procedure to be applied by EASA for the issuing of opinions, certification specifications and other detailed specifications, acceptable means of compliance and guidance material ('Rulemaking Procedure'), and repealing Management Board Decision No 18-2015 (https://www.easa.europa.eu/the-agency/management-board/decisions/easa-mb-decision-01-2022-rulemaking-procedure-repealing-mb).

6 ToR RMT.0230 Issue 4

7 NPA 2024-01 'Introduction of a regulatory framework for the operation of drones — Enabling innovative air mobility with manned VTOL-capable aircraft' (RMT.0230 – SUBTASK C#3) (https://www.easa.europa.eu/en/document-library/notices-of-proposed-amendment/npa-2024-01)

2. In summary — why and what

2.1. Why we need to act

Compared to existing manned aircraft and ground vehicle operations, operations with aircraft with a 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 transport of passengers or cargo in different geographical scales ranging from urban environments to intercontinental routes. 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 VCA, while in the future such operations may be performed on the same platforms but remotely piloted with increasing levels of autonomy; therefore, it is necessary to support the transition phase and to ensure the smooth integration of these new operational concepts in the current civil aviation domains.

The drivers of this regulatory activity are the following:

— new operational concepts enabled by innovative, manned VCA typically powered by electrical engines;

— the need to enable IAM as one element of the future ‘smart, green and digital’ cities, offering multimodal transportation;

— 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 passenger-carrying, innovative, manned VCA;

— support the EU’s industry competitiveness at global level.

2.1.1. Description of the issue

The issue is to support the implementation of Regulation (EU) 2024/1111 which addresses the following:

— Inadequate protection for aircraft crew and passengers

  — VCA, being a new class of aircraft, differ significantly from traditional aeroplanes and helicopters in terms of design, propulsion and flight dynamics. The operational behaviour of VCA, especially in urban environments, introduces unprecedented safety challenges that existing aviation regulations and rules were not designed to handle.

  — The safe, large-scale integration of these new aircraft into their intended operational environment requires synergies on the level of provisions and requirements distributed across several aviation domains (initial/continuing airworthiness, maintenance, air operations, flight crew licensing, rules of the air, air traffic management, aerodromes).

— Inadequate protection against ground safety risks (accidents/incidents involving persons on the ground or in sensitive areas).

- Ground risk involves the probability of a VCA crashing on persons or property on the ground causing injuries/fatalities or damage (including damage to critical infrastructure). 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 due to the presence of obstacles (e.g. buildings, barriers, etc.) during navigation.
- The risk of damage to critical infrastructure[8].
- Ground risk also involves the risk associated with ground operations (taxiing, servicing of aircraft, refuelling/recharging of aircraft, and the risk related to parts detaching from the VCA and hitting persons on the ground).

— Inadequate protection against air safety risks (mid-air collision risk, aircraft proximity (AIRPROX), accidents and incidents involving manned and unmanned aircraft and wildlife)

- The increase in the number of VCA operated 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 air traffic management.

— Inadequate protection against aviation security risks (incidents due to malicious and harmful actions)

- VCA will typically operate from vertiports located outside aerodromes, and for such new structures there is a need to identify appropriate and proportionate measures, such as security checks of the passengers or scanning of luggage, in order to mitigate the risk associated with the malicious use of VCA.
- Similarly to other aircraft operations, operations with VCA 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 over 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, and a possible reduction in financial investments on research and development of solutions that would improve the level of safety. This could also lead to the EU industry having a competitive disadvantage 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 adoption of the IAM use cases by future users, and also the acceptance of IAM use cases by urban residents.

[8] A similar approach has been proposed by JARUS in its SORA 2.5 document published at http://jarus-rpas.org/publications.

2.1.2. Who is affected by the issue

The issues described in Section 2.1.1 will have an impact on the following stakeholders:

— VCA manufacturers;

— VCA operators;

— competent authorities;

— pilots and pilot training organisations;

— other airspace users (manned and unmanned aircraft);

— providers of air traffic management/air navigation services (ATM/ANS) and other ATM network functions;

— aerodrome operators;

— the general public.

2.2. What we want to achieve — objectives

The overall objectives of the EASA system are defined in Article 1 of the Basic Regulation. The regulatory material presented here is expected to contribute to achieving these overall objectives by addressing the issues described in Section 2.1.

The specific objectives of RMT.0230 Subtask C#3 are to:

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

— ensure that the applicable conditions are met as regards the safe operation of manned VCA in the ATM environment;

— support innovation and development in the field of IAM through the implementation of an efficient, proportionate, and well-designed regulatory framework which does not unnecessarily hinder the development of the manned VCA market;

— provide guidance to competent authorities of the EU Member States for the application of the regulations applicable to manned VCA;

— provide guidance to VCA manufacturers and operators for the deployment of operations with manned VCA; and

— support the early adoption of IAM technologies, products and services.

With the regulatory material presented here, EASA intends to support the implementation of Regulation (EU) 2024/1111, whose detailed objectives are explained in Section 2.2 of EASA Opinion No 03/2023[9].

[9] Opinion No 03/2023 - Introduction of a regulatory framework for the operation of drones — Enabling innovative air mobility with MVCA, the initial airworthiness of UAS subject to certification, and the continuing airworthiness of those UAS operated in the 'specific' category | EASA

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

The following sections address the amendments to, and creation of, the AMC and GM associated with:

— air operations (AIR OPS);

— flight crew licensing (FCL); and

— standardised European rules of the air (SERA),

and summarise the underlying assumptions and criteria adopted for their amendment/creation.

2.3.1. Air operations (AIR OPS)

Regulation (EU) 2024/1111 amended Regulation (EU) No 965/2012[10] (the Air OPS Regulation) in order to accommodate implementing rules for VCA operations. The following parts of the Air OPS Regulation were affected by the amendment:

— Regulation (enacting terms),

— Annex I (Definitions),

— Annex II (Part-ARO),

— Annex III (Part-ORO),

— Annex V (Part-SPA),

— Annex IX (Part-IAM) (a new annex dedicated to IAM operations with VCA).

The AMC and GM to the amended Air OPS Regulation have been developed with the primary objective to ensure safe IAM operations taking into account VCA specificities and expected operational risks, especially in congested (urban) areas. The main concerns identified during the development of the implementing rules related to pre-flight preparation, availability of landing sites for nominal operations and for diversion, and last but not least to fuel/energy management, including usable fuel/energy amount and final fuel/energy reserve amount. Therefore, major effort during the drafting of the AMC and GM focused on ensuring that VCA specificities and potential drawbacks are well addressed, that safety levels will not be lower than those required for CAT operations with small helicopters and small aeroplanes, as well as on providing certain limits (e.g. only VFR by day with the surface in sight) and flexibility margins that can reasonably be anticipated at this stage where both experience with and operational data collected from real VCA operations are insufficient.

The following are examples of some important operational requirements for which detailed AMC and GM have been developed:

— preparation of an operational flight plan for each intended flight;

— use of adequate vertiports, diversion locations and VEMS[11] operating sites, including the policy and procedures for their selection and the associated documentation;

[10] Commission Regulation (EU) No 965/2012 of 5 October 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (OJ L 296, 25.10.2012, p. 1) (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32012R0965&qid=1695398138580).

[11] The term 'VEMS' refers to emergency medical services with VCA.

— compliance with weather minima and fuel/energy schemes;

— use of diversion locations in cross-border operations;

— establishment of a point of commitment for landing at the destination from which at least two safe landing options should be selected; the pilot-in-command (PIC) should make sure that the committed landing option is available and the remaining energy is sufficient to perform a safe landing;

— establishment of a final fuel/energy reserve amount and its protection; the flight should be so planned that from any point along the route, should a critical failure for performance (CFP) occur, a safe landing can be performed with the final fuel/energy reserve preserved; if during the flight the final fuel/energy reserve can no longer be protected, then a fuel emergency should be declared.

2.3.2. Flight crew licensing (FCL)

As regards FCL, AMC have been developed to illustrate how compliance can be achieved with Article 4f of Regulation (EU) No 1178/2011[12] (as amended by Regulation (EU) 2024/1111).

— AMC1 to Article 4f(2) and (3) addresses general arrangements related to the content and the design of VCA type rating training courses, mainly by making references to existing AMC related to the design of helicopter type rating training courses (AMC3 ORA.ATO.125) and the theoretical knowledge syllabus for helicopter type rating training courses (AMC1 FCL.725(a)). The content of these AMC should be the basis for designing a VCA type rating training programme, with adaptations as necessary due to innovative aircraft designs and aircraft types. In that context, AMC1 to Article 4(f)(2) and (3), in addition to the reference to AMC1 FCL.725(a), lists additional VCA-specific areas to be considered for inclusion in the VCA type rating training programme.

  In reaction to comments received on NPA 2024-01, the text has been updated as follows:

  — The introductory phrase of point (b):

    - has been revised to refer to AMC1 FCL.725(a) in general (not only exclusively to the helicopter syllabus), since the appropriate theoretical knowledge topics should be selected from the syllabi for the different aircraft categories, like Article 4f foresees to select appropriate practical training exercises from the different syllabi in Part-FCL Appendix 9; and
    - has been complemented by adding a reference to OSD, to allow OSD to make specific determination for theoretical knowledge needs with regard to a particular VCA type.

  — In point (b)(2), the detailed training topic on the VCA's 'U-space capabilities and equipment' has been identified to not accurately address VCA operated by a pilot on board and has, therefore, been replaced by a more general and suitable training topic on

[12] Commission Regulation (EU) No 1178/2011 of 3 November 2011 laying down technical requirements and administrative procedures related to civil aviation aircrew pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council (OJ L 311, 25.11.2011, p. 1) (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32011R1178&qid=1705480332246).

'general knowledge about U-space airspace', since general knowledge about that subject is considered relevant for any future (VCA) pilot.

— GM1 Article 4f(3)(a)(i) has been added, following a comment received, to explain the applicability of the requirements of Part-FCL Appendix 9 related to the use of FSTDs for training, testing and checking.

— AMC1 to Article 4f(8)(a) illustrates the arrangements for the VCA instructor refresher training. Since the affected instructors will be holders of FI, TRI or SFI certificates and will in any case need to comply with the general FI, TRI and SFI revalidation and renewal arrangements, the arrangements related to VCA instructor privileges have been made consistent with the related arrangements for FI, TRI and SFI, as set out in existing AMC to points FCL.940.FI, FCL.940.TRI and FCL.940.SFI respectively.

2.3.3. Standardised European rules of the air (SERA)

As regards SERA, the AMC and GM have been amended and complemented with new information in order to provide guidance and clarification on operational aspects as well as on terminology used.

Firstly, respective amendments have been made in relation to the term 'fuel/energy' used in:

— GM1 SERA.11012 'Minimum fuel and fuel emergency',

— GM2 SERA.11015 'Interception',

— Appendix 1 to AMC1 SERA.14001 'General', and

— GM1 SERA.14095(c)(1)(ii)(F) 'Distress and urgency radiotelephony communication procedures'.

The energy used for aircraft propulsion comes from various sources and is of various types. A frequently used type of energy in aviation is derived from processing (in a piston or turbine engine) hydrocarbon-based fuels that include gasoline (leaded or unleaded), diesel, avgas, JET A-1, and JET B. Hydrogen may also be used as fuel for fuel-cell applications, which generate electricity that is used to generate propulsion.

However, as current technologies already use other sources of energy for aircraft propulsion, such as stored electrical energy, the typical term 'fuel' has become restrictive and no longer covers emerging technologies.

Therefore, a broader, combined term has been introduced to accommodate new types of energy, other than fuel, used for aircraft propulsion. The term 'fuel/energy' should cater for both typical fuel and any other type or source of energy used for aircraft propulsion, including but not limited to electrical energy stored in batteries.

When used in the compound form 'fuel/energy', the term 'energy' only refers to the electrical energy used for aircraft propulsion. It does not include any other form of stored electrical energy that is used on board an aircraft (e.g. batteries of electronic flight bags (EFBs), emergency locator transmitters (ELTs), underwater locating devices (ULDs), automatic external defibrillators (AEDs), or backup energy sources).

Subsequently, the term 'fuel/energy' is used whenever appropriate, but the term 'fuel' is retained in particular in sentences that contain standardised phraseology.

Secondly, GM1 SERA.5001(***)(b) 'VMC visibility and distance from cloud minima' has been developed to clarify that until sufficient safety data related to manned VCA operations is available, manned VCA should not be operated when the flight visibility is lower than 1 500 m.

As explained in Section 2.3.6.2 'The term "helicopter"' of NPA 2022-06[13], the operating conditions of manned VCA are not identical to those of helicopters. To permit operations with the same reduced flight visibility as for helicopters, the availability of sufficient safety data related to manned VCA operations is paramount.

Finally, 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 (such as sailplanes) for which the electrical energy should be kept for operating the transponder in the most relevant circumstances.

The question was raised on whether electrically powered, manned VCA should be considered 'aircraft without sufficient electrical power' — for example, in the case where all available energy should be secured for the functioning of the engine. These electrically powered, manned VCA are certified and designed to be used with their full electrical capability planned and managed throughout the flight. Subsequently, manned VCA should not be included in the category 'aircraft without sufficient electrical power'. Therefore, no amendment has been proposed to point SERA.13001; however, it has been considered necessary to add GM2 SERA.13001(c) for clarification.

2.4. What are the stakeholders' views

NPA 2024-01 was publicly consulted from 6 February to 6 June 2024, and attracted more than 300 comments from around 30 commentators.

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

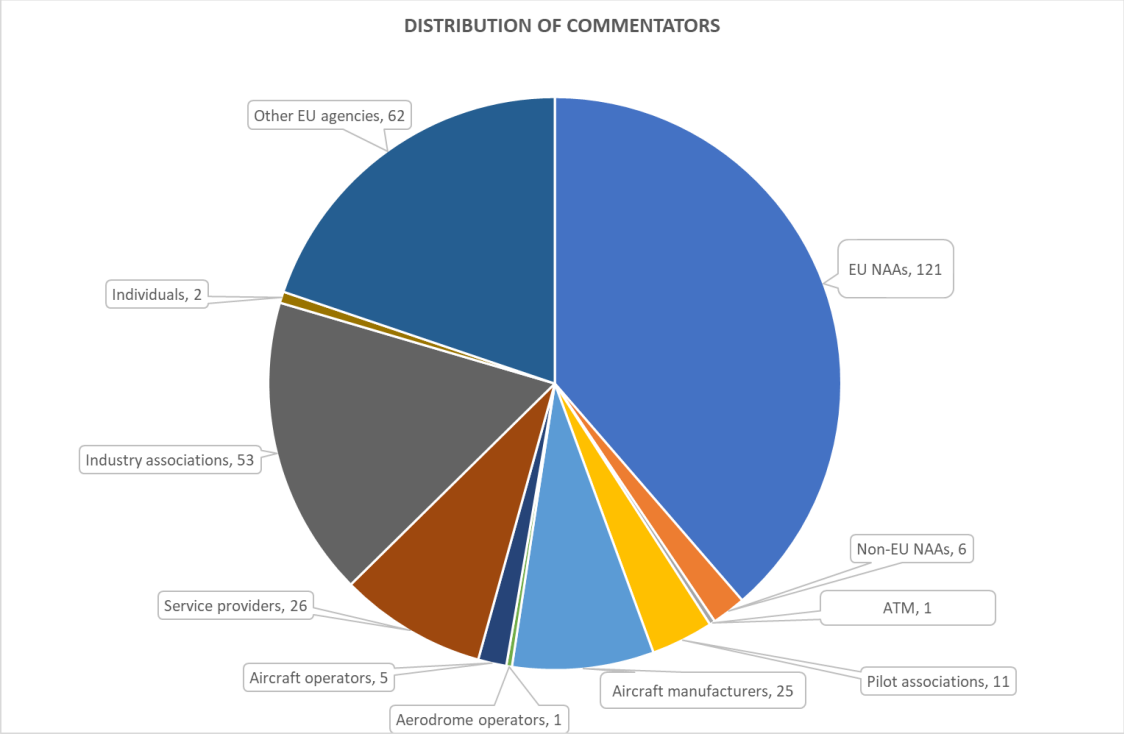

Figure 1 — Distribution of commentators

In addition to the formal public consultation, EASA took into account the inputs received during several meetings of the Experts' Groups for the review and assessment of the comments.

The following sections summarise the main comments received and the EASA views on those comments raised on the proposed amendments to the related AMC and GM and the common underlying conceptual approach followed. For the detailed comments and the respective EASA responses, please refer to CRD to NPA 2024-01[14].

2.4.1. Air operations (AIR OPS)

2.4.1.1. Final fuel/energy reserve

The national competent authorities (NCAs) of two Member States drew EASA's attention to the performance-based approach chosen to regulate the 'final fuel/energy reserve' that remains in the VCA upon landing.

The performance-based approach to regulating final fuel/energy reserve is embedded in Regulation (EU) 2024/1111. It uses the representative time for a go-around manoeuvre in the most demanding ambient atmospheric conditions from the point of view of fuel/energy consumption to calculate the final fuel/energy reserve. The representative time is established by the OEM during the type certification of the VCA and must factor-in degraded performance capabilities and an appropriate configuration/speed for the go-around manoeuvre and approach procedures. Therefore, the go-around manoeuvre must be executable in any real operation.

[14] CRD to NPA 2024-01, available at https://www.easa.europa.eu/en/document-library/comment-response-documents/crd-2024-01.

This approach differs from that for aeroplanes and helicopters in that it does not set a particular value as is the case with VFR NCO aeroplanes and VFR CAT helicopters, where the amount of final fuel/energy reserve should be sufficient for an additional 30-minute flight, or with VFR NCO helicopters, where this amount equals 20 minutes additional flying time, or with A-to-A VFR NCO aeroplanes, where it is 10 minutes.

The different approach to regulating final fuel/energy reserve is due to the differences in regulating safety of IAM operations under VFR by day compared to existing aircraft operations under VFR by day. Considering the challenges novel operations of VCA pose to the society and users, the regulatory framework for IAM has been reinforced with additional safety requirements that are designed to ensure that the flight will not get to a stage where, for example, an unavailable destination vertiport/FATO will require rerouting to an alternate vertiport located at a 20- or 30-minute flight time from the destination. A VFR flight with VCA should be planned and executed in such a way so that at any point during the flight trajectory, even with degraded performance capabilities, the VCA will be able to reach a diversion vertiport or diversion location. Also, the flight should be planned and executed in such a way so that before reaching the destination, at the point of commitment, the PIC has more than one available safe landing option, reachable even with degraded performance capabilities.

It is very important to use realistic values for all fuel/energy planning categories within the individual operator's fuel/energy scheme (in particular, taxi, trip, additional, extra, and discretionary fuel/energy). It is already mandatory for operators to plan enough fuel/energy which takes into account delays caused by ATC flight control and other air traffic. Foreseeable energy needs (occupied FATO, ATC instructions) must be considered for taxi, trip, additional, extra and discretionary fuel/energy planning categories. Unforeseeable energy needs are covered by contingency fuel/energy.

It is within the competence of NCAs to influence the establishment of realistic fuel/energy schemes with sufficient margins on the basis of safety considerations through the mechanism of approval of fuel/energy planning categories, operators' selection of vertiports, diversion locations or safe landing options.

However, the two particular NCAs believe that the performance-based approach may lead to very low amounts of final fuel/energy reserves. Consequently, both NCAs propose setting a threshold for the final fuel/energy reserve, as follows:

'When, having taken into account all the considerations in point (c)(4) of UAM.OP.VCA.191, the determined final reserve fuel/energy results to be less than the amount of fuel/energy necessary to guarantee 5 minutes flying at the appropriate configuration/speed to perform the go-around and approach procedures, the operator should ensure that in no case the final fuel/energy reserve is less than the amount of fuel/energy necessary to guarantee 5 minutes flying at the appropriate configuration/speed to perform the go-around and approach procedure.'

Eventually, EASA has decided to accept the proposed threshold, considering that it will not have an impact on operators that, based on the value of the representative time provided by the manufacturer, plan anyway for a final/energy reserve of more than 5 minutes flight time. It is currently expected that the number of such operators will be higher than the number of operators whose representative time is less than 5 minutes due to, e.g., more performant aircraft. In the latter case,

the penalising effect of having to comply with a higher limit may be regarded as an additional safety margin.

2.4.1.2. Adequate diversion location

Several stakeholders referred to the concept of 'adequate diversion location', claiming that it raises several questions not fully addressed in the NPA, namely: if a diversion location is being simultaneously used as an aerodrome or a private airfield by other modes of aviation, what would be the rights and obligations of the VCA PIC, the landowner/user or any third-party user of the diversion location?

The rights and obligations of the owner of the diversion location or any third-party user are beyond the scope of the applicable regulation. Furthermore, a diversion location is neither an aerodrome nor a vertiport. It may be a football stadium, a parking lot, a grass field or other, exceptionally used to divert from the planned route when needed.

VCA operators should as a matter of priority use adequate vertiports for their normal operations and for diversion from the planned route, if necessary. However, due to infrastructural constraints, it is likely that no adequate aerodromes (vertiports) exist for the intended operation. In such cases, IAM operators may use pre-surveyed diversion locations.

Adequate (e.g. not occupied by other aircraft) pre-surveyed diversion locations must be available at the expected time of use. All adequacy requirements, technical conditions for the adequacy of the diversion location, and anticipated meteorological conditions must be taken into account by the PIC/operator in the pre-flight phase.

Before committing to land, the PIC needs to confirm that the diversion location is still available for landing and that current conditions are safe. Should a diversion location become unavailable, it is no longer considered adequate for the operation and the PIC should use another planned landing site. This means that in order to guarantee availability, the PIC/operator should take all reasonable measures already in the flight planning phase, and also in-flight, including the selection of more than one en-route diversion location within the CMP range, arrangements established with third parties that control the diversion location, and last but not least, only commence the flight provided the departure, destination and en-route diversion locations are above the specified minima by the time of use.

Having already addressed this in the adopted implementing rules, supported by AMC and GM, EASA believes that no additional guidance material is necessary to clarify the rights and obligations of the PIC, the landowner/user or any third-party user of the diversion location.

2.4.1.3. Operator conversion training and checking

Industry stakeholders suggested specifying different ways of how line flying under supervision (LIFUS) can be performed, also allowing for the use of FSTDs or for credits between different aircraft types.

Since LIFUS and line checks are not training flights, and for the time being it is not foreseen that VCA pilots will be issued with a type rating based on a zero flight-time training ('ZFTT') course, EASA cannot satisfy this request for the time being.

2.4.1.4. Single-pilot incapacitation in IAM operations with VCA

Today, operator procedures in the event of pilot incapacitation are required for both single-pilot and multi-pilot operations; however, relevant training (OCC, OPC, recurrent) is only prescribed for multi-pilot CAT, SPO and NCC operations with aeroplanes and helicopters.

EASA believes that, for single-pilot IAM operations with VCA and for VEMS operations with a technical crew member, suitable pilot incapacitation training may be provided excluding transfer of command, but including (self-)detection, making a correct stop/go decision, correctly applying relevant operator's procedures, etc.

Therefore, guidance material on pilot incapacitation training was included in NPA 2024-01. That guidance was of very general and informative nature, including possible training objectives. In addition, EASA invited interested parties to provide their opinion as to whether similar guidance needs to be included for single-pilot CAT, SPO and NCC operations with aeroplanes and helicopters.

Most of the commentators, except for two, were in favour to elaborate guidance on how to early identify possible pilot incapacitation and render it applicable also to other types of operations. At the same time, it was underlined that any change to the existing AMC and GM applicable to other types of operations will need to be properly considered by all interested parties. This is a task EASA takes on for future amendments to Regulation (EU) No 965/2012.

There was also criticism about the formulation of parts of the guidance material, which might be interpreted as AMC. EASA has, therefore, modified the text to avoid misinterpretation.

2.4.1.5. Flights over water

An operator asked for a change both in the adopted implementing rule (point UAM.IDE.MVCA.300) and the proposed guidance material regarding the new certification category for VCA called 'limited overwater certification'. The operator referred to the 'continued safe flight and landing' (CSFL) capability of the VCA which is meant to ensure an improved safety level, in case of CFP, compared to typical rotorcraft operations. Requiring limited overwater certification in addition to CSFL, for flights over water of more than 3 minutes' duration, appeared to be too demanding for that particular operator.

The reason EASA has decided not to amend the proposed guidance material at this stage is that not all VCA designs will be able to glide, and of those able to glide, not all will be equally suited to handle certain emergencies such as a potential partial or complete loss of power over water.

Limited overwater certification aims to provide for a certain level of crashworthiness over water to give the occupants a reasonable chance to survive in case of a ditching. It goes thus beyond the failures that are considered for CSFL. It provides for such protection without assumptions on the cause of the ditching, thus it does not cover specific aircraft features such as the glide capability.

2.4.2. Flight crew licensing (FCL)

In reaction to the comments received to NPA 2024-01[15], and following subsequent internal review, the following further amendments to the draft AMC and GM, as presented in that NPA, have been made:

[15] NPA 2024-01 - Introduction of a regulatory framework for the operation of drones — Enabling innovative air mobility with manned VTOL-capable aircraft | EASA

— In AMC1 Article 4f(2) and (3), the introductory phrase of point (b):

  — has been revised to refer to AMC1 FCL.725(a) in general (not only exclusively to the helicopter syllabus), since the appropriate theoretical knowledge topics should be selected from the syllabi for the different aircraft categories, like Article 4f foresees to select appropriate practical training exercises from the different syllabi in Part-FCL Appendix 9; and

  — has been complemented with the addition of a reference to OSD, to allow OSD to make specific determinations for theoretical knowledge needs with regard to a particular VCA type.

— In point (b)(2) of AMC1 Article 4f(2) and (3), the detailed training topic on the VCA's 'U-space capabilities and equipment' has been identified to not accurately address VCA operated by a pilot on board and has, therefore, been replaced by a more general and suitable training topic on 'general knowledge about U-space airspace', since general knowledge on that subject is considered relevant for any future (VCA) pilot.

— GM has been added to explain the applicability of the requirements of Part-FCL Appendix 9 related to the use of FSTDs for training, testing and checking.

2.4.3. Standardised European rules of the air (SERA)

Following the comments received on NPA 2024-01, the following can be stated in summary:

— Stakeholders welcomed the introduction of the term 'fuel/energy' and correctly identified that the term was not included in the title of point SERA.11012, while the content was amended. Respective corrections will be made in the context of future SERA amendments.

— Several commentators requested EASA to reconsider GM1 SERA.5001(***)(b) 'VMC visibility and distance from cloud minima'.

  EASA has decided not to change the proposal since it leaves the possibility to NCAs to decide for different minima, but NCAs are recommended to base their decision on actual safety-related data. EASA will support in parallel the collection and analysis of such data. Once available, respective changes to this GM could be made.

3. Expected benefits and drawbacks of the regulatory material

EASA assessed that intervention was required and that both new and amended AMC and GM are necessary to effectively address the issues described in Section 2.1, and to achieve the objectives described in Section 2.2.

The AMC and GM do not create any other impact beyond those identified by the proposed amendments to the related regulations. The assessment of these impacts was presented in NPA 2022-06 and in Opinion No 03/2023. They remain valid for the AMC and GM issued with these three Decisions.

Please, refer to Chapter 4 of NPA 2022-06[16] and to Section 2.5 of Opinion No 03/2023[17] for details.

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

[17] Opinion No 03/2023 - Introduction of a regulatory framework for the operation of drones — Enabling innovative air mobility with MVCA, the initial airworthiness of UAS subject to certification, and the continuing airworthiness of those UAS operated in the 'specific' category | EASA

4. Monitoring and evaluation

The regulatory material presented here will support the implementation of Regulation (EU) 2024/1111. EASA will monitor whether the established objectives are achieved as part of the monitoring and evaluation actions described in Chapter 5 of Opinion No 03/2023.

EASA plans to monitor the effective application of the AMC and GM at Advisory Body meetings and during standardisation inspections.

5. Proposed actions to support implementation

The regulatory material presented here will support the implementation of Regulation (EU) 2024/1111. EASA will support its implementation as part of the actions proposed in Chapter 6 of EASA Opinion No 03/2023.

In order to support affected stakeholders with the implementation of the new regulatory material, EASA plans to take any of the following actions, as applicable:

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

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

— Detailed explanations/clarifications on the EASA website

— Dedicated thematic workshops/sessions

— Combination of the above-mentioned actions